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CATALOGUE OF CANADIAN MINERALS
Revised 1980

R.J. TRAILL

Canada

1983

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CATALOGUE OF CANADIAN MINERALS REVISED 1980

INTRODUCTION

The first descriptive list of Canadian minerals was prepared by T. Sterry Hunt and published by the Geological Survey of Canada in Geology of Canada, 1863, *Report of Progress from Commencement to 1863*. Hunt's descriptions, which comprised 76 pages and included some 70 to 80 species were introduced as follows: "It is now proposed to notice in succession the various minerals, which have, up to the present time, been observed in the province. Under each species will be given the most interesting facts in its history, as far as regards its occurrence in Canada, its associations, and its chemical composition. Without attempting to follow a rigidly scientific classification we shall first notice the carbonates, sulphates, phosphates, and fluorides, and then proceed to the silicates; reserving for the last, the metallic ores and combustible minerals."

In 1889, G.C. Hoffmann's "Annotated List of the Minerals Occurring in Canada" appeared in *Transactions of the Royal Society of Canada*, Vol. VII, Sec. III, and was subsequently reprinted in *Annual Report of the Geological Survey of Canada* for 1889. The latter list, which included some 180 mineral species and an additional 95 varieties, was said to embrace "all such as have, up to date (July 31, 1890), been identified with any degree of certainty, as occurring in Canada." In addition to being an authoritative index as to the knowledge of Canadian mineralogy up to the date of its publication, the list served to indicate the progress that had been made in mineralogical investigations since the earlier report by Hunt. Hoffmann listed the minerals alphabetically, and made no attempt to list all occurrences of each mineral.

A quarter of a century later, in 1915, R.A.A. Johnston attempted to bring together in Geological Survey of Canada Memoir 74 as complete a list as possible of all notable occurrences of minerals so far recorded in Canada. This memoir contained about 260 mineral names in alphabetical order. Under each name a list of localities of occurrence was given for each province and territory. Literature references and the results of chemical analyses were noted where applicable, but descriptions of the occurrences were largely omitted.

During the half century that has elapsed since publication of Johnston's memoir much has been learned about Canadian minerals and mineral localities and a large part of that knowledge lies buried in the host of publications that now constitute the scientific record. The need to undertake a new revision of the Geological Survey of Canada list of Canadian mineral occurrences became evident from the increasing difficulty encountered in supplying adequate answers to the many enquiries that are received for such information. This need was further emphasized by the National Advisory Committee on Research in the Geological Sciences and the Mineralogical Association of Canada, and accordingly, the Geological Survey of Canada in 1958 instituted a project to update the Canadian mineral record.

Paper 69-45, *A Catalogue of Canadian Minerals*, was published in 1970. It contained information on several thousand occurrences of 450 different mineral species. Paper 73-22, *A Catalogue of Canadian Minerals*, Supplement I, published in 1974 recorded many more occurrences and added 112 minerals to the growing list of mineral species found in Canada. Revised Edition, 1980, was prepared in order to correct many errors found in the earlier catalogue; to convert all measurements to the metric system; and to incorporate new data compiled since 1974.

In the preparation of *A Catalogue of Canadian Minerals*, a search of literature dealing with Canadian minerals was made, and it became apparent as the compilation progressed that for many common minerals it would be impractical to attempt to record all reported localities of occurrence. An arbitrary list of common minerals was drawn up and occurrences of these were not recorded unless the reference contained either analytical data or some feature likely to be of particular interest, such as distinctive physical properties, unusual associated minerals or mode of occurrence, economic value, or use as a gemstone or decorative stone. Occurrences of hydrocarbons, rocks, coal, petroleum and natural gas were not compiled.

The minerals are listed in alphabetical order and, for each mineral, the localities of occurrence are subdivided according to province or territory in alphabetical order and in increasing numerical order of the NTS index system. Each entry consists of the NTS number, normally equivalent to a 1:50,000 map sheet reference; a more detailed description of the location; a brief account of the information pertinent to the mineral found at that locality; and a reference to the source of information. A geographical listing by province or territory of minerals found within each NTS 1:50,000 quadrangle is given as an appendix.

ACANTHITE

Ag_2S

Acanthite, the orthorhombic form of Ag_2S, is stable at temperatures below 180°C. Argentite, the cubic form, is stable only at temperatures above 180°C. All occurrences of argentite are therefore valid for acanthite and are so recorded here. Most acanthite probably crystallized originally as argentite and inverted to acanthite on cooling. Pseudomorphs of acanthite after argentite are common. Orthorhombic crystal forms have not been noted in Canadian occurrences.

British Columbia

82 E/2 Argentite has been noted in association with silver and gold at the Jewel and other mines in the Greenwood Mining Division (R. Bell, 1902-3: Geol. Surv. Can., Ann. Rept., XV, 127A).

82 E/4 Acanthite, tetrahedrite, pyrargyrite, cerargyrite, galena, sphalerite, pyrite and chalcopyrite occur as irregular concentrations and bands within a vein system extending from the Similkameen River road to Richter Creek at 49°03'N, 119°41'W, 16 km west-northwest of Osoyoos on Richter Mountain (B.C. Dept. Mines and Pet. Res.; Geol., Exp. and Mining in B.C., 1973, p. 43).

82 E/6 Jet black acanthite, with a brilliant lustre which fades on exposure, occurs as coatings along joints and minor faults and as masses and crystals in vugs at the Highland Bell Mine, Wallace Mountain, near Beaverdell, 37 km east of Penticton. Chemical analyses by R.M. Williams: crystallized acanthite, S.G. 7.24 ± 0.04, Ag 86.37, Cu 0.23, Fe 0.25, Zn 0.40, Sb trace, S 12.72, total 99.97; massive acanthite, S.G. 7.00-7.21, Ag 86.14, Cu 0.36, Fe 0.21, Zn 0.31, Sb 0.57, S 12.39, total 99.98 (A.B. Staples and H.V. Warren, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 32).

82 F/6 Argentite has been found at the Silver King Mine, Toad Mountain, about 8 km south of Nelson (G.M. Dawson, 1896: Geol. Surv. Can., Ann. Rept., IX, 27A).

82 F/14
82 K/3 At the Slocan mining camp, argentite is present as a primary mineral associated with argentiferous galena, and has been observed in megascopic amounts in ores from the Capello, Wilmer, Black Grouse, Silver Glance, Boomerang, Howard Fraction and Meteor properties. It is found in considerable masses as a supergene mineral replacing galena at the Hewitt Mine, and as films associated with native silver coating joint fractures at the Molly Hughes, Comstock-Virginia and Republic properties (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 123).

82 K/3 Quartz veins containing acanthite and tetrahedrite with minor galena and sphalerite occur at 50°04'N, 117°12'W, 14.4 km northeast of New Denver on the southeast slope of London Ridge, covering the headwaters of Watson Creek at about 1980 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 82).

82 K/4 A fractured quartz vein bearing galena, sphalerite and acanthite has been found at 50°05'N, 117°48'W, 16.8 km south of Nakusp, at the headwaters of Mineral Creek at about 1950 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 91).

82 M/4 Galena, argentite, sphalerite and minor chalcopyrite are reported at 51°05'N, 119°45'W, at an elevation of 760m on the west side of Adams Lake, 40 km southeast of Barriere. Argentite has also been reported with barite, tetrahedrite, galena, sphalerite, pyrite, chalcopyrite and minor native silver at claims at an elevation of about 900 m on Homestake Creek (51°06.7'N, 119°49.5'W) 4.8 km west of Skwaam Bay (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 86-87).

103 P/12 Argentite occurs in bluish vuggy quartz associated with pyrite, galena, sphalerite, pyrargyrite, native silver, chalcopyrite, tetrahedrite, polybasite and argyrodite, at the Dolly Varden Mine, 29 km from the head of Alice Arm, near the headwaters of the Kitsault River, Skeena mining division (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 545).

Newfoundland

12 A/15 Argentite occurs with native silver and bornite in fractures in the ore at the Buchans Mine (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 106).

Northwest Territories

86 F/12 At the How Group, Camsell River Silver Mines, located on Camsell River about 32 km south of Great Bear Lake, argentite occurs in dolomite-quartz gangue associated with galena, chalcopyrite, pyrite, sphalerite, bismuth, argentiferous bismuthinite, silver, tetrahedrite, marcasite and an unidentified cobalt-nickel-arsenic sulphide (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 547).

86 K/4 Acanthite, native silver and argentian galena are the main sources of silver at the Echo Bay Mines property located 1.6 km northeast of Port Radium (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 42).

86 L/1 A rare constituent of the ore at the Eldorado Mine, Great Bear Lake, argentite occurs as inclusions in native silver, and is also associated with tetrahedrite which has been partly replaced by pyrargyrite (Ellis Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 47).

Nova Scotia

21 H/1 Argentite is the source of silver found at the Magnet Cove barium-lead-zinc-silver deposit, 4 km southwest of Walton. The deposit is located in the brecciated zone between two faults and is composed of sulphides and sulphates (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104).

Ontario

31 M
41 P

Most of the cobalt-nickel-silver deposits in the Cobalt-Gowganda area contain argentite. It is less common and occurs in smaller quantity than silver. While usually without crystal form, it occasionally occurs as well developed crystals of larger size than those of any other metallic minerals in the veins. Paragenetically, argentite is closely associated with silver, bismuth and dyscrasite, filling fractures in earlier smaltite, niccolite and calcite. Some argentite found as hair-like crystals in vugs and open spaces in the lower, nonproductive workings of the mines appears to be of secondary origin. Occurrences have been reported in the townships of Coleman, South Lorrain, James, Tudhope, Speight, Whitson, Auld, Cane, Casey, Ingram, Harris, Pense, Haultain and Miller (W.G. Miller, 1913: Ont. Bur. Mines, Ann. Rept., vol. 19, pt. II).

The association of argentite and silver is very intimate in specimens from the Cobalt area. Close examination of silver specimens revealed the presence of argentite usually as thin coatings or scales attached to the surface of the silver. Coatings of ruby silver are also common. Minute argentite inclusions in leaf silver were also noted.

A specimen of argentite from the Casey-Cobalt Mine showing good crystal surfaces embedded in cleavable calcite was examined by H.V. Ellsworth. Two distinct habits were noted: (1) simple half octahedrons attached vertically to the argentite mass, the plane of attachment corresponding to the direction of a cube face; and (2) somewhat tabular forms which proved to be combinations of the rhombic dodecahedron, cube, icositetrahedron, trisoctahedron and tetrahexahedron. Chemical analysis of part of the specimen: Ag 86.80, S 13.01, Fe 0.08, SiO_2 0.16, Sb trace, total 100.05. A specimen of argentite from the O'Brien Mine, having a peculiar iridescent tarnish resembling that of bornite was analyzed in the belief that the tarnish might indicate some variation in composition. It proved to be ordinary argentite. Chemical analysis: Ag 86.91, S 12.86, Sb or As trace, Cu trace, Co trace, insol. trace, total 99.77 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, pp. 205-8).

Masses of argentite weighing several pounds and crystals ranging in size from 3 to 20 mm were described from the Frontier and Keeley mines, 32 km southeast of Cobalt in South Lorrain Township. The crystals were commonly frosted, rough, and somewhat rounded. The common forms were cube, octahedron, and combinations of these. Twinning according to the fluorite law was common. The argentite occurred with native silver, stephanite and arsenides of cobalt, nickel and iron in a calcite gangue (T.L. Walker, 1930: Univ. Toronto Stud., Geol. Ser., 29, p. 14).

42 A/6

Argentite is reported with native silver in barite veins on the property of the Premier Langmuir Mining Company in the Township of Langmuir along the south boundary and immediately west of Night Hawk River (W.G. Miller, 1913: Ont. Bur. Mines, Ann. Rept., vol. 19, Pt. II).

42 A/8

Argentite is one of several silver minerals reported to have been mined at the Ross Mine located in the community of Holtyre, 8.8 km from Highway 11. The mine produced gold and silver (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 111).

42 A/11

Acanthite is an accessory mineral in the ores of the Kidd Creek Mine, lots 3 and 4, conc. V, Kidd Township, about 27 km north of Timmins (R.R. Walker, A. Matulich, A.C. Amos, J.J. Watkins and G.W. Mannard, 1975: Econ. Geol., 70, p. 80).

52 A/3
52 A/6
52 A/7

Argentite has been noted at a number of old silver deposits near the shores of Thunder Bay, Lake Superior. It was reported to be more common than native silver particularly at depth in the ore bodies. The vein-filling material consisted of quartz, barite, calcite, dolomite and fluorite containing a variety of metallic minerals including: sphalerite, galena, pyrite, marcasite, pyrrhotite, chalcopyrite, arsenopyrite, niccolite, domeykite, tetrahedrite, animikite, argentite, silver and bismuth. Other reported minerals include: graphite, erythrite, annabergite, malachite, azurite, witherite, cerargyrite and rhodochrosite. Specific localities mentioned were: Silver Islet off Thunder Cape; Beaver in O'Connor Township; Silver Mountain in Lybster Township; Badger and Porcupine in Gillies Township; Prince's Mine on Spar Island and adjacent mainland; Jarvis and McKellar islands; and Rabbit Mountain Mine (E.D. Ingall, 1887: Geol. Surv. Can., Ann. Rept. III, H. G.C. Hoffmann, 1889-90: Geol. Surv. Can., Ann. Rept., IV, 20 T. W.G. Miller, 1913: Ont. Bur. Mines, Ann. Rept., vol. 19, Pt. II, 197-210). Chemical analysis of an argentite crystal from Thunder Bay: Ag 86,44, S 13.37, Cu trace, total 99.81, S.G. 7.31 (E.J. Chapman, 1888: Minerals and Geology of Ontario and Quebec, Copp Clark Company, Toronto).

52 E/9

A specimen of argentite in the Royal Ontario Museum mineral collection is from a gold-bearing quartz vein, Sultana Mine, Sultana Island, Lake-of-the-Woods (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 44).

Saskatchewan

63 L/10

Acanthite is a minor constituent of the Western Nuclear Mine orebody which consists mainly of galena and sphalerite. The orebody lies beneath Hanson Lake, 180 m east of the shore between Bertrum Bay and McIlvenna Bay (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 17).

Yukon

105 D/2

Acanthite occurs with native silver, pyrargyrite, galena, pyrite, arsenopyrite and tetrahedrite in quartz veins at the Montana Mine property of Arctic Gold and Silver Mines Limited at Montana Mountain, near Carcross (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 59).

105 M/13

Argentite occurs associated with native silver, freibergite and argentiferous galena containing dots and blebs of ruby silvers at the Elsa Mine on the north facing slope of Galena Hill, Mayo District (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 507).

105 M/14

At the Lucky Queen Mine in the Keno Hill-Sourdough Hill area, Mayo District, argentite is associated with native silver and pyrargyrite in ore shoots in which siderite, galena, sphalerite and freibergite are the principal hypogene minerals. For description of the vein system, see R.W. Boyle (1956): Geol. Surv. Can., Paper 55-30, pp. 19-22.

115 I/3 Acanthite was identified in specimens collected from the surface at the Webber showing of Mount Nansen Mines Limited on the ridge between Nansen and Victoria Creeks, at 62°03'30"N, 137°10'30"W (L.H. Green, 1965: Geol. Surv. Can., Paper 65-19, p. 32).

Acmite

(see AEGIRINE)

ACTINOLITE

$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$

Actinolite and tremolite constitute a calcium-magnesium-iron series of monoclinic amphiboles in which tremolite is the iron-free end member and actinolite has a significant and variable iron content. Actinolite is of widespread occurrence in Canada, often formed as a result of contact metamorphism. It is frequently a major constituent of metamorphosed impure limestones and shales, crystalline schists, and greenstones, and is a common gangue mineral in ore deposits. Nephrite jade, consisting of randomly oriented fine fibres of actinolite or tremolite, is valued as a gemstone for its toughness and attractive green colour. Asbestiform actinolite has been mined commercially as a source of asbestos.

British Columbia

The following occurrences of jade are noted by S. Leaming in Geol. Surv. Can., Paper 72-53, pp. 43-52.

92 H/6 Boulders have been found along the Coquihalla River from Jessica to the confluence with the Fraser River. The best occurrences are on Sawaqua Creek.

92 H/13 Boulders occur in the drainage basin of Nahatlach River.

92 J/15
92 J/16 Jade is found in place at the head of Hell Creek, a tributary of Bridge River about 3.2 km upstream from the confluence with Yalakam River; also up Brett Breek which flows into Marshall Creek about 9.7 km from the Bralorne Road; and at Noel Creek near the Bralorne Mine.

93 K/14 Good quality jade is produced from the Jade Queen Mine, near the head of O'Ne-ell Creek on the north side of Mount Sidney Williams, about 80 km north-northeast of Burns Lake.

93 N/13 A bedrock jade deposit has been developed by Teegee Explorations on Mount Ogden, about 87 km west-northwest of Manson Creek. Several large blocks of jade have also been mined at a deposit about 3.2 km northwest of the Teegee deposit by Far North Jade Mines.

104 I/7 A considerable amount of jade has been produced commercially from boulders along Wheaton Creek.

104 J/16 Boulders of jade are present along Thibert Creek, and in the creek at Sawmill Point on the east side of Dease Lake.

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104 I/7 The area southeast of Letain Lake near the headwaters of Kehlechoa River contains several lode, talus and alluvial deposits of jade. (S.F. Leaming, 1977: Geol. Surv. Can., Paper 77-1A, p. 297).

104 P/5
104 P/6 Nephrite jade is associated with the serpentine at the Cassiar Asbestos Mine on the west flank of McDame Mountain. It is recovered and marketed in Cassiar. Jade and rhodonite are recovered from the gravels of Snowy Creek in the vicinity of the Cassiar Road, which bridges the creek at Km 123.3. Jade, rhodonite and gold are recovered from the gravels of McDame Creek at Centreville by Centreville Placers Limited of Cassiar (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, pp. 26-27).

Northwest Territories

86 O/13 Boulders of nephrite have been found in the stream gravels of the Rae River in the Coronation Gulf region (John Sinkankas, 1959: Gemstones of North America, D. Van Nostrand Company, New York).

Ontario

31 C/11 Asbestiform actinolite was mined at intervals from 1883 to 1927 from a large mass about 4.8 km east of the village of Actinolite in Elzevir Township.

31 F/7 Dull green bladed actinolite occurs with silvery green foliated chlorite at the Bluff Point Mine, an old magnetite deposit located 2.4 km south of Calabogie (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 8).

31 F/15 Chemical analysis of a light greenish, finely fibrous, massive actinolite from Westmeath Township, Renfrew County: SiO_2 56.70, Al_2O_3 1.62, Fe_2O_3 3.06, FeO 7.19, MnO 0.30, NiO 0.54, MgO 17.20, CaO 10.62, Na_2O 0.64, K_2O 0.24, H_2O (at 100°C) 0.64, H_2O (above 100°C) 2.05, total 100.80, S.G. 2.941 (at 15.5°C) (G.C. Hoffmann, 1892-3: Geol. Surv. Can., Ann. Rept., VI, 15 R).

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Specimens of actinolite are present in the Royal Ontaio Museum mineral collection from the following localities:

31 C/5 Highway 7, 3.2 km east of Marmora, lots 6-7, conc. VII, Marmora Township;
31 C/11 near Flinton, and lot 13, conc. XI, Kaladar Township;
31 C/13 3.2 km southeast of Wollaston Lake, conc. III, Wollaston Township;
31 C/14 lot 24, conc. X, Barrie Township;
31 C/15 near Sharbot Lake, Oso Township;
31 D/10 Adair occurrence, lot 3, conc. A, Somerville Township;
31 D/16 Highway 507, 0.8 km south of Gooderham, lot 25, conc. V, Glamorgan Township;
31 E/1 lot 23, conc. VIII, Dysart Township;
31 E/1 lot 33, conc. XIV, Monmouth Township, 2 km south of Wilberforce;
31 E/5 lot 23, conc. XIV, Monteith Township;
31 F/3 lot 34, conc. IV, Lyndoch Township;
31 F/5 near Maple Leaf, Wicklow Township;
31 F/7 Buckhorn occurrence, lot 30, conc. IV, Bagot Township;
41 I/6 Crean Hill mine, lot 5, conc. V, Denison Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, pp. 19-20)

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Quebec

21 E/13 White fibres of actinolite up to 30 cm long have been found in granitic dykes at the Jeffrey Mine, lots 9-10, ranges II-III, Shipton Township, Richmond County, at 45°46'25"N, 71°57'12"W. Electron microprobe analysis: SiO_2 53.32, TiO_2 0.04, Al_2O_3 0.89, Fe_2O_3 1.19, FeO 17.00, MnO

0.37, MgO 12.01, CaO 11.97, Na_2O 0.09, K_2O 0.10, H_2O 2.18, total 99.16 (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

21 L/2 Chemical analysis of finely fibrous actinolite which forms large beds of tough greenish rock in the Township of St. Francis (Beauceville), Beauce County: SiO_2 52.30, Al_2O_3 1.30, FeO 6.75, NiO trace, MgO 21.50, CaO 15.00, volatile 3.10, total 99.95 (T. Sterry Hunt, 1863: Geol. Surv. Can., Geology of Canada).

31 G/5 Dark green bladed aggregates of actinolite are found in the area north of Aylmer and Hull, notably in roadcuts along the Gatineau Parkway; at the Laurentide, Headley, Cliff and Wallingford mines; and at the Payne property. Bluish grey amphibole asbestos is abundant at the Wallingford mine. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 5, 7, 8, 9, 10, 13.)

31 G/12 Bluish grey compact fibrous masses of actinolite asbestos occur at the Lake Girard Mine near St-Pierre-de-Wakefield. Dark green crystals of actinolite are also plentiful. (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 25.)

31 G/12 In the area between Hull and St-Pierre-de-Wakefield, actinolite crystals are abundant at the Nellie and Blanche, Blackburn, Dacey, Breckin and Deziel mines and at the Templeton quarry. (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 17, 18, 21, 28, 30.)

31 G/12 Dark green actinolite is associated with black tourmaline crystals, brown sphene, pink calcite, pyrite and mica in quartz-feldspar dykes that traverse pyroxenite at the Jackson Rae Mine near Perkins Mills. Actinolite also occurs at the Little Rapids (Watts) Mine near Glen Almond. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 13, 30.)

31 H/8 At the Orford Marble Company quarry green masses of acicular actinolite are associated with deep red calcite cut by green and white calcite veins. The quarry is about 4 km from the St-Elie-Bonsecours road. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-15, p. 17.)

31 H/11 Green radiating actinolite is associated with patches of massive pyrrhotite on hornfels, at the Dulude Quarry north of St-Bruno (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 55).

31 H/11 At the Mont St-Hilaire Quarry, also known as the Desourdy Quarry, on the north side of Mont St-Hilaire, actinolite is present as light to dark green, colourless to light brown, acicular and elongated prismatic crystals and in massive form (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 57).

31 J/12 Roadcuts on both sides of Highway 35 north of St-Aimé show dark green bladed actinolite occurring with striated prismatic aggregates of colourless to light green scapolite (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 55).

Yukon

105 H/4
105 H/5 Nephrite jade has been found in situ in the Camsell Range near Frances Lake. Deposits have been staked at the 1700 m level about 4.8 km due west of Mile 81 (Km 130) on the Campbell Highway, and at the 1700 m level about 11.3 km due west of the Campbell Highway at Mile 97 (Km 155.7) (Ann P. Sabina, 1973: Geol. Surv Can., Paper 72-32, p. 23).

115 I Fine specimens of jade were collected from gravel bars in the Yukon River upstream from the junction of the Pelly River (G.M. Dawson, 1887-8: Geol. Surv. Can., Ann. Rept., III, 38 B).

116 B/3 Asbestiform actinolite has been found on the Klondike River about 2.4 km from its junction with the Yukon River (G.C. Hoffmann, 1902: Geol. Surv. Can., Ann. Rept., XV, 432 A).

AEGIRINE

$NaFeSi_2O_6$

Aegirine is a rare soda pyroxene found in alkali rocks such as nepheline syenite, soda granite soda aplite, and phonolite. Aegirite is a synonym. The name, acmite, is used by some people to characterize the yellow-brown variety. Others have referred to sharply pointed crystals as acmite, and bluntly terminated crystals as aegirine.

British Columbia

104 O/3 Acmite is a constituent of partly-spherulitic rhyolite dykes that are associated with the Glundebery batholith at the southeastern part of the Atsutla Range. It occurs mainly as small equant grains and stout prisms disseminated throughout the spherulites, and is also present as stout radiating fibres in the matrix of the rock. The soda amphibole, riebeckite, is closely associated with aegirine in the spherulites (W.H. Mathews and K.D. Watson, 1953: Am. Mineralogist, 38, p. 435).

Newfoundland

13 K/5 Aegirine occurs with beryllium mineralization in alkali syenite at Seal Lake, Labrador. Most of the mafic minerals are in clusters, vein-like aggregates, or disseminated microlites. Riebeckite replaces aegirine (E.W. Heinrich and R.W. Deane, 1962: Am. Mineralogist, 47, p. 758).

Ontario

31 L/5 Acmite occurs in carbonatite at the Nova Beaucage Mine on the east end of Newman Island, one of the Manitou Islands in Lake Nipissing, 10.4 km southwest of the wharf at North Bay (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 83).

41 I/2 An occurrence of acmite in Bigwood Township, 6.4 km below French River station on the Canadian Pacific Railway, has been described. It occurs in nepheline syenite as radiating tufts and bunches of yellow-green fibres up to 2.5 cm long. Chemical analysis by H.C. Rickaby: SiO_2 52.63, Al_2O_3 3.30, TiO_2 0.35, Fe_2O_3 29.72, FeO 0.64, CaO 0.18, MgO 0.69, MnO trace, Na_2O 11.66, K_2O 0.54, H_2O 0.26, total 99.97 (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 11).

Quebec

31 H/5
31 H/12 Acmite is reported to be an important constituent of some of the nepheline syenites near Montreal in Hochelaga County, and Beloeil in Rouville County (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 15 T).

31 H/11 Aegirine is one of the principal minerals in veins that transect nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

32 I/14 A gneissic nepheline syenite containing up to 10 per cent aegirine outcrops along the Metawishish River (50°51'N, 73°01'W) north of Lac Grenier, about 19.3 km east of Lac Albanel. Associated minerals are: potash feldspar, nepheline, cancrinite, biotite and hastingsite. The syenite is partly garnetiferous (J.M. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 14).

AEGIRINE - AUGITE

$(Na, Ca)(Fe^{+++}, Fe^{++}, Mg, Al)Si_2O_6$

This soda pyroxene mineral forms a solid solution series with the aegirine end member having the formula $NaFe^{+++}Si_2O_6$.

Alberta

82 G/9 Electron probe analyses of zoned phenocryst from a blairmorite in the Crowsnest volcanics: core - SiO_2 50.03, Al_2O_3 1.44, Fe_2O_3 2.95, FeO 15.99, CaO 20.98, MgO 6.42, Na_2O 2.02, K_2O 0.03, MnO 0.63, TiO_2 0.62, total 101.11; rim - SiO_2 48.95, Al_2O_3 0.97, Fe_2O_3 8.81, FeO 15.11, CaO 15.29, MgO 2.55, Na_2O 4.01, K_2O 0.03, MnO 0.62, TiO_2 0.89, total 97.22. FeO and Fe_2O_3 were calculated from the total Fe determination (T.H. Pearce, 1970: Can. Jour. Earth Sci., 7, p. 46).

Newfoundland

13 K/5 Aegirine - augite is found with arfvedsonite in paragneiss at beryllium deposits in the vicinity of Ten Mile Lake, in the Seal Lake area of Labrador. The minerals occur predominantly in layers up to several millimeters thick but also as individual grains in feldspar. Chemical analysis by Miss E. Mark: SiO_2 50.96, BeO 0.20, Al_2O_3 2.52, TiO_2 2.70, Nb_2O_3 1.04, Fe_2O_3 18.53, FeO 7.56, MgO 0.31, MnO 1.01, Na_2O 10.34, CaO 3.46, K_2O 0.51, $H_2O(+110°)$ 0.36, $H_2O(-110°)$ 0.04, F 0.51, Total 100.05 less O for F 0.21, 99.84. S.G. 3.517 (E.H. Nickel and E. Mark, 1965: Can. Mineralogist, 8, p. 185-197).

AENIGMATITE

$Na_4(Fe_{10},Ti_2)Si_{12}O_{40}$

British Columbia

104 G/10 Aenigmatite is an ubiquitous constituent of peralkaline end members of the Mt. Edziza volcanic complex. It occurs as phenocrysts in rhyolite, ash falls and obsidian, and in the groundmass of trachytes. Associated minerals are aegirine, aegirine-augite and arfvedsonite. Electron microprobe analyses of aenigmatites, phenocryst (A) and groundmass (B) gave: (A) - SiO_2 40.7, TiO_2 8.3, Al_2O_3 0.72, FeO 41.1, MnO 0.85, MgO 0.11, CaO 0.50, Na_2O 7.2, K_2O 0.03, total 99.51; (B) - SiO_2 41.7, TiO_2 6.95, Al_2O_3 0.29, FeO 42.3, MnO 0.71, MgO 0.11, CaO 0.32, Na_2O 7.2, K_2O 0.11, total 99.69 (K. Yagi and J.G. Souther, 1974: Am. Mineralogist, 59, p. 820).

104 J/6 Reddish brown crystals up to 2 mm long occur in vugs with amethystine quartz in a light grey sugary latite in a rock butte in the wide pass at the head of Beatty Creek, about 800 m east of Meszah Peak, Level Mountain, Stikine River area (E.A. Ostinsoe, 1960: Univ. of B.C. Thesis, Level Mountain Northwestern British Columbia).

AESCHYNITE

$(Ce,Ca,Fe,Th)(Ti,Nb)_2(O,OH)_6$

Ontario

31 E/1 Eschynite-priorite is reported at the Patterson occurrence on lots 12 and 18 conc. XVI, Herschel Township. (R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 18, p. 94)

41 H/15 Eschynite-priorite occurs in granite pegmatite on lot 3, conc. A, Henvey Township. (D.F. Hewitt, 1960: private communication)

Quebec

31 J/5 Eschynite and several other radioactive minerals were reported in a pegmatite sill on the property of Opawica Explorers Limited, Kensington Township. (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept. 80, p. 42)

agate

(see QUARTZ)

AGRELLITE

$NaCa_2Si_4O_{10}F$

Quebec

31 L/16 A new mineral, agrellite, named after Dr. Stuart Agrell, University of Cambridge, England, is described from Kipawa River, Villedieu Township, at 46°47'49" N, 78°29'31" W. It occurs in pegmatitic pods in mafic gneiss and is associated with eudialyte, hiortdahlite, mosandrite, miserite, britholite and vlasovite. Chemical analyses; (1) by J. Gittins, SiO_2 57.99, TiO_2 0.01, Al_2O_3 1.32, Fe_2O_3 0.11, MnO 0.25, CaO 25.70, SrO 0.16, BaO 0.06, MgO 0.02, ZrO_2 0.18, RE 2.57, Na_2O 7.90, K_2O 0.22, H_2O^+ 0.4, F 4.45, total 101.14 less O for F 1.87, total 99.27. (2) by A.W. Bykova, SiO_2 57.90, Al_2O_3 0.80, Fe_2O_3 0.42, MnO 0.20, CaO 26.43, RE 3.84, Na_2O 7.13, K_2O 0.20, H_2O^+ 0.17, F 4.60, total 101.69 less O for F 1.93, total 99.76 (J. Gittins, M.G. Bown and D. Sturman, 1976: Can. Mineralogist, 14, p. 120).

AIKINITE

$Pb\ Cu\ BiS_3$

British Columbia

82 F/6 Aikinite is found with pyrite, chalcopyrite, sphalerite, tetrahedrite, galena, scheelite, gold and silver at the Golden Age (Euphrates) property at 49°23' N, 117°13' W, 12 km south-southeast of Nelson, astride Highway 6 between 900 m and 1200 m elevation (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1973, p. 65).

93 L/2 A sample of Cu-Pb-Ag-Zn ore from a prospect near Owen Lake, northwest of the west end of Francois Lake was found to contain minor amounts of aikinite. Tennantite, berryite, matildite and gold are also present. Electron microprobe analysis of the aikinite gave: Pb 36.2, Cu 10.8, Bi 35.6, S 16.9, total 99.5. (D.C. Harris and D.R. Owens, 1973: Can. Mineralogist, 11, p. 1016)

103 P/6 Aikinite occurs with cosalite, nuffieldite, molybdenite and pyrite in vugs in narrow quartz veins in the Lime Creek quartz diorite stock on the property of B.C. Molybdenum Corporation, 9.6 km southeast of the town of Alice Arm (P.W. Kingston, 1968: Can. Mineralogist, 9, p. 439-452).

New Brunswick

21 G/7 At the Mount Pleasant deposit of Brunswick Tin Mines, Limited, aikinite occurs as microscopic inclusions in galena and as separate tiny grains (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

21 O/8 A few grains of aikinite were observed in polished sections of ore from the Wedge mine. The identification was made by X-ray diffraction pattern. The mine is on the north side of the Nepisiguit River. (X-ray Laboratory, Geol. Surv. Can.)

Ontario

31 M/5 Aikinite has been identified by the X-ray powder diffraction method in specimens from the Silanco and Aguanico Mines, Cobalt (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 M/5 A specimen of aikinite from the Silver Miller Mine, lot 2, conc. III, Coleman Township, is in the mineral collection of the Royal Ontario Museum. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 22)

AKERMANITE

$Ca_2MgSi_2O_7$

Quebec

31 G/9 At the Molybdenum Corporation of America property, Oka district, Two Mountains Country, akermanite is a major constituent of the silica deficient rock, okaite, where it is associated with lesser amounts of nepheline, magnetite, biotite, calcite and perovskite. The akermanite is altered in places to fine-grained vesuvianite. (R.B. Rowe, 1955: Geol. Surv. Can., Paper 54-22, p. 12).

31 G/9 Tan coloured akermanite occurs as grains and patches in calcite rock at the Oka Rare Metals Mine (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 61).

ALABANDITE

MnS

British Columbia

104 P/5 Alabandite has been noted in a vein cutting dolomitized limestone between the headwaters of McDame and Cottonwood Creeks at an elevation of 1,830 m. The vein material is composed chiefly of galena, sphalerite, and magnetite. Pyrrhotite, marcasite, arsenopyrite, dyscrasite, and native antimony are also present. Alabandite occurs as irregular grains up to 4 mm in size, and as what appear to be exsolution laths in sphalerite (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 527).

alabaster

(see GYPSUM)

albertite

(see HYDROCARBONS)

ALBITE

$NaAlSi_3O_8$

Albite is a member of the plagioclase, or soda-lime, feldspar series which together with potash feldspar constitute about 60 per cent of the igneous rocks. The plagioclase feldspars vary in composition between the end members $NaAlSi_3O_8$ and $CaAl_2Si_2O_8$. Albite has been defined as that part of the series containing from 90 to 100 per cent of the $NaAlSi_3O_8$ molecule and 0 to 10 per cent $CaAl_2Si_2O_8$. Albite usually contains small amounts and may contain about 15 per cent of the potash feldspar molecule, $KAlSi_3O_8$. There are two structural modifications depending upon the temperature of formation. Low-temperature albite occurs in gneisses and schists and in acid plutonic rocks such as pegmatites, granites and syenites. The less common high-temperature modification occurs as phenocrysts in acidic extrusive rocks. Cleavelandite is a platy variety of albite frequently found in pegmatite veins. Peristerite, an iridescent variety valued as a gemstone, derived its name from the Greek for pigeon, because of the resemblance of its iridescence to the play of colours on the neck feathers of the pigeon.

Manitoba

52 L/5 Cleavelandite, a variety of albite, occurs in the cesium-lithium ore mined at Bernic Lake (R. Brinsmead, 1960: Precambrian, vol. 33, No. 8, p. 19).

52 L/6 Bands of cleavelandite up to 30 cm thick occur in the Silver Leaf pegmatite in the Winnipeg River area, about 1.6 km southwest of Winnipeg River at a point 6.4 km east of Lamprey Falls. Chemical analysis of a clear white mass containing some glassy quartz; SiO_2 67.76, Al_2O_3 20.61, CaO 0.06, Na_2O 11.14, K_2O 0.13, H_2O 0.10, total 99.80; S.G. 2.626 (V.B. Meen, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 37).

Nova Scotia

21 A/10 Chemical analysis of albite from a pegmatite first examined in 1903 on the Reeves farm located about 4.8 km west of New Ross in Lunenburg County. Analysis by E.W. Todd: SiO_2 67.62, Al_2O_3 20.02, Fe_2O_3 0.05, Na_2O 11.44, K_2O 0.30, CaO 0.32, H_2O 0.16, total 99.91; S.G. 2.603 (by pycnometer) (T.L. Walker and A.L. Parsons, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 46).

Ontario

31 C/7 Attractive specimens of pale red peristerite have been collected from the Burnham pegmatite deposit, conc. X, lot 3, Portland Township, Frontenac County (H.S. Spence, 1930: Am. Mineralogist, 15, p. 436).

31 C/16 Chemical analysis of peristerite from lot 19, conc. IX, Bathurst Township, by T. Sterry Hunt: SiO_2 66.80, Al_2O_3 21.80, K_2O 0.58, Na_2O 7.00,

CaO 2.52, MgO 0.20, Fe_2O_3 0.30, volatiles 0.60, total 99.80; S.G. 2.635 (Geol. Surv. Can., Geology of Canada, 1863).

31 D/9 A pegmatite vein which outcrops along the shore of Stoney Lake near the shore of Eel Creek in Burleigh Township, Peterborough County, is reported to have contained peristerite (E. Coste, 1887-8: Geol. Surv. Can., Ann. Rept. III, 75 S).

31 E/1 Good specimens of colourless to pale flesh-red to fawn coloured peristerite have been described from pegmatite deposits a few km east of Wilberforce in the north half of Cardiff Township, Haliburton County (A.L. Parsons, 1934: Univ. of Toronto Stud., Geol. Ser., 36, p. 17).

31 E/9 Pink peristerite and grayish pink sunstone suitable for lapidary purposes occur at the J.G. Gole quarry about 3.2 km north of Madawaska along the Victoria Lake-McAuley Lake Road (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 54).

31 E/14 A yellowish white cabochon, somewhat less transparent but with more brilliant fire than moonstone from Ceylon, has been cut from persisterite collected near Sundridge in Strong Township, Parry Sound district (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 77).

31 F/4 Chemical analysis of flesh-coloured peristerite from Monteagle Township, probably from a pegmatite in the north half of lot 24, conc.VI: SiO_2 66.16, Al_2O_3 21.38, Fe_2O_3 0.33, FeO 0.09, CaO 1.14, Na_2O 10.43, K_2O 0.64, H_2O 0.13, total 100.30; S.G. 2.637 (V.B. Meen, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 37).

Chemical analyses of iridescent and non-iridescent portions of peristerite from Monteagle Township by M.C. Haller: (a) iridescent portion; SiO_2 66.25, Al_2O_3 20.94, Fe_2O_3 0.34, CaO 1.23, Na_2O 9.74, K_2O 1.50, H_2O 0.20, total 100.20; S.G. 2.631; (b) non-iridescent portion; SiO_2 66.72, Al_2O_3 20.98, Fe_2O_3 0.31, CaO 0.81, Na_2O 9.74, K_2O 1.12, H_2O 0.16, total 99.84; S.G. 2.628 (A.L. Parsons, 1930: Am. Mineralogist, 15, p. 93).

31 F/5 Large albite crystals have been found in lot 2, conc. III, Wicklow Township, Hastings County (National Mineral Collection).

31 F/6 Masses of cleavelandite have been found in a beryl-bearing pegmatite in lot 23, conc. XV, Lyndoch Township, Renfrew County (H.S. Spence, 1930: Am. Mineralogist, 15, p. 435).

31 K/4 Pink peristerite with a blue schiller is abundant at the Carey quarry, 3.2 km north of Mackey (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 64).

41 H/16 Fine specimens of peristerite are reported to have been collected from a pit near a small pond north of Caribou Lake, on lot 16, conc. V, McConkey Township, Parry Sound district (Beecher B. Woods, 1958: private communication).

Quebec

21 N/13 Peristerite is reported to be a major constituent of pegmatitic rock on the Brouillard property, ranges II and III, lots 8 and 9, Callieres Township, Charlevoix County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 21).

22 D/12 Cleavelandite is associated with quartz and muscovite at the Lac à la Mère Mica mine near St-Nazaire, north of the Saguenay River. A hydrocarbon occupies spaces between cleavelandite plates (Ann. P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 110).

31 G/11 Good specimens of peristerite have been collected from a pegmatite in range V, lot 20, Buckingham Township, Papineau County (National Mineral Collection).

31 G/11 Peristerite with a blue schiller occurs at the Burnt Lake Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 24).

31 G/11 A small quantity of peristerite is present at the Smith Lake Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 26).

31 G/12 White massive feldspar that fluoresces pink under ultraviolet rays has been found at the Haycock Mine near Perkins Mills (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 8).

31 G/12 Coarse peristerite and massive white quartz form the core of a large pegmatite inclusion at the O'Leary-Malartic deposit, range III, lot 25, Wakefield Township, Gatineau County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 47).

31 G/13 Some of the finest gemstone peristerite found in Canada has been obtained at the old Villeneuve Mine, range I, lot 31, (45°50'25"N, 75°35'45"W), Villeneuve Township, Papineau County. Chemical analysis of a clean white cleavage mass containing small amounts of quartz, muscovite and hornblende: SiO_2 65.62, Al_2O_3 21.72, CaO 1.48, Na_2O 10.54, K_2O 0.34, H_2O 0.19, total 99.89; S.G. 2.635 (V.B. Meen 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 37).

31 G/13 Some of the white feldspar at the Lapointe Mine near Notre-Dame-de-la-Salette displays a faint blue play of colour (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 69-51, p. 34).

31 H/11 At the Mont St-Hilaire Quarry, also known as the Desourdy Quarry, on the north side of Mont St-Hilaire, albite is present as colourless to white platy aggregates (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 57).

31 J/16 White peristerite, exhibiting the characteristic blue iridescence, occurs at the Maisonneuve Mine near St-Michel-des-Saints (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 78).

32 C/5 Cleavelandite forms part of a zoned dyke containing pollucite at the Valor property, Lacorne Township (R.W. Mulligan, 1961: Geol. Surv. Can., Paper 61-4, p. 4).

ALLANITE

$$(Ca,Ce)_2(Al,Fe,Mg)_3Si_3O_{12}(OH)$$

Allanite is classed as a member of the epidote group and is characterized by the presence of major amounts of cerium and other rare-earths replacing calcium in the structure. Minor amounts of thorium, uranium, manganese, and magnesium are usually incuded in its composition; and sodium and beryllium are rarer constituents. The presence of radioactive elements commonly results in a loss of crystal structure and thus, many allanites are

metamict. Although large concentrations of allanite are rare it is, nevertheless, one of the most common radioactive minerals in Canadian rocks. Frequently found in pegmatite and as an accessory mineral in granites, syenites and diorites, allanite also occurs in gneisses, mica and amphibolite schists, metamorphic pyroxenites, and as a contact metamorphic mineral in crystalline limestone. A partial list of occurrences is given below; for additional occurrences in Ontario and Quebec see: E.R. Rose, 1960: Geol. Surv. Can., Paper 59-10.

British Columbia

82 F/11 About 4 km above the Lemon Creek bridge, Slocan region (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 45).

92 J/15 In pegmatite, Gem group property, Bridge River camp (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 43).

93 M/4 In pegmatite, Homestake and Victoria properties, Rocher Deboule Mountain, Hazelton camp (A.H. Lang, 1952; Geol. Surv. Can., Econ. Geol. Ser., 16, pp. 41-42).

Manitoba

52 L/6 Fibrous metamict allanite, mostly altered to bastnaesite occurs in the central of three small pegmatites on the southeastern shore of Shatford Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 561).

Ontario

31 C/10 Specimens from lot 2, conc. VIII, Olden Township are in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 23).

31 D/9 The Royal Ontario Museum mineral collection includes allanite from the Crystal Lake (Silver Crater) prospect, lot 23, conc. X, Galway Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 24).

31 D/16 Granite pegmatites: conc. VII, lot 20, Monmouth Township, Haliburton County; concs. XII and XIII, lot 6 to 10, Cardiff Towsnhip, Haliburton County (D.F. Hewitt, 1960: private communication).

31 D/16 Specimens in Royal Ontario Museum mineral collection: Molybdenum Corporation of America deposit, north half of lot 11, Conc. XI, Cardiff Township; Bicroft (Centre Lake) Mine, lot 27, conc. XI, Cadiff Township; Cavendish Mine, lot 14, conc. VII, Cavendish Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, pp. 23-4).

31 E/1 Syenite pegmatite: conc. XVI, lot 2, Cardiff Township, Haliburton County. Calc-fluorite pegmatite: conc. XX, lots 7 and 8, Cardiff Township, Haliburton County (D.F. Hewitt, 1960: private communication).

31 E/1 A specimen of allanite from the Richardson (Fission) Mine, lot 4, conc. XXI, Cardiff Township is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 23).

31 E/3 A specimen of allanite in the Royal Ontario Museum mineral collection is from a granite pegmatite along Highway 11 near Bracebridge, Macaulay Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 24).

31 E/4 Granite pegmatite: conc. IX, lot 4, 9 and 10, Conger Township, Parry Sound district (D.F. Hewitt, 1960: private communication).

31 E/5 Well-developed crystals of allanite, 3 mm to 19 mm in diameter, have been described from a pegmatite near Fry Lake, just south of Seguin Falls, conc. B, lots 20 and 21, Monteith Township, Parry Sound district. Chemical analysis by E.W. Todd: SiO_2 31.88, Al_2O_3 16.66, Fe_2O_3 4.91, FeO 9.56, CaO 12.94, MgO 1.03, MnO 0.74, ThO_2 0.44, Ce group oxides 19.58, Y group oxides 1.64, H_2O 1.33, total 100.71; S.G. 3.658 (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto, Stud., Geol. Ser., 16, pp. 29-30. H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, pp. 191-2).

31 E/9 Granite pegmatite: conc. IV, lot 14; conc. VI, lot 17; conc. VIII, lot 22: Murchison Township; Nipissing district (D.F. Hewitt, 1960: private communciation).

31 E/11 An allanite specimen in the Royal Ontario Museum collection is from the north sie of the Pickerel and Jacks Lakes road, lot 7, conc. XI, Armour Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 24).

31 E/11 Granite pegmatite: conc. VI, lots 1 to 4; conc. VII, lots 11 and 13; Butt Township, Nipissing district (D.F. Hewitt, 1960: private communication).

31 E/12 Granite pegmatite: conc. I, lot 20, Chapman Township, Parry Sound district (D.F. Hewitt, 1960: private communication).

31 E/13 Pegmatite: concs. V and VI, lot 5, Lount Township, Parry Sound district (J. Satterly, 1955: Ont. Dept. Mines, Ann. Rept. vol. 64, Pt. VI, p. 43).

31 F/4 Granite pegmatite: conc. XI, lots 16 and 17, Faraday Township, Hastings County; conc. III, lot 27 and 28; conc. VI, lots 20 and 21; conc. VII, lots 11, 18 and 19; conc. XII, lot 6; Monteagle Township, Hastings County (D.F. Hewitt, 1960: private communication).

31 F/6 Sphene and allanite pegmatites are reported as occurring between Strain and Burns lakes in Griffith Township, Renfrew County (E.W. Heinrich, 1959: Can. Mineralogist, 6, pp. 339-47). Granite pegmatites: conc. IV, lot 34, Brudenell Township; conc. XV, lots 23, 25, 30, Lyndoch Township; Renfrew County (D.F. Hewitt, 1960: private communication).

31 F/10 A road-cut on Highway 17, 6.6 km southeast of Cobden exposes pink and grey calcite containing allanite, pyroxene, titanite and apatite (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 63).

31 F/11 Allanite is exposed in rock-cuts in pegmatite along Highway 60, 5.9 km west of Douglas (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 30).

31 F/11 Granite pegmatite: conc. A, lot 13, Hagarty Township, Renfrew County (D.F. Hewitt, 1960: private communication).

31 F/12 The Five Mile Quarry located about 2.4 km north of Opeongo in Dickens Township contains laths of allanite in feldspar (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 52).

31 L/1 Dull greenish black allanite is an accessory mineral in a pegmatite feldspar quarry on the west side of Muskwa Lake in Deacon Township, 4.4 km northeast of Brent (Ann P. Sabina, 1971; Geol. Surv. Can., Paper 70-50, p. 65).

31 L/2 Granite pegmatite: conc. IX, lot 20, Calvin Township, Nipissing district (D.F. Hewitt, 1960: private communication).

31 L/7 Allanite is one of the accessory minerals at the Purdy mica mine, once Canada's largest muscovite producer, located at 46°19'N, 78°54'30"W, 4.8 km north of Highway 17 from a point 18 km west of Mattawa (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 69).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16
Allanite is the most abundant of the rare-earth minerals in the Cobalt-Gowganda area. It occurs in veins as acicular grains up 0.25 mm long and as spheroid aggregates of radiating grains. Partial electron probe microanalysis: CaO 13.9, Al_2O_3 13.6, SiO_2 31.2, total Fe as FeO 15.7, remainder rare-earth elements of which Ce and La are the most abundant (J.L. Jambor, 1971: Can. Mineralogist, 11, p. 248).

41 H/16 Granite pegmatite: conc. B, lot 5, Henvey Township, Parry Sound district (D.F. Hewitt, 1960: private communiction).

52 F/13 Uraniferous pegmatite has been described to the west and north of Richard Lake in MacNicol Township. Uraninite, monazite, uranothorite, allanite, kasolite, uranophane and beta-uranophane have been identified (A.P. Pryslak, 1976: Ont. Div. Mines, GR 130, pp 43-45).

52 L/2 Allanite is a common constituent of pegmatitic bands in granitic rocks on the southeastern shore of Roughrock Lake on the Winnipeg River, 14.4 km north-northwest of Minaki. It alters in varying degrees to bastnaesite (Petr Černý and Iva Černá, 1972: Can. Mineralogist, 11, pp. 541-3).

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The following partial chemical analyses are given for Ontario allanites by Judith W. Frondel, 1964: Am. Mineralogist, 49, pp. 1159-1177.

31 D/16 Lescombe property, Monmouth Township, Haliburton County. Harvard specimen number 102412. Partial XRF analysis: CaO 7.0, Y_2O_3 3.1, Nd_2O_3 6.2, Ce_2O_3 12.9, La_2O_3 3.5.

31 E/1 Cardiff Township. Harvard specimen number 102534. Partial XRF analysis: CaO 11.3, Y_2O_3 0.15, Nd_2O_3 1.0, Ce_2O_3 10.4, La_2O_3 5.4. Cardiff Township, Haliburton County, concession XX, lot 7. Partial XRF analysis: CaO 10.5, Y_2O_3 0.2, Nd_2O_3 2.3, Ce_2O_3 14.7, La_2O_3 7.1.

31 E/9 Gale mine, concession IV, lot 14, Murchison Township, Nipissing district.

Harvard specimen number 102499. Wet chemical analysis, Jun Ito: SiO_2 33.16, TiO_2 0.24, Al_2O_3 18.69, Fe_2O_3 4.36, FeO 9.30, MgO 0.46, CaO + SrO 12.46, ThO_2 0.33, Ce and La oxides 7.60, Y and Nd oxides 7.89, MnO 2.68, P_2O_5 0.13, H_2O^+ 2.47, Na_2O 0.02, K_2O nil, SO_3 nil, total 99.79. Partial XRF analysis: CaO 12.46, Y_2O_3 7.7, Nd_2O_3 2.1, Ce_2O_3 4.5, La_2O_3 1.1.

Harvard specimen number 102661. Partial XRF analysis: CaO 12.7, Y_2O_3 7.5, Nd_2O_3 2.0, Ce_2O_3 4.4, La_2O_3 1.3.

31 F/4 Hybla, Ontario. Harvard specimen number 96020. Partial XRF analysis: CaO 14.3, Y_2O_3 0.15, Nd_2O_3 2.3, Ce_2O_3 9.7, La_2O_3 3.9.

Macdonald mine, Hybla. Harvard specimen number 102522. Wet chemical analysis by Jun Ito: SiO_2 32.29, TiO_2 0.06, Al_2O_3 18.19, Fe_2O_3 6.53, FeO 7.98, MgO 0.78, CaO + SrO 14.70, ThO_2 0.41, Ce and La oxides 15.00, Y and Nd oxides 1.49, MnO 0.30, P_2O_5 0.21, H_2O^+ 1.97, total 99.91. Partial XRF analysis: CaO 14.7, Y_2O_3 0.2, Nd_2O_3 3.3, La_2O_3 3.1.

Macdonald mine, Hybla. Harvard specimen number 102599. Partial XRF analysis: CaO 13.7, Y_2O_3 0.15, Nd_2O_3 2.8, Ce_2O_3 10.4, La_2O_3 3.9.

31 F/5 Dickens Township, Nipissing district, Harvard specimen number 102506. Partial XRF analysis: CaO 10.5, Y_2O_3 0.1, Nd_2O_3 3.3, Ce_2O_3 14.5, La_2O_3 5.8.

31 F/6 Lyndoch Township, Renfrew County. Harvard specimen number 102517. Partial XRF analysis: CaO 10.5, Y_2O_3 0.15, Nd_2O_3 3.6, Ce_2O_3 14.7, La_2O_3 5.8.

31 F/6 Lyndoch Township, concession V, Lot 23, Renfrew County. Harvard specimen number 102512. Parial XRF analysis: CaO 11.8, Y_2O_3 0.35, Nd_2O_3 1.4, Ce_2O_3 12.9, La_2O_3 6.7.

31 L/2 Near Eau Claire, Nipissing district, Harvard specimen number 98905. Partial XRF analysis: CaO 10.7, Y_2O_3 2.7, Nd_2O_3 4.2, Ce_2O_3 9.0, La_2O_3 2.6.

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Quebec

21 N/13 In pegmatite, Brouillard property, ranges II and III, lots 8 and 9, Callières Township. Charlevois County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 21).

31 F/9 Allanite is present in pegmatite associated with uraniferous pyroxenite at the Kirkham deposit located about 13 km north of Shawville at the end of Clarendon Road 13 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 93).

31 F/15 Crystals of allanite occur in grey pegmatite in a road-cut on the south side of the Campbells Bay to Otter Lake road, 6.4 km east of Highway 8 and opposite Lawless Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 104).

31 F/16 In scapolite-diopside rock, Yates Uranium Mines, Huddersfield Township, Pontiac County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept. 80, p. 40).

In pyroxenite; range IV, lot 49, Leslie Township (R. Kretz: Que. Dept. Mines, Prelim. Rept., 346).

31 G/11 Greyish black allanite occurs at the Back (Wallingford) Mine, and greenish black vitreous allanite occurs in feldspar at the Smith Lake Mine, near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 24, 26).

31 G/12 Allanite is found in feldspar at the Wakefield quarry and is abundant at the Evans-Lou Mine near St-Pierre-de-Wakefield (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 26, 35).

Dark brown resinous masses and orange grains of allanite are present at the Little Rapids (Watts) Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 30).

31 G/12 As large crystals in pegmatite, range III, lot 13, Portland Township, Papineau County. Chemical analysis by E.W. Todd: SiO_2 31.94, Al_2O_3 18.18, Fe_2O_3 3.80, FeO 12.13, CaO 14.76, MgO 0.32, MnO 1.10, ThO_2 0.52, Ce group oxides 13.44, Y group oxides 0.76, H_2O 2.99, total 99.94; S.G. 3.279 (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto Stud., Geol. Ser., 16, p. 30. H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 244).

31 G/14 At the Cole Lake Mine near Glen Almond allanite occurs massive with a dull brownish colour, and as shiny black elongated aggregates with woody structure (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 28).

31 J/12 Small masses of brown allanite are exposed with actinolite crystals in roadcuts on both sides of Highway 35 north of St-Aimé (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 55).

31 K/16 Near Mercier dam, Mitchell Township, Gatineau County, streaks of radioactivity up to 200 times background in a region of pyroxenes, granites and syenites were found to be rich in allanite, titanite, zircon and uranothorite (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, pp. 44-5).

31 P/3 Tabular crystals of allanite, some as large as 15 x 10 x 2.5 mm are reported to occur throughout a granite cliff at Lac à Baude, Normand Township, Laviolette County.

Chemical analysis by H.V. Ellsworth: SiO_2 29.90, TiO_2 1.91, Al_2O_3 13.68, Fe_2O_3 4.64, FeO 12.45, CaO 9.46, MgO 1.20, MnO 1.18, K_2O 0.03, Na_2O 0.07, ThO_2 0.41, Ce group oxides 21.15, Y group oxides 1.58, P_2O_5 0.04, H_2O (-110°) 0.13, H_2O(+110°) 0.59, insol. 1.26, total 99.68 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 251).

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The following chemical and X-ray diffraction data are given for Quebec allanites by Judith W. Frondel, 1964: Am. Mineralogist, 49, p. 1159-1177 .

31 F/16 Twin Valley mine, Huddersfield Township, Pontiac County, Harvard specimen number 102529. Partial XRF analysis: CaO 12.1, Y_2O_3 tr., Nd_2O_3 2.1, Ce_2O_3 15.8, La_2O_3 7.9. X-ray powder pattern of heated mineral: 3.52 (6), 3.22 (7), 2.91 (10), 2.85 (6), 2.81 (3), 2.69 (9), 2.61 (4), 2.54 (6), 2.41 (1), 2.31 (1), 2.17 (5), 2.13 (4), 2.06 (3).

Huddersfield Township. Harvard specimen number 102585. Partial XRF analysis: CaO 14.3, Y_2O_3 0.15, Nd_2O_3 2.1, Ce_2O_3 12.9, La_2O_3 6.5.

31 F/16 Huddersfield Township, Pontiac County, range V, lot 22, Harvard specimen number 102449. Partial XRF analysis: CaO 11.3, Y_2O_3 tr., Nd_2O_3 2.1, Ce_2O_3 15.6, La_2O_3 7.3.

Chapham Township. Pontiac County, range IV, lot 28, Harvard specimen number 102573. Partial XRF analysis: CaO 14.7, Y_2O_3 0.15, Nd_2O_3 1.7, Ce_2O_3 7.5, La_2O_3 4.3.

X-ray powder pattern of heated mineral: 3.49 (3), 3.28 (1), 3.21 (2), 2.90 (10), 2.84 (3), 2.81 (2), 2.68 (5), 2.61 (4), 2.54 (3), 2.40 (3), 2.31 (2), 2.17 (3), 2.12 (3), 2.09 (2), 2.06 (2).

31 J/5 La March Mine, Kensington Township, Gatineau County, range IV, lot 45, Harvard specimen number 102508. Partial XRF analysis: CaO 11.3, Y_2O_3 0.05, Nd_2O_3 0.9, Ce_2O_3 9.7, La_2O_3 6.5.

La March Mine, No. 2, Harvard specimen number 102516. Partial XRF analysis: CaO 10.5, Y_2O_3-, Nd_2O_3 1.3, Ce_2O_3 9.7, La_2O_3 3.9. X-ray powder pattern, unheated mineral: 3.53 (3), 3.33 (10), 2.93 (8), 2.89 (4), 2.72 (7), 2.63 (3), 2.57 (4), 2.50 (2), 2.42 (1), 2.34 (1) 2.19 (3).

31 P/3 Lac à Baude, Normand Township, Laviolette County, Harvard specimen number 102385. Partial XRF analysis: CaO 9.7, Y_2O_3 0.5, Nd_2O_3 4.0, Ce_2O_3 16.0, La_2O_3 6.8.

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Saskatchewan

74 O/13 Occurs abundantly in apatite-rich veins in the Nisikkatch and Northwest lakes region, 56 and 64 km northeast of Uranium City. Analysis of one specimen gave 12.03 per cent total rare-earths, mainly Ce_2O_3 (D.D. Hogarth, 1957: Can. Mineralogist, 6, pp. 140-50).

ALLARGENTUM

$Ag_{0.86}Sb_{0.14}$

Ontario

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16

Allargentum has been defined as the naturally-occurring epsilon-phase of the Ag-Sb system. It is abundant in the highgrade silver ores of the Cobalt camp. (W. Petruk, L.J. Cabri, D.C. Harris, J.M. Stewart and L.A. Clark, 1970: Can. Mineralogist 10, p. 163-172).

52 L/16 A few grains of allargentum associated with antimonial silver were found in a polished section of ore from a deposit in Mulcahy Township about 32 km west of Red Lake and 1,200 m south-southwest of the south end of Trout Bay. Electron microprobe analysis gave Ag 83.3, Sb 16.7 (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 234).

ALLEMONTITE

AsSb

British Columbia

104 M/8 Allemontite occurs with native antimony and gold in quartz veins at the Engineer Mine, 30 km southwest of Atlin. The mineral is tin-white on a freshly broken surface and exhibits mammillary structure. Chemical analysis: As 70.08, Sb 28.68, S 0.25, Au 0.05, total 99.06; S.G. 6.05 (T.L. Walker, 1921: Am. Mineralogist 6, p. 97).

Manitoba

52 L/6 Allemontite has been found in the Odd West pegmatite, located about 1 km north of the western end of Rush Lake in the Bird River area. An electron microprobe analysis gave: Sb 62.91, As 38.01, total 100.92 (P. Černý and D.C. Harris, 1973: Can. Mineralogist, 11, p. 978).

ALLOCLASITE

(Co, Fe, Ni)AsS

Northwest Territories

75 M/2 A narrow vein containing small amounts of chalcopyrite and alloclasite in quartz-siderite gangue ocurs on the southwest side of Susu Lake. Radiating steel grey needles of alloclasite form small rounded masses that are coated with erythrite on weathered surfaces (W.W. Heywood and A. Davidson, 1969: Geol. Surv. Can., Memoir 361, p. 33).

Ontario

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16

Alloclasite occurs in the Cobalt-Gowganda ores as euhedral crystals around iron-rich safflorite, as alternating layers with glaucodot, as separate euhedral crystals embedded in calcite at the cores of rosettes, and in masses. It has orthorhombic symmetry, space group $P222_1$, and is crystallographically different from glaucodot and arsenopyrite. Electron microprobe analyses gave:

	Co	Fe	Ni	As	S	Total
1	26.5	6.0	tr.	49.0	17.0	98.5
2	28.5	1.9	2.9	47.0	19.3	99.6
3	23.9	4.9	7.4	47.5	19.5	103.2
4	32.3	0.5	2.8	47.4	19.4	102.4
5	29.7	4.0	0.5	48.2	18.9	101.3
6	29.1	4.1	0.9	-	-	-
7	28.4	5.1	0.6	46.3	19.4	99.8
8	27.0	3.4	4.1	46.5	19.5	101.0
9	31.3	2.5	0.6	46.4	19.5	100.3
10	31.1	1.7	1.3	46.3	19.5	99.9

(W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 180-2)

ALLOPHANE

silica-alumina gel

This amorphous, poorly defined, hydrous aluminium silicate has been reported as occurring at the following localities.

British Columbia

103 P/11 Along cleavage cracks in slates, at the Red Bluff claim, north of Alice Arm, Observatory Inlet (R.G. McConnell, 1911: Geol. Surv. Can., Summ. Rept., p. 49).

Yukon

105 D/11 Pale bluish allophane, filling fissures in andradite, was identified by means of blowpipe and chemical tests in a specimen from the Rabbit-foot claim, on the west side of the Yukon River at Miles Canyon (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, 18 R).

ALMANDINE

$Fe_3Al_2(SiO_4)_3$

The name almandine, or almandite, is applied to the dominantly ferrous iron and aluminium compositional variety of the garnet group. In addition to ferrous iron and aluminium, most almandines contain lesser amounts of calcium, magnesium, manganese, and ferric iron and are thus gradational in chemical composition between pure almandine and the other common compositional varieties of garnet: grossular, pyrope, spessartine, and andradite. Transparent red almandine is valued as a gemstone; translucent varieties are called common garnet.

The almandine variety of garnet is commonly found in schists, particularly mica schists, associated with other metamorphic minerals, such as staurolite, andalusite and kyanite. It occurs less commonly in gneiss, pegmatitic granite, and associated with mica in pegmatite. Garnets, of which almandine is probably the most common variety, are of such widespread distribution throughout Canada that no attempt has been made to list separate occurrences. Because of the analytical difficulties involved in determining the chemical composition of a garnet, only a few analyses of almandine have been published, and most of these are not accompanied by precise locations and descriptions of the occurrences.

Manitoba

52 L Physical properties of almandine garnets: (1) from the contact metamorphosed andesite, Shatford Lake, n = 1.813, S.G. = 4.21, a = 11.53 Å; (2) from andesite or greywacke, Winnipeg River, n = 1.805, S.G. = 4.125, a = 11.54 Å (C.H. Stockwell, 1927: Am. Mineralogist, 12, p. 343).

63 K/13 Chemical analysis of garnet separated from Kisseynew gneiss, Kisseynew Lake; by A.F. Matheson: SiO_2 39.02, Al_2O_3 21.20, Fe_2O_3 2.27, FeO 27.59, MgO 4.90, CaO 4.60, MnO 2.43, total 102.01 (E.L. Bruce and A.F. Matheson, 1930: Trans. Roy. Soc. Canada, Sect., IV, vol. XXIV, p. 123).

63 N/3 Chemical analyses of garnets: (1) from contact zone, Wiltsey-Henderson claims, north of Sherritt Gordon Mine; by F.T. Jolliffe: SiO_2 38.92, Al_2O_3 23.34, Fe_2O_3 2.53, FeO 25.40, MnO 7.94, CaO 1.62, total 99.75; (2) from basic gneiss, Sherritt Gordon Mine; by A.F. Matheson: SiO_2 38.40, Al_2O_3 21.60, FeO 30.30, MgO 4.90, CaO 4.50, MnO 1.30, total 101.00 (E.L. Bruce and A.F. Matheson, 1930: Trans. Roy. Soc. Canada, Sect. IV, vol. XXIV, p. 123).

Northwest Territories

Specimens of deep red, gem-quality almandine are reported to have been found in southern Baffin Island as early as 1908. The occurrences are not described and the localities are reported vaguely as Albert Harbour, Alert Harbour and Garnet Island (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 10. John Sinkankas, 1959: Gemstones of North America, D. Van Nostrand Company, New York, A.L. Parson, 1934: Univ Toronto Stud., Geol. Ser., 36, p. 19).

Ontario

31 C/9 Flattened and elongated almandine garnets occur on the surfaces of foliation of Grenville gneisses in the Gananoque area. One such specimen was collected on Brier Hill Road, 2.6 km east of the village of Morton, South Crosby Township (W.H. Blackburn and W.H. Dennen, 1968: Am. Mineralogist, 53, p. 1386).

31 C/9 Pink to red garnets, intermediate in composition between almandine and pyrope occur in gneisses in the Westport area. Chemical analyses: (1) from garnet hypersthene gneiss, Clear Lake anticline, SiO_2 37.00, Al_2O_3 22.20, Fe_2O_3 2.56, FeO 27.72, MgO 7.80, CaO 2.15, TiO_2 0.27, MnO 0.36, total 100.06, n = 1.784, SG = 4.00; (2) from garnet- sillimanite-biotite gnessis, north

shore Rideau Lake, SiO_2 36.40, Al_2O_3 21.10, Fe_2O_3 6.37, FeO 20.24, MgO 12.10, CaO 2.40, TiO_2 0.52, MnO 0.21, total 99.34, n = 1.773; (3) from garnet-sillimanite- biotite-cordierite gneiss, Lake Opinicon, SiO_2 36.00, Al_2O_3 20.10, Fe_2O_3 4.98, FeO 25.83, MgO 10.30, CaO 2.00, TiO_2 0.21, MnO 0.39, total 99.81, n = 1.777. (H.R. Wynne-Edwards, 1967: Geol. Surv. Can., Memoir 346, p. 20).

31 E/1 Garnets separated from metamorphic rocks occurring along the north shore of Fishtail Lake, Harcourt Township, have been analysed by W.H. Herdsman. The molecular compositions were found to be Al_{53-58}, Py_{32-40} , $Sp+An_{6-10}$.

	(1)	(2)	(3)
SiO_2	33.18	37.52	37.80
TiO_2	0.09	0.10	0.15
Al_2O_3	19.15	16.80	18.19
Fe_2O_3	8.53	8.10	6.44
FeO	25.13	25.00	25.19
MnO	1.41	2.42	2.82
MgO	10.58	9.20	7.81
CaO	1.20	1.04	1.24
Na_2O	0.40	-	0.42
K_2O	0.03	-	0.12
H_2O	-	-	-
Total	99.70	100.18	100.18

(R.K. Lal and W.W. Moorhouse, 1969; Can. Jour. Earth Sci., 6, p. 145)

31 F/3 Pinkish red garnets up to 1 cm in diameter occur in gneiss at the Ruby Mine, lot 9, conc. XV, Ashby Township. From 1922 to 1924 the mine produced and shipped 1,420 tonnes of garnet ore to the Carborundum Company, Niagara Falls, New York. (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 23).

41 I/9 One of the few properties in Canada from which garnet has been mined is located about 1.6 km northeast of River Valley at latitude 46°36'N, longitude 80°10'W. Garnetiferous schists in this area contain almandine crystals up to 15 cm in diameter (Mr. Beecher B. Woods, 1959: private communication).

52 F/11
52 F/15 Large crystals of garnet have been found in chloritic schist along the shore of Garnet Bay at the northwest end of Eagle Lake. Garnet crystals up to 12 mm in diameter occur in biotite schist that outcrops along the northwest, west and south shores of Thunder Lake; along the Canadian Pacific railway 2 km west of the railway bridge over the Wabigoon River; and along Highway 17 at the eastern limits of Dryden. (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 41-43).

52 P/10 Physical properties of almandine garnets from Miminiska Lake: (1) from arkosic schists, n = 1.805, S.G. = 4.039, a = 11.59 Å; (2) from amphibolite, n = 1.797, S.G. = 4.01, a = 11.61 Å (C.H. Stockwell, 1927: Am. Mineralogist 12, p. 343).

Quebec

22 C/5 Attractive specimens consisting of sheets of clear mica enclosing crystals of deep red garnet and sea green apatite are found at the McGie Mine on the northeast shore of Charlotte Lake. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 100).

Saskatchewan

63 L/9 Chemical analysis of almandine from biotite schist, Amisk Lake; SiO_2 36.00, Al_2O_3 22.61, Fe_2O_3 2.67, FeO 32.12, MgO 2.19, CaO 2.36, MnO 1.86, total 100.01. Garnet composition expressed as molecular percentages of end-members: Al 81.5, Py 7.4, Gr 6.5, Sp 4.6.

Physical properties and partial analysis of garnet from garnet-andalusite schist, Amisk Lake: n = 1.805, S.G. = 3.97, FeO = 29.1 per cent, Mn trace. Estimated composition expressed as molecular percentages of end-members: Al 68, Py 15, An 10, Gr 5, Sp 2. (W.L. Wright, 1938: Am. Mineralogist, 23, pp. 437-8).

Yukon

105 G/13 Chemical analysis of almandine found in gravel at Hoole Canyon, Pelly River, by R.A.A. Johnston: SiO_2 37.7, Al_2O_3 21.1, Fe_2O_3 2.4, FeO 31.90, MnO 1.5, MgO 5.1, total 99.7, S.G. 3.991 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 11).

ALTAITE

PbTe

British Columbia

82 E/2 Altaite has been identified, associated with hessite, gold, copper and possibly native tellurium, at the Lakeview claims, on the north side of Long Lake some 21 km NNE of the mouth of Boundary Creek, Kettle River. Chemical analysis by R.A.A. Johnston (recalculated to 100 per cent): Te 43.01, Pb 54.04, Ag 2.27, Fe 0.68, total 100.00, S.G. 8.081 (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, 11 R).

Also reported to occur, in association with tetradymite, at the Rhoderic Dhu claim in the same mining camp (Ellis Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

82 E/5 An occurrence of altaite, associated with hessite and petzite, at the Hedley Monarch Mine, Olalla, has been confirmed by X-ray powder pattern (R.M. Thompson, 1949: Am. Mineralogist 34, p. 361).

82 G/5 Altaite is reported to have been found in a quartz vein with gold and chalcopyrite at the Payroll claim, Little Nigger Creek, 19 km southwest of Cranbrook (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, 19 R).

82 K/3 The first recorded identification of altaite in Canada was made by R.A.A. Johnston in a specimen of quartz from a locality about 9.6 km north of Liddle Creek, a tributary of the Kaslo River (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept. VI, 29 R).

92 G/16 Identified by X-ray powder pattern in float of limonitic vein calcite from near Glacier Lake, New Westminster mining division (R.M. Thompson, 1949; Am. Mineralogist 34, p. 361).

92 O/4 Altaite has been described from the Charlie Group, north of the Tchaikazan River, about 8 km southwest of Taseko Lake narrows. It is associated with hessite, gold and several sulphides (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser. 51, p. 77). This occurrence and a similar one at the Hido Group (Pellaire Mines Ltd.) in the same area, have been confirmed by X-ray powder patterns (R.M. Thompson, 1949: Am. Mineralogist 34, p. 361).

93 E Altaite, hessite, and galena are reported to occur in limonite-stained vuggy quartz veins at the Hebson property, Surel Lake, Tweedsmuir Park (R.M. Thompson, 1950: Am. Mineralogist 35, p. 452).

Manitoba

63 K/11
63 K/14 Altaite has been identified by X-ray powder pattern as grains in quartz from Copper Lake, The Pas district (R.M. Thompson, 1949: Am. Mineralogist 34, p. 361).

63 K/13 Altaite has been identified as a minor constituent of the sulphide orebody at the Flin Flon Mine (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 41).

Ontario

32 D/4
42 A/1 The Kirkland Lake camp has long been noted for the various telluride minerals that are associated with the gold ores. Of these, altaite is the most common. Altaite has a creamy yellow colour when freshly broken but it takes on a brilliant blue to bluish green tarnish. It occurs in irregular masses ranging in size from minute blebs to seams 12 mm wide. Usually associated closely with other tellurides, gold, and sulphides, it also occurs alone in quartz or other gangue minerals. Paragenetically, altaite was one of the latest minerals to be deposited (J.E. Hawley, 1948: Ont. Dept. Mines, Ann. Rept., vol. 57, Pt. V, p. 113).

Altaite has been identified by X-ray powder pattern in specimens from the following mines in the Kirkland Lake area: Lake Shore, Macassa, Toburn (Tough-Oakes), Kirkland Lake, Wright-Hargreaves, Teck-Hughes, Sylvanite, Kirkland Golden Gate, Bidgood, and Upper Canada (R.M. Thompson, 1949: Am. Mineralogist 34, p. 362).

Chemical analysis of two specimens of altaite from Lake Shore Mine, by H.C. Rickaby: (1) spherical masses associated with coloradoite, Pb 61.26, Cu 0.20, Fe 0.64, Hg trace, Te 36.84, S 0.29, insol. 0.46, total 99.69; (2) associated with chalcopyrite in nests, Pb 57.33, Au + Ag 1.10, Cu 1.60, Fe 1.63, Te 35.66, S 1.95, insol. 0.38, total 99.65 (E.W. Todd, 1928: Ont. Dept. Mines, Ann. Rept., vol. 37, Pt. II, p. 74).

41 I/16 Altaite has been identified by X-ray powder pattern in a specimen from the New Golden Rose Mine, a former gold producer in Afton Township, Timagami area (E.W. Nuffield and D.H. Gorman, 1960: private communication).

42 A/2 As the Ashley Mine in Bannockburn Township altaite is reported to occur with gold and galena in narrow veinlets cutting across pyrite and quartz-carbonate gangue (Ellis Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 27).

42 A/2
42 A/3 Altaite is reported to occur in quartz stringers cutting basalt at the property of McGill Gold Mines in Hincks Township (H.C. Rickaby, 1931: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. II, pp. 12-19).

42 A/6 Telluride minerals are constituents of the gold ores of the Porcupine camp. Altaite has been reported from the Hollinger and Dome mines (A.G. Burrows, 1924: Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. II, p. 54). The occurrence at Dome has been confirmed by X-ray powder pattern (R.M. Thompson, 1949: Am. Mineralogist 34, p. 362).

42 D/14 An occurrence of altaite is reported at the Chambers-Ferland Group, near Schreiber (Ellis Thomson, 1923: Univ. Toronto Stud., Geol. Ser., 16, p. 39).

52 SW Altaite is reported to occur with gold, galena, and pyrite at the Three Ladies Mine, Lake of the Woods district (Ellis Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 100).

52 B/10 Altaite occurs with hessite in a quartz-calcite gangue at the Ardeen (Moss, Huronian, Shebandowan) Mine in Moss Township. Identification was made by X-ray powder pattern (R.M. Thompson, 1949: Am. Mineralogist 34, p. 361).

52 F/16 At the property of Newlund Mines Limited in Echo Township, altaite has been observed with gold in a quartz vein cutting lavas, about 150 m east of No. 4 zone (H.S. Armstrong, 1950: Ont. Dept. Mines, Ann. Rept., vol. 59, Pt. V. p. 35).

52 N/4 Small amounts of altaite occur in the gold ores of the Red Lake area, at the Gold Eagle, Howey, and McKenzie Red Lake mines (H.C. Horwood, 1940: Ont. Dept. Mines, Ann. Rept., vol. 49, Pt. II, pp. 114, 166).

Quebec

31 M/7 Altaite has been identified by X-ray powder pattern in a specimen from the Belleterre Mine, Guillet Township (E.W. Nuffield and D.H. Gorman, 1960: private communication).

32 C/3 Altaite occurs disseminated with petzite, wehrlite, and gold in massive white quartz in a specimen from the Bevcourt (Bevcon) Mine in Louvicourt Township. The identification was made by X-ray powder pattern (R.M. Thompson, 1949: Am. Mineralogist 34, p. 362).

32 D/3 At the Horne Mine, Noranda, altaite occurs with petzite and calaverite in coarsely crystalline masses, or intergrown with tellurbismuth. Identification by X-ray powder pattern (R.M. Thompson, 1949: Am. Mineralogist 34, p. 362).

32 D/6 At the Robb-Montbray Mine, about 4.8 km northwest of the southeast corner of Montbray Township, altaite occurs in substantial masses, usually intergrown with tellurbismuth. Associated tellurides include petzite, melonite, frohbergite, and montbrayite. Identification by X-ray powder pattern (R.M. Thompson, 1949: Am. Mineralogist 34, p. 362).

32 F/12 A telluride zone at the Mattagami Lake Mine in Galinee Township about 8 km southwest of the town of Matagami contains altaite as the most common ore mineral. Hessite, mattagamite and tellurantimony are less abundant (R.I. Thorpe and D.C. Harris, 1973: Can. Mineralogist, 12, p. 55).

Saskatchewan

74 K/6 Altaite has been identified with native gold in specimens from the D uranium deposit at 58°21'35"N, 109°00'08"W, east of the northern tip of Cluff Lake (V. Ruzicka, 1975: Geol. Surv. Can., paper 75-1C, p. 279).

Yukon

115 G/6 An occurrence of altaite, associated with hessite, gold, and hedleyite, has been confirmed by X-ray powder pattern, in a specimen from

Upper Burwash Creek in the Kluane Lake district (R.M. Thompson, 1949: Am. Mineralogist 34, p. 361).

ALUMINOCOPIAPITE

$MgAlFe(SO_4)(OH).H_2O$

Nova Scotia

11 J/4 Aluminocopiapite has been identified with rozenite, pickeringite and halotrichite in surface outcrops of the Emery coal seam at No. 26 Colliery, Glace Bay (E.R. Zodrow and K. McCandlish, 1978: Can. Mineralogist, 16, p. 17).

ALUNITE

$KAl_3(SO_4)_2(OH)_6$

New Brunswick

21 H/10 Alunite is reported to have been found in association with quartz and specularite at New Ireland road, parish of Alma, in Albert County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, 16 T).

Newfoundland

1 M/16 At Hickey's Pond, 8 km west of the head of Placentia Bay, alunite occurs with quartz and specularite as a fine-grained constituent of silicified gneissic rock. It is common as euhedral crystals showing rhombohedron and basal pinacoid forms (A.L. Howland, 1940: Am. Mineralogist 25, p. 34).

ALUNOGEN

$Al_2(SO_4)_3.18H_2O$

British Columbia

82 L/12 Alunogen is reported as thick yellowish white crusts on weathered, pyritiferous, quartzo-feldspathic rocks at Blair Creek, which flows into Bolean Creek southeast of Pillar Lake, Kamloops district (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, 13 R).

83 D/15 Coatings of alunogen on weathered chloritic schists have been noted near the mouth of Grant Brook, a tributary of the Fraser River, southeast of Moose Lake, Cariboo district (J. McEvoy, 1898: Geol. Surv. Can., Ann. Rept., XI, 33 D).

92 I/11 Pale yellowish to white, cellular mammillary crusts occurring near Spatsum, on the east side of the Fraser River, south of Ashcroft, Kamloops district, have been identified as alunogen (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, 24 T).

92 I/12 Alunogen is reported to occur as pale ochre-yellow to white, crystalline, cellular masses in rocks at the mouth of Fountain Creek, which flows into the Fraser River northeast of Lillooet (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, 25 R).

92 I/15 Pale yellowish to white, silky masses on greyish pyritiferous, quartzo-feldspathic rock occurring 6.4 km west of Savona, at the west end of Kamloops Lake, have been identified as alunogen (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, 24 T).

94 M/9 Waxy, white, botryoidal aggregates of alunogen occur on black shale exposed along the side of a ridge on the southeast side of the bridge over Smith River at Mile 513.9 (Km 824.8) of the Alaska Highway from Dawson (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 20).

Nova Scotia

21 H/9 Alunogen is reported as crusts on slate at the Scotia Mine, Springhill, Cumberland County. Chemical analysis by Adams: Al_2O_3 13.479, Fe_2O_3 2.888, FeO 0.157, CaO 0.140, MgO 0.138, K_2O 0.087, Na_2O 0.131, SO_3 36.935, H_2O 45.109, insol. 0.235, total 99.299 (G.C. Hoffmann, 1878-79: Geol. Surv. Can., Rept. Prog. 8 H).

amalgam

(see SILVER)

amazonite

(see POTASSIUM FELDSPAR)

AMBLYGONITE

$(Li,Na)AlPO_4(F,OH)$

Amblygonite is a pegmatite mineral that occurs typically with quartz in the core zones of complex pegmatites which usually contain spodumene, lepidolite, tourmaline and apatite and may contain a wide variety of minerals. The name montebrasite has been given by some authors to the dominantly hydroxyl variety of amblygonite.

Manitoba

52 E/11 Amblygonite has been found at the Lucy No. 1 claim of North American Rare Metals Limited located in the West Hawk Lake district about 800 m north of the Trans Canada Highway at a point 10.6 km east of the East Braintree turnoff (R. Mulligan, 1956: Geol. Surv. Can., Paper 57-3, p. 18).

52 L/6 Amblygonite occurs in greyish white masses in the Bear (Silverleaf) pegmatite located about 4.8 km southeast from Lamprey Falls on the Winnipeg River. The indices of refraction (nX 1.600, nY 1.611, nZ 1.620) correspond to the variety montebrasite. Chemical analysis by R.J.C. Fabry: Al_2O_3 33.14, K_2O 0.26, Li_2O 8.20, Na_2O 2.96, P_2O_5 48.63, H_2O 5.12, F_2 2.15, less O for F 0.91, total 99.55 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 155).

52 L/6 Amblygonite is a constituent of the complex pegmatite dyke on the Montgomery (Chemalloy) property near the west end of Bernic Lake. This dyke is better known for its rich assemblages of spodumene and pollucite (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 19).

Irregular masses up to 60 cm long of white, locally pink-stained amblygonite occur in massive grey quartz in the lowest exposed zone of a complex pegmatite on the Buck claim, about 450 m east of Bernic Lake (R. Mulligan, 1956; Geol. Surv. Can., Paper 57-3, p. 21).

52 L/6 Specific gravities, refractive indices, differential thermal behavior, unit cell dimensions and X-ray powder patterns have been studied on amblygonites from the Tanco pegmatite at Bernic Lake. The following chemical analyses are reported.

A1 Pale pink core of zoned crystal
A2 Yellow outer rim of zoned crystal
A3 Water clear colourless crystal
A4 White material surrounding and veining A5
A5 Yellow, translucent, veined by A4
A13 White to pinkish cleavable mass
A22 Brownish, translucent, massive
A29 Milky, white, cleavable mass
A60 Milky, white cleavage fragment
A98 Pale yellow translucent mass

	A1	A2	A3	A4	A4	A5
Al_2O_3	34.53	35.53	34.63	34.45	34.75	34.86
Fe_2O_3	0.11	0.11	0.007	0.02		0.028
CaO	0.17	0.17	0.22		0.166	0.074
MgO	0.005	0.002	0.008		0.014	0.002
Li_2O	9.86	9.86	10.22	10.14	9.47	10.29
Na_2O	0.054	0.025	0.039	0.055	0.039	0.044
K_2O					0.003	
P_2O_5	49.32	49.21	49.22	49.48	48.98	49.26
H_2O^-	0.10	0.04	0.08	0.08	0.07	0.08
H_2O^+	3.39	4.09	2.70	3.85	4.34	3.30
F	5.56	3.65	6.30	3.65	4.05	4.51
	103.099	101.687	103.424	101.725	101.882	102.448
-O=F	2.341	1.536	2.65	1.536	1.71	1.898
Total	100.758	100.151	100.774	100.189	100.172	100.50

	A13	A22	A29	A60	A98
Al_2O_3	34.18	35.10	32.86	33.53	34.46
Fe_2O_3					
CaO	0.015	0.085	0.132	0.146	0.030
MgO		0.003	0.002	0.003	0.002
Li_2O	9.52	9.52	9.90	9.90	9.90
Na_2O	0.082	0.139	0.047	0.128	0.015
K_2O	0.005	0.005	0.004	0.005	0.004
P_2O_5	49.11	49.11	49.26	48.85	49.26
H_2O^-	0.06	0.07	0.06	0.05	0.05
H_2O^+	3.37	5.25	3.21	3.32	4.43
F	6.43	1.40	6.30	6.17	3.44
	102.772	100.682	101.775	102.102	101.591
-O=F	2.70	0.59	2.65	2.59	1.45
Total	100.072	100.092	99.125	99.512	100.141

(I. Černá, P. Černý and R.B. Ferguson, 1973: Am. Mineralogist, 58, p. 291)

53 N/2 Amblygonite occurs with rubidium-rich lithian mica in a swarm of dykes at the northeastern end of Red Cross Lake, approximately 2.8 km northwest of the Red Sucker River (J.L. Jambor and R.R. Potter, 1967: Geol. Surv. Can., Paper 67-15, p. 2).

Northwest Territories

85 I/1 Amblygonite and quartz form the core zones of the Moose pegmatite dykes located immediately north of Hearne Channel, Great Slave Lake (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 16).

85 I/1 A series of quartz pods that contain amblygonite and spodumene make up the core of a complex pegmatite on the Best Bet claims (lat. 62°14'N, long. 112°18'W) located northwest of the northcentral part of a lake known locally as Drever Lake (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 16).

A group of four zoned pegmatites on the Tan claims, located 2.4 km east of the southeast corner of Blatchford Lake, carry spodumene and, locally, amblygonite, cassiterite, and columbite-tantalite (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 15).

85 I/7 Amblygonite, beryl, lithiophilite and columbite-tantalite are associated with abundant spodumene in the central zone of a complex pegmatite that outcrops about 8 km southwest of the north end of Buckham Lake (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 15).

85 I/11 Amblygonite is associated with spodumene, lithiophilite, cassiterite and columbite-tantalite in a group of narrow pegmatites that extend 500 m southeastward from Sproule Lake (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 14).

85 O/14 Large crystals of amblygonite, spodumene and columbite-tantalite occur in a pegmatite 11.2 km south of Ghost Lake (C.S. Lord, 1951: Geol. Surv. Can., Mem. 261, p. 57).

Nova Scotia

21 A/10 White to pale bluish amblygonite occurs in a pegmatitic segregation with durangite, cassiterite, scheelite, wolframite, lepidolite, monazite and beryl at the Reeves farm, 600 m south of a point 4.8 km by road west of New Ross, Lunenburg County. Analysis by E.W. Todd: SiO_2 1.08, Al_2O_3 32.92, P_2O_5 46.62, Fe_2O_3 0.31, CaO 2.22, MnO 0.06, K_2O 0.08, Li_2O 7.45, Na_2O 2.53, H_2O 6.38, F_2 1.38, less O for F 0.58, total 100.45, S.G. 2.989 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 255).

Ontario

52 H/1 A small amount of amblygonite is reported in drill logs of a pegmatite on the M.N.W. Group property, about 2.4 km west of Cosgrave Lake (R. Mulligan, 1956: Geol. Surv. Can., Paper 57-3, p. 15).

amethyst

(see QUARTZ)

ANALCIME

$NaAlSi_2O_6 \cdot H_2O$

Analcime is one of the more common minerals of the zeolite group. The zeolites are hydrated aluminosilicates, chiefly of sodium and calcium, which are capable of undergoing cation exchange and which can lose part or all of their water without change of crystal structure. They are formed in nature late in the sequence of magmatic crystallization and also as secondary minerals by hydrothermal activity or diagenesis. At the 1962 meeting of the International Mineralogical Association, members of the Commission on New Minerals and Mineral Names voted unanimously to recommend to mineralogists that the name analcime be used in preference to analcite.

Alberta

82 G/9 Specimens of analcime have been collected from a railway cut near Blairmore on the Crows Nest branch of the Canadian Pacific Railway (C.W. Knight: Canadian Record of Sciences, IX, No. 5, pp. 265-78).

Analcime has been found in fragments of blairmorite in a 1 m thick stratum of tuffaceous breccia, in the valley of the South Fork River.

Bluish red phenocrysts of analcime up to 2.5 cm in diameter are evenly distributed through a dark olive-green matrix and form half of the rock. The analcime is distinguishable with difficulty from garnet. Large phenocrysts occur

in a finely crystalline groundmass of a second generation of analcime, aegirine-augite, nephelite, sanidine, and melanite, which are in turn embedded in an unresolvable matrix. The analcime phenocrysts are faintly pink, homogeneous, and anisotropic. Cubic cleavage is well developed and faint dust-like inclusions are seen along cleavage cracks. Narrow rims of clear analcime border most phenocrysts. Alteration to calcite is frequent. Analysis by M.F. Connor, 1914: SiO_2 54.16, Al_2O_3 22.35, FeO 0.06, Fe_2O_3 0.92, MgO 0.25, CaO 0.60, Na_2O 12.49, K_2O 0.59, H_2O 8.50, TiO_2 0.15, MnO tr., CO_2 0.30, total 100.37 (J.A. Maxwell et al., 1965: Geol. Surv. Can. Bull. 115, p. 378).

Chemical analyses of analcime specimens from the Crowsnest volcanics:

	brown	brown	red	green
SiO_2	53.7	55.96	53.8	52.5
Al_2O_3	21.6	23.06	22.75	21.40
Fe_2O_3	1.18	0.82	1.09	2.37
FeO	0.20		0.17	
CaO	1.56	0.32	0.21	0.38
Na_2O	13.0	13.0	13.4	13.1
K_2O	0.41	0.14	0.34	0.82
L.O.I.	9.10	9.10	8.65	8.65
Total	100.75	102.40	100.41	99.22

(T.H. Pearce, 1970: Can. Jour. Earth Sci., 7, p. 46)

British Columbia

82 E/2 Small crystals of analcime are abundantly developed in volcanic rocks north of Midway and Rock Creek in the Similkameen district (R.A. Daly, 1912: Geol. Surv. Can., Mem. 38).

82 E/5 Zeolites are abundant along the north side of Yellow Lake, about 14.5 km west of Okanagan Falls. They occur as nodules up to 7.5 cm in diameter and include natrolite, heulandite, laumontite, thomsonite and analcime (S. Leaming, 1973: Geol. Surv. Can., Paper 75-53, p. 20).

82 L/5 Basalts cut by logging roads south of Monte Lake contain the zeolite minerals, analcime, levyne, cowlesite, thomsonite, ferrierite, stilbite, heulandite and chabazite (W.S. Wise and R.W. Tschernich, 1975: Am. Mineralogist, 60, p. 951).

92 B/5 Veins and amygdules in the Metchosin basalt east of the Sooke River contain epidote, pumpellyite, prehnite, laumontite, chabazite, stilbite, analcime, quartz and calcite (W.G. Libby and Jerry Kopel, 1971: Can. Mineralogist, 10, p. 915).

92 I/15 Good specimens of analcime were collected by W.F. Ferrier in 1918 from Criss Creek, 400 m above its junction with Deadman River in the Ashcroft district (National Mineral Collection).

93 A/6 Dodecahedral phenocrysts of analcime up to 5 cm across occur in basaltic boulders near the mouth of Horsefly Creek where it empties into Quesnel Lake (52°27'N, 121°26'W) near the site of an old placer gold mine (K.L. Currie, 1976: Geol. Surv. Can., Bull. 239, p. 41).

Manitoba

52 L/6 Cesian analcime occurs as a secondary mineral in spodumene-rich zones of the Tanco pegmatite at Bernic lake. Chemical analyses by K. Ramlal and R.M. Hill: SiO_2 54.85, 52.10; Al_2O_3 20.36, 17.60; CaO 0.05, 0.13; Na_2O 10.30, 6.46; K_2O 0.40, 0.19; Rb_2O 0.01, 0.06; Cs_2O 6.00, 18.00; H_2O^+ 7.51, 4.45; H_2O^- 0.41, 0.14; total 99.89, 99.13 (P. Černý, 1972: Can. Mineralogist, 11, p. 717).

63 N/3 At the Sherritt Gordon Mine, analcime and natrolite occur as encrustations in cavities on the hanging-wall along the contact between the pyrrhotite-pyrite-chalcopyrite-sphalerite ore assemblage and quartz-feldspar gneiss host rock. This occurrence is unusual because of the close association of zeolites with the ore and the absence of any evidence of volcanic activity. The simple trapezohedron (211) is the only form observed on the analcime crystals. Refractive index, 1.486 ± 0.002. Specific gravity, 2.253 (G.M. Brownell, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 19).

New Brunswick

21 B/10
21 B/15 On Grand Manan Island, analcime is associated with scolecite, heulandite, laumontite, natrolite, epistilbite, thomsonite, stilbite, quartz crystals, copper, hematite and chlorite in amygdaloidal cavities and seams in basalt (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 10).

21 P/13 The ore of the Sturgeon River Mines in the Bathurst area contains analcime and jamesonite (X-ray Laboratory: Geol. Surv. Can.).

Nova Scotia

21 A
21 H Many fine specimens of analcime have been collected along the south shore of the Bay of Fundy from Digby Neck to Cape Blomidon and on the north shore of Minas Channel and Minas Basin. The mineral occurs with other zeolites in veins and cavities in basic volcanic rocks.

Some of the more favourable collecting localities are reported as: Amethyst Cove, Cape Blomidon, Cape d'Or, Digby Gut, Digby Neck, Five Islands, Horseshoe Cove, Martials Cove, McKay Head, Partridge Island, Pinnacle Island, Pinnacle Rock, Swan Creek, Sheffield Vault, Two Islands, Wasson's Bluff and Williamsbrook (E. Gilpin: Nova Scotia Inst. Nat. Sci., V, p. 283. C.W. Willimott, 1882-4: Geol. Surv. Can., Rept. Prog. 27 L. A. R. C. Selwyn, 1890: Geol. Surv. Can., Ann. Rept., V, 55 AA. L.W. Bailey, 1896: Geol. Surv. Can., Ann. Rept., IX, 93 A. G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., XII, 192 A).

The morphology and effects of heating studies of analcime from Nova Scotia are reported by A.L. Parsons. The trapezohedron (211) is the only form observed. Analcime from Cape d'Or shows feeble double refraction; some grains give biaxial interference figures, others are uniaxial with a refractive index of 1.484 ± 0.003. Chemical analysis of analcime crystals from Cape d'Or: SiO_2 56.56, Al_2O_3 21.99, Fe_2O_3 0.05, CaO 0.39, Na_2O 12.58, K_2O 0.25, H_2O 8.47, total 100.29, S.G. 2.227-2.239 (A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 32).

Analcime has been found at numerous localities in the Minas Basin-Bay of Fundy area. The following list of localities and associated minerals was compiled from the detailed account by Ann. P. Sabina, 1964: Rocks and Minerals for the Collector, Bay of Fundy Area; Geol. Surv. Can., Paper 64-10.

	Locality	Associated Minerals
21 B/8	East Sandy Cove (St. Mary's Bay), Digby County	scolecite, stilbite, chalcedony, jasper
21 H/1	Woodworth Bay, Kings County	chalcedony, jasper, thomsonite, heulandite, mordenite, stilbite
21 H/2	Baxter Harbour, Long Beach Kings County	chalcedony, jasper, heulandite, laumontite, stilbite
	Morden, Kings' County	stilbite, laumontite, mordenite, apophyllite, heulandite, mesolite
21 H/3	Margaretsville, Annapolis County	heulandite, laumontite, apophyllite, gyrolite, mesolite, stilbite, scolecite, natrolite
	Port George, Annapolis County	chalcedony, stilbite, heulandite, mesolite, apophyllite, laumontite, gyrolite, thomsonite
21 H/7	Horseshoe Cove, Cape d'Or, Cumberland County	stilbite, laumontite, apophyllite, chabazite, thomsonite, mesolite, natrolite, heulandite, jasper, copper, calcite
21 H/8	McKay (McCoy) Head, Cumberland County	heulandite, calcite, quartz crystals
	Partridge Island, Cumberland County	stilbite, laumontite, natrolite, heulandite, chabazite, apophyllite, quartz crystal, calcite, chalcedony, jasper
21 H/8	Pinnacle Island; Cumberland County	chabazite, natrolite, stilbite, heulandite, thomsonite, gmelinite, calcite
	Swan's Creek (Swan Brook), Cumberland County	gmelinite, chabazite, apophyllite, natrolite, heulandite, calcite, stilbite
	Wasson Bluff, Cumberland County	chabazite, heulandite, stilbite, gmelinite, natrolite, calcite, copper
	Two Islands, Guysborough County	gmelinite, chabazite, heulandite, natrolite, calcite, agate
	Cape Blomidon - Cape Split, Kings County	apophyllite, heulandite, natrolite, stilbite, chabazite, gmelinite, laumontite, mesolite, thomsonite, amethyst, jasper, agate, calcite, celadonite

21 H/8 Chemical analysis of analcime from Cape Blomidon: SiO_2 54.84, TiO_2 0.12, Al_2O_3 23.32, Fe_2O_3 0.04, MnO 0.06, CaO 0.06, K_2O 0.35, Na_2O 13.20, P_2O_5 0.13, H_2O^+ 8.40, total 100.52 (F. Aumento and C. Friedlaender, 1966: Min. Soc. India, I.M.A. Volume, p. 149-154).

Ontario

31 D/16 A specimen of analcime from lot 29, conc. IV, Glamorgan Township is in the Royal Ontario Museum mineral collection. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 28)

41 N/12
41 N/13 Analcime is reported to occur, associated with native copper, in amygdaloidal lavas on Michipicoten Island (T. Sterry Hunt, 1863: Geol. Surv. Can., Geology of Canada, p. 481).

42 E/10,
42 E/11 Dull white crystals with well-developed icositetrahedral form occur in contact zones between diabase and greenstone in the area between Longlac and Jellicoe. Chemical analysis by K. McNeill: SiO_2 50.98, Na_2O 10.42, Al_2O_3 23.2, CaO 2.10, MgO 1.16, H_2O 7.45, total 95.31 (A.G. Burrows, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 246).

52 H/8 Crystals of analcime, associated with pectolite and prehnite, have been found filling crevices in oliving diabase. One broken crystal measured 4 cm in diameter. The diabase is exposed in rock cuts along the railway between Orient Bay and Fairclough (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 19).

52 H/9 A specimen of analcime in the Royal Ontario Museum mineral collection is from Warneford Station, Kitto Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 28).

Quebec

31 G/9 Analcime occurs at the Oka Rare Metals Mine (Ann P. Sabina, 1968: Geol Surv. Can., Paper 67-51, p. 61).

31 G/9 Alkaline rocks composed mainly of augite and analcime with varying amounts of olivine and phlogopite outcrop just northwest of Ste-Monique-des-Deux-Montagnes, 36.8 km northwest of Mount Royal (K.L. Currie, 1976: Geol. Surv. Can., Bull. 239, p. 68).

31 H/11 Analcime is a locally abundant constituent of veins and vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire. Most of the rare minerals found at

this quarry occur in or closely associated with analcime (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 H/11 At the Goyer Quarry north of St. Bruno, igneous dykes and sills contain phenocrysts (up to 2.6 cm long) of colourless to white analcime, greenish yellow olivine, dolomite, chlorite and talc (Ann. P. Sabina 1968: Geol. Surv. Can., Paper 67-51, p. 54).

31 H/11 Colourless to white radiating dawsonite associated with quartz, analcime and pyrite has been reported to occur in fractures in black limestone at the Dulude Quarry north of St. Bruno (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 55).

31 H/5
31 H/11 Analcime and natrolite have been found in dykes cutting Trenton limestone near Montreal, Hochelaga County. Chemical analysis by Harrington: Geol. Surv. Can., Rept. Prog. 1877-78: SiO_2 53.59, Al_2O_3 23.33, Fe_2O_3 trace, CaO 0.64, MgO trace, Na_2O 14.54, H_2O 8.47, total 100.27, S.G. 2.255 (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 17 T).

31 H/12 Analcime is a relatively common mineral at the Francon quarry, Montreal Island, where it occurs as colourless, yellow, and orange-red crystals about 5 mm in diameter, and as white globular aggregates, spheres and small cubes (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 16).

31 H/12 Dykes and sills which intrude limestone at the Miron quarry, Jarry Street at Papineau Avenue, Montreal, contain analcime (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 253).

ANATASE

TiO_2

Anatase, rutile and brookite are three polymorphic modifications of TiO_2 that occur as minerals. Anatase, also know as octahedrite, is found frequently as a fine-grained alteration product of titanium-bearing minerals. Leucoxene is a very fine grained alteration product consisting of anatase and/or rutile.

Nova Scotia

11 F/4 Anatase is reported to occur in small, but fine crystals in quartz at Sherbrooke, Guysborough County (Henry How, 1868: Mineralogy of Nova Scotia, p. 209).

Ontario

31 D/16 Brown anatase occurs as grains in magnetite which is exposed in trenches cut in leucogranite and granite pegmatite in lot 9, conc. XVI, Chandos Township (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 170).

31 D/16 A specimen of anatase in the mineral collection of the Royal Ontario Museum is from near Cheddar, Cardiff Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 29).

31 E/9 Creamy-white compact masses of anatase are found in hornblende at the Cameron and Aleck pegmatite deposit, 4.8 km northwest of Madawasks (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 55).

31 F/6 Columbian anatase has been identified by X-ray study in a beryl-bearing pegmatite on lot 23, conc. XV, Lyndoch Township (D.F. Hewitt, 1953: Ont. Dept. Mines, 62, pt. 5, p. 41).

31 F/6 Granular aggregates of dark brown anatase are exposed in road-cuts on both sides of Highway 512 at a point 12.5 km south of its junction with Highway 60 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 49).

31 K/4 Tan coloured anatase is one of the minerals present in the Carey pegmatite located 3.2 km north of Mackey and accessible by road from Highway 17 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 64).

41 H/15 An interesting occurrence of anatase as an alteration product of titanite is reported from a pegmatite dyke in lot 5, conc. B, Henvey Township, Parry Sound district. The altered titanite occurs as masses of coarse crystals weighing several kg intimately associated with uraninite and thucholite in oligoclase zones. The titanite crystals are completely altered to a clay-like material having an inner cellular structure of siliceous material upon which is deposited many small, black, lustrous crystals of anatase (F.T. Pough, 1934: Am. Mineralogist, 19, pp. 599-602).

41 J/7 Fine-grained anatase is a constituent of the radioactive conglomerates in the Blind River area. It occurs most frequently as a creamy-white alteration product of brannerite and also as separate dark brown grains (R.J. Traill, 1954: Can. Mining J., 75, pp. 63-8).

41 N/5 A specimen of anatase from the Parkhill Mine in McMurray Township, 3.2 km southeast of Wawa is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 29).

Saskatchewan

74 A/11 A small hand specimen of radioactive material from the Eldorado pegmatite dyke near Middle Foster Lake was found to consist of about 60 per cent of a mixture of black rutile with a metallic lustre and dull black anatase, and 40 per cent light brown, metamict brannerite. The brannerite gave an anatase X-ray powder pattern when unheated and a brannerite pattern when heated at 800°C for 5 minutes in vacuum (X-ray Laboratory: Geol. Surv. Can., 1955).

ANCYLITE

$Sr_3Ce_4(CO_3)_7(OH)_4 \cdot 3H_2O$

Ontario

31 E/1 At the Desmont Mining Corporation property near Wilberforce, ancylite occurs intimately intergrown with stillwellite (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 253).

Quebec

31 G/8
31 G/9 Ancylite is reported to be one of the carbonate minerals present in the Oka carbonatite (Gaston Pouliot, 1970: Can. Mineralogist, 10, p. 512).

31 H/11 Ancylite has been identified in veins and vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mount St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino

and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 H/12 Ancylite occurs sparingly in dykes and sills that intrude limestone at the Miron quarry, Jarry Street at Papineau Avenue, Montreal. It forms greenish brown to dark green, granular to platy aggregates in massive white analcime (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 253).

ANDALUSITE

Al_2SiO_5

The compound Al_2SiO_5 occurs in nature as three polymorphic modifications, namely, andalusite, kyanite and sillimanite. Andalusite usually occurs as nearly square prismatic crystals. Chiastolite is a variety containing regular arrangements of carbonaceous inclusions in the interior of the crystal, commonly in the shape of a cross. Andalusite is a typically metamorphic mineral occurring in schists and slates. Common mineral associates are kyanite, sillimanite, mica, garnet and cordierite.

British Columbia

82 L/6 Chiastolite is reported to be a prominent constituent of a black schist that outcrops on hills west of Armstrong (A.R.C. Selwyn, 1892-3: Geol. Surv. Can., Ann. Rept., VI, 7 A).

New Brunswick

21 G/3
21 G/6 Large crystals of andalusite have been found in Charlotte County at St. Stephen, and at Moores Mills in the parish of St. James (L.W. Bailey and G.F. Matthew, 1870-1: Geol. Surv. Can., Rept. Prog.).

Newfoundland

2 D/16 Andalusite porphyroblasts are partly developed in the metasediments at a granite contact along the highway 1.6 km north of the bridge at the east end of Gander Lake (S.E. Jenness, 1963: Geol. Surv. Can., Mem. 327, p. 81).

12 H/1 Smoky blue, radiating, prismatic aggregates of andalusite are associated with cordierite, chlorite and anthophyllite at the Gullbridge Mine, a former copper producer at Mineral Point on the west side of Gull Lake (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 108).

Northwest Territories

85 H/11 At Outpost Islands in the east arm of Great Slave Lake, andalusite occurs in a conformable series of sandy and argillaceous sediments cut by a few basic dykes and later quartz-mica-andalusite pegmatites. It is present in greatest quantity in a conglomeratic andalusite schist. Mauve, pink, and brown andalusite crystals up to 10 cm long and 4 cm in cross-section occur as aggregates in the pegmatites. Chemical analysis by H.V. Ellsworth: SiO_2 36.58, Al_2O_3 60.16, Fe_2O_3 1.82, MnO <0.01, TiO_2 0.05, CaO 0.22, MgO 0.16, Na_2O 0.03, K_2O 0.22, H_2O^+ 0.86, H_2O^- 0.08, total 100.18, S.G. 3.139 (J.E. Hawley, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 53. H.V. Ellsworth and F. Jolliffe, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, pp. 74-6).

85 M/12 Andalusite is found with cordierite in metamorphosed greywacke and slates of the Yellowknife Group, Basler Lake (1963: J. Geol., vol. 71, No. 5, p. 644).

85 P Andalusite having a glassy appearance and slightly pink colour occurs in a quartz-andalusite pegmatite about 88 km north-northeast of Yellowknife Bay. Chemical analysis by H.V. Ellsworth: SiO_2 38.86, Al_2O_3 61.46, Fe_2O_3 0.60, MnO <0.01, TiO_2 0.04, CaO 0.20, MgO 0.22, H_2O^+ 0.64, H_2O^- 0.08, total 100.10, S.G. 3.137. Spectrograms of this specimen showed strong gallium lines (H.V. Ellsworth and F. Jolliffe, 1936-7: Univ. Toronto Stud., Geol. Ser., 40, p. 74).

Nova Scotia

11 D/12
11 D/15 Andalusite is reported to occur in Halifax County at Geizers Hill, west of Halifax, and at Beaver Dam, near Sheet Harbour (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 16).

11 F/4 Specimens of andalusite have been obtained from the Crow's Nest Mine, near St. Mary's Guysborough County (X-ray Laboratory: Geol. Surv. Can.).

20 O/16 Andalusite is reported to occur inland from Yarmouth and Pubnico in Yarmouth County (L.W. Bailey, 1892-3: Geol. Surv. Can., Ann. Rept., VI, 12 Q).

20 P/11
20 P/12
20 P/14 Pale pink prismatic crystals of andalusite have been found in Shelburne County at the Red Head, and Goose Neck Point near Port Latour (L.W. Bailey, 1896: Geol. Surv. Can., Ann. Rept., IX, 58 M, 148 M), and at Shelburne Harbour (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 16).

20 P/15 Masses of andalusite crystals occur in mica schists along the Broad River, about 2.4 km from its mouth (L.W. Bailey, 1896: Geol. Surv. Can., Ann. Rept., IX, 52 M).

21 H/1 Poikilitic, subhedral to anhedral andalusite crystals are common in a siliceous gneiss at the contact of a granite with slate along the Gaspereau River (D.G. Crosby, 1962: Geol. Surv. Can., Mem. 325, p. 30).

Ontario

42 A/9 Numerous large prisms and almost square crystals of chiastolite have been noted in thin sections of a green metamorphosed rock occurring in Beattie Township, lot 5, conc. V (P.E. Hopkins, 1915: Ont. Dept. Mines, Ann. Rept., vol. 24, Pt. IV, p. 175).

52 N/4 Andalusite occurs as grains up to 3 mm in diameter as an essential constituent of the so-called 'paint rock', a highly metamorphosed sediment making up'Cochenour Point' at the Cochenour-Willans Mine (M.H. Frohberg, 1960: private communication).

52 P/9 A specimen of andalusite in the Royal Ontario Museum mineral collection is from Frond Lake, southeast of Keezhik Lake, 51°37'N, 88°19'W, Kenora district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 30).

53 C/14 The mineral collection of the Royal Ontario Museum includes a specimen of chiastolite from Rat House Bay, Sandy Lake, Kenora district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 30).

Quebec

21 E/4
21 E/5
21 E/6 Andalusite is reported to have formed as a product of contact metamorphism in slates cut by granite dykes in Barnston, Hatley and Stanstead

Townships, in Stanstead County; Compton, Eaton and Hampden Townships in Compton County; and in Marston Township, Frontenac County (R.W. Ells, 1886: Geol. Surv. Can., Ann. Rept., II, 11 J - 37 J).

21 E/13 Lavender, prismatic andalusite occurs as bundles of crystals up to 15 cm long associated with quartz and muscovite in granitic pegmatites at the Jeffrey Mine at 45°46'25"N, 71°57'12"W, lots 9-10, ranges II and III, Shipton Township, Richmond County. (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69)

21 E/14 Andalusite is reported to occur at St. Samuel de Gayhurst, Frontenac County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 65), and as small flesh-red prisms in micaceous slates at Lake St. Francis, Frontenac county (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 17 T).

Yukon

115 P/12 Andalusite porphyroblasts largely altered to pseudomorphous mica have been found in a pebble from White Channel cut on the east side of Clear Creek, opposite Gauvin's Cabin, Barlow (X-ray Laboratory, Geol. Surv. Can.).

ANDESINE

$NaAlSi_3O_8$-$CaAl_2Si_2O_8$

Andesine is an intermediate member of the plagioclase feldspar group of minerals which are the most common rock-forming minerals in the Earth's crust. It has been defined as that part of the series containing from 70 to 50 per cent of the $NaAlSi_3O_8$ molecule and 30 to 50 per cent of the $CaAl_2Si_2O_8$ molecule.

Quebec

21 L/4 Chemical analysis of reddish andesine which occurs in large cleavable masses with hypersthene and ilmenite at Chateau Richer, Montmorency County: (1) SiO_2 59.55, Al_2O_3 25.62, Fe_2O_3 0.75, CaO 7.73, MgO trace, K_2O 0.96, Na_2O 5.09, H_2O 0.45, total 100.15, S.G. 2.66-2.67; (II) SiO_2 59.80, Al_2O_3 25.39, Fe_2O_3 0.60, CaO 7.78, MgO 0.11, K_2O 1.00, Na_2O 5.14, total 99.82, S.G. 2.66-2.67 (T. Sterry Hunt, 1863: Geol. Surv. Can., Geology of Canada, p. 478).

21 M/2 Chemical analysis of pale lavender-blue vitreous andesine found as large cleavable masses in a boulder at St. Joachim, Montmorency County: SiO_2 57.55, Al_2O_3 + Fe_2O_3 27.10, CaO 8.73, K_2O 0.79, Na_2O 5.38, H_2O 0.20, total 99.75, S.G. 2.68-2.69 (T. Sterry Hunt, 1863: Geol. Surv. Can., Geology of Canada, p. 478).

31 G/8 Chemical analysis of specimen of lavender blue to sapphire blue andesine from near Lachute, Argenteuil County: SiO_2 58.15, Al_2O_3 26.09, Fe_2O_3 0.50, CaO 7.78, MgO 0.16, K_2O 1.21, Na_2O 5.55, H_2O 0.45, total 99.89, S.G. 2.687 (T. Sterry Hunt, 1863: Geol. Surv. Can., Geology of Canada, p. 478).

ANDORITE

$AgPbSb_3S_6$

British Columbia

93 N/11 This rare sulphosalt is reported to occur at a property (Kay Group) located on the hillside on the west side of the pass from Kwanika Creek to Silver Creek, 32 km east of Takla Landing, Takla Lake, in the Omineca mining division. The andorite occurs in a vein associated with stibnite, jamesonite, arsenopyrite, sphalerite, pyrite, freibergite, native silver, quartz and calcite. Chemical analysis by R.N. Williams: Pb 20.89, Ag 9.18, Cu 1.45, Fe 2.51, Zn 0.50, As 0.76, Sb 41.07, S 21.83, insol. 1.83, total 100.02; S.G. 5.23 ± 0.04 (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 72).

Yukon

115 I/3 Andorite was identified in specimens collected from the surface at Mount Nansen Mines Limited. Nansen Creek, at 62°03'30"N, 137°10'30"W (L.H. Green, 1965: Geol. Surv. Can., Paper 65-19. p.32).

ANDRADITE

$Ca_3Fe_2(SiO_4)_3$

The name andradite is applied to the dominantly calcium-iron members of the garnet group of minerals. Most andradites contain lesser amounts of aluminium, ferrous iron, manganese and magnesium, and are gradational in composition between pure andradite and one or more of the other compositional varieties of garnet: grossular, pyrope, almandine and spessartine. Schorlomite is a highly titaniferous variety of andradite. Andradite has been found in nepheline syenite, serpentine, chloritic schist, pegmatite and crystalline limestone.

Alberta

82 G/9 Black titanium andradite (melanite) is common in rocks of the Crowsnest formation in the Blairmore area. Chemical analyses of crystals from a road-cut on Highway 3, west of Coleman:
(1) light brown zone-electron probe analysis by T.H. Pearce,
(2) dark brown zone-electron probe analysis by T.H. Pearce,
(3) composite sample-rapid chemical analysis by Geol. Surv. Can.

	(1)	(2)	(3)
SiO_2	37.76	34.90	35.3
Al_2O_3	2.50	1.27	4.5
Fe_2O_3	25.05	22.17	18.4
FeO	2.57	2.29	1.9
CaO	32.60	31.79	32.3
MgO	0.18	0.29	0.5
MnO	0.47	0.51	0.41
TiO_2	1.94	7.64	4.0
Other			0.7
Total	103.07	100.86	98.01

(T.H. Pearce, 1970: Can. Jour. Earth Sci., 7, p. 46)

British Columbia

82 N/1 Schorlomite occurs in some of the coarsely crystalline ijolites in the Ice River area, associated with nephelite, aegirine, titanite and calcite. Specimens have been collected near the head of Moose Creek valley and on the ridge to the west of Garnet Mountain. Chemical analysis by F.G. Wait: SiO_2 25.77, TiO_2 10.83, Al_2O_3 3.21, Fe_2O_3 18.59, CaO 31.76, TiO_2 8.23, MnO 0.76, MgO 1.22, total 100.37, S.G. 3.802. Other varieties of garnet including black andradite (nontitaniferous), grossular, almandine and

possibly spessartine have been reported from the same area (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, pp. 12-13R; J.A. Allan, 1914: Geol. Surv. Can., Mem. 55, pp. 176-7).

A portion of the ground sample of schorlomite that was analyzed by Wait gives a typical garnet-type X-ray powder pattern. The unit cell edge is 12.160 ± 0.005 Å (X-ray Laboratory: Geol. Surv. Can.).

92 F/10 Brilliant crystals of andradite, measuring up to 13 cm in diameter are found in the Marble Bay Mine on Texada Island. The mineral is commonly found embedded in sulphides in the ore zones. Chemical analysis of andradite crystal: SiO_2 37.00, TiO_2 0.14, Al_2O_3 8.68, Fe_2O_3 16.62, FeO 1.08, MgO 0.76, CaO 34.58, MnO 0.74, Na_2O 0.33, K_2O 0.16, H_2O 0.24, P_2O_5 trace, total 100.33; S.G. 3.78. Large masses of buff coloured grossular have been found developed in the host rocks away from the ore zone (T.L. Walker, 1930: Univ. Toronto Stud., Geol. Ser., 29, p. 7).

92 I/12 Chemical analysis by F.G. Wait of a massive, finely-columnar andradite found near Foster Bar on the Fraser River about 37 km north of Lytton: SiO_2 34.52, Al_2O_3 4.09, Fe_2O_3 25.82, FeO 2.66, MnO 0.94, CaO 31.49, MgO 0.59, H_2O(at 100°C)0.03, total 100.14; S.G. 3.706 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 16 R).

The unit cell edge of a portion of the specimen analyzed by Wait is 11.981 ± 0.005 Å (X-ray Laboratory, Geol. Surv. Can.).

104 O/7 Tin-bearing skarn occurs at 59°17'30"N, 130°31'00"W, and elsewhere in the vicinity of Ash Mountain. It contains a deep green, tin-bearing andradite garnet having a refractive index of 1.88 and a unit cell edge of 12.064. Chemical analysis by J.L. Bouvier: SiO_2 33.6, Al_2O_3 2.5, Fe_2O_3 30.2, FeO 1.8, MnO 0.1, MgO 0.2, CaO 31.2, H_2O 0.2, SnO_2 0.9, total 100.7. (R. Mulligan and J.L. Jambor, 1968: Can. Mineralogist, 9, p. 358-370).

Ontario

31 C/13 Good crystal specimens are reported from lots 6, 7, conc. XIII, Tudor Township, Hastings County (R.A.A. Johnston: 1915, Geol. Surv. Can., Mem. 74, p. 17).

31 D/15 Chemical analysis by B.J. Harrington of black andradite from the Paxton iron mine, lot 5, concs. V and VI, Lutterworth Township, Haliburton County: SiO_2 35.68, Al_2O_3 5.88, Fe_2O_3 23.70, FeO 3.65, MnO 0.81, CaO 29.64, MgO 0.35, H_2O 0.28, total 99.99; S.G. 3.813 (B.J. Harrington: Canadian Record of Sciences, VI, p. 480).

31 F/4 Andradite is associated with nepheline syenites in Dungannon Township, Hastings County. Chemical analysis by B.J. Harrington: SiO_2 36.604, Al_2O_3 9.771, TiO_2 1.078, Fe_2O_3 15.996, FeO 3.852, MnO 1.301, CaO 29.306, MgO 1.384, H_2O 0.285, total 99.577; S.G. 3.739 (B.J. Harrington: Canadian Record of Sciences, VI, p. 480).

At the MacDonald Mine, lots 18 and 19, conc. VII, Monteagle Township, Hastings County, a garnet identified as andradite occurs as rounded masses and rough crystals near the walls of the dyke. The garnet is radioactive, has a specific gravity of 3.73, refractive index of more than 1.80, and contains 1.14 per cent total rare earths (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 208).

Quebec

21 L/3 Pale green crystals of garnet are reported to occur embedded in a kaolin-like matrix at West Thetford Mines. Small diopside crystals are embedded in the garnet and also occur as separate grains in the clay. The most common garnet form is the trisoctahedron (332). A chemical analysis made by W.F. Green gave the following composition: SiO_2 36.66, TiO_2 0.10, Al_2O_3 4.18, Fe_2O_3 24.86, CaO 33.89, MgO 0.25, MnO 0.20. This corresponds to 78.74 per cent andradite, 18.45 per cent grossularite, and 2.91 per cent diopside (A.L. Parsons, 1935: Univ. Toronto Stud., Geol. Ser., 38, p. 33).

31 F/16 Chemical analysis of black andradite from Cawood Township, Pontiac County, by F.G. Wait: SiO_2 36.09, Al_2O_3 12.69, Fe_2O_3 12.33, FeO 3.30, MnO 0.48, CaO 34.46, MgO 0.94, H_2O(at 100°)0.04, total 100.33; S.G. 3.690 (G.C. Hoffmann, 1892-3: Geol. Surv. Can., Ann. Rept., VI, p. 16 R).

The unit cell edge of a portion of the original specimen analyzed by Wait is 11.914 ± 0.005 Å (X-ray Laboratory: Geol. Surv. Can.).

31 G/8 Anhedral grains of a black zirconium bearing variety of andradite occur with calcite, nepheline, and biotite at the Oka property of Quebec Columbium Ltd. The grains are up to 5 mm in diameter and have the following composition: CaO 42, SiO_2 32, Fe_2O_3 14, TiO_2 5, MnO 2.6, Al_2O_3 3.8, MgO 1.0, ZrO_2 3.7, total 104 (E.H. Nickel, 1960: Can. Mineralogist, 6, pp. 549-550).

31 G/9 Electron microprobe analyses of garnets from the Oka carbonatite. (1) Bond zone. Carbonatite containing melilite, garnet, niocalite, apatite, magnetite, amphibole, trace perovskite and monticellite. (2) Bond zone. Carbonatite containing calcite, magnetite, garnet, melilite, biotite, apatite, niocalite, monticellite, perovskite. (3) Bond zone. Carbonatite containing calcite, garnet, magnetite, biotite, apatite, niocalite, perovskite.

	(1)	(2)	(3)
SiO_2	35.9	36.3	34.7
TiO_2	1.38	1.92	1.89
Al_2O_3	2.17	2.78	2.04
Fe_2O_3	26.6	27.0	25.6
MnO	0.37	0.49	0.57
MgO	0.17	0.17	0.15
CaO	32.5	32.6	32.9
Total	99.1	101.3	97.9

(David H. Watkinson, 1972: Can. Mineralogist, 11, p. 457)

31 G/12 Yttrian andradite is a common accessory mineral in granite pegmatites in the southern Gatineau Park. Chemical analysis of a specimen taken from a small concordant pegmatite outcropping along the road leading from the Gatineau parkway to the Camp Fortune Ski Property; E.L.P. Mercy, analyst: Na_2O 0.16, K_2O 0.02, CaO 24.79, MnO 5.86, FeO 3.32, Y_2O_3 3.36, MgO 0.05, TiO_2 0.10, Fe_2O_3 20.69; Al_2O_3 8.43, SiO_2 33.40, H_2O^+ 0.05, total 100.23. (M.A. Kasowski and D.D. Hogarth, 1968: Can. Mineralogist, 9, p. 552-558).

ANGLESITE

$PbSO_4$

British Columbia

82 F/14 Anglesite occurs sparingly in the zones of oxidation of lead ores in the Slocan area. The first occurrence to be noted in Canada was as small, colourless, translucent crystals coating a specimen of galena from the Wellington Mine, 4 km northeast of Bear Lake. Other properties at which anglesite has been reported include: Beaver, Mammoth, Rainbow, Payne, Queen Bess, Hope and Recco (G.C. Hoffmann, 1892-3: Geol. Surv. Can., Ann. Rept., IV, pp. 27-8 R; R.A.A. Johnston, 1910: Geol. Surv. Can., Summ. Rept., p. 260; C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173).

82 N/5 Oxidized lead-zinc ores containing silver and gold occur on the Waverley group claims located just north of Tangier Pass and accessible from Albert Canyon. The ores consist of anglesite, cerussite, malachite and azurite with minor smithsonite and rare residual nodules of galena and argentian tetrahedrite (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

New Brunswick

21 O/8 Anglesite occurs on the property of Heath Steele in Northumberland County (A.L. McAllister 1959: Bull. Can. Inst. Mining Met., N.B. Mines Br. reproduction).

21 P/5 Anglesite is present in the ore of the Brunswick No. 6 Mine, Bathurst (X-ray Laboratory: Geol. Surv. Can.).

Newfoundland

2 E/12 Specimens coated with anglesite and cerussite are common on the dump of the abandoned Silverdale Mine, 1 km from Silverdale (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 114).

Quebec

22 G/1 Cream-white anglesite forms irregular encrustations on pyrite and galena at the Candego mine. The deposit, on the west side of the Marsoui River, is in a protected forest area and may be reached by road, 19.5 km south of the hotel at Marsoui (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 75).

31 I/16 Anglesite forms dull bluish white coatings on galena at the Montauban Mine near Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 89).

Yukon

105 K/6 Anglesite has been reported at the Anvil Mine at 62°21.5'N, 133°22'W, in the Anvil Range near Faro Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 87).

105 M/13
105 M/14 Anglesite is the most abundant of the secondary lead minerals and has a widespread occurrence in the oxidized parts of silver-lead-zinc deposits in the Keno Hill-Galena Hill area (R.W. Boyle, 1956: Geol. Surv. Can., Paper 55-30, p. 51).

115 I/3 Silver and gold bearing veins and pods of anglesite, cerussite and limonite, containing remnants of galena, arsenopyrite and pyrite occur on the May Group claims (62°07'00"N, 137°15'00"W) on the northeast shoulder of Mount Nansen, northwest of the headwater of Nansen Creek and south of the Klaza River (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 90).

ANHYDRITE

$CaSO_4$

Anhydrite is an important sedimentary rock-forming mineral and occurs with gypsum in salt deposits. It also occurs, less-commonly, as a gangue mineral in metalliferous veins and filling amygdules and cavities in lava flows.

Alberta

Anhydrite is probably associated with massive gypsum beds which outcrop in the following localities: (a) in Wood Buffalo National Park, along the banks of the peace River between Peace Point and Little Rapids; (b) along the banks of the Slave and Salt rivers, north and west of Fort Fitzgerald; (c) in Jasper Park north of Brûlé Lake.

74 D/11 Beds of anhydrite and gypsum were encountered in wells drilled near McMurray at depths of 120 to 150 m (J.A. Allan, 1929; Bull. Can. Inst. Mining Met. 206, p. 77).

82 J/7 Anhydrite is associated with cryptocrystalline limestone in the Mount Head map-area (R.J.W. Douglas, 1958: Geol. Surv. Can., Mem. 291, p. 33).

British Columbia

82 L/5 Lenticular masses of anhydrite occur in the Falkland (Salmon River) gypsum deposits. Chemical analysis of bluish, translucent, vitreous anhydrite, by R.A. Rogers: CaO 37.65, MgO 0.22, Fe_2O_3 0.20, Al_2O_3 0.07, SO_3 53.81, CO_2 0.69, H_2O 4.02, insol. 3.00, pyrite 0.47, total 100.13 (L.H. Cole and R.A. Rogers, 1933: Can. Dept. Mines Br. Publ., No. 732).

92 G/11 At the Britannia property on Howe Sound, anhydrite is one of the most abundant and widespread of the non-metallic minerals within the Britannia shear zone. It does not occur as a gangue mineral in the sulphide veins, but in a separate group of veins. One vein in the Victoria Mine is about 1.5 m wide, and is essentially pure anhydrite (H.T. James, 1929: Geol. Surv. Can., Mem. 158).

Manitoba

62 G/9 A borehole sunk at Rothwell encountered a 19 mm thick bed of gypsum and anhydrite at a depth of 293 m below the surface (R.C. Wallace, 1927: The Non-Metallic Mineral Resources of Manitoba: Industrial Development Board of Manitoba, p. 41).

62 J/10 A zone of pale-blue vitreous anhydrite about 1.2 m thick occurs between layers of gypsum at the Amaranth gypsum deposit (G.M. Brownell, 1931: Trans. Can. Inst. Mining Met. pp. 274-94).

62 O/10 Anhydrite occurs abundantly in the Gypsumville district associated with large deposits of gypsum. Chemical analysis of bluish white, semi-translucent, vitreous anhydrite, by R.A. Rogers: CaO 38.84, MgO 0.03, Fe_2O_3 0.04, Al_2O_3 0.04, SO_3 56.03, CO_2 0.05, H_2O 4.57, insol. 0.28, total 99.88 (L.H. Cole and R.A. Rogers, 1933: Can. Dept. Mines, Mines Br., Publ. 732).

63 K/16 Coarsely cleavable masses of mauve anhydrite occur at the Anderson Lake Mine on Highway 395, 1.9 km from its junction with Highway 392 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 63).

New Brunswick

21 H/15 Anhydrite is associated with gypsum deposits in Albert County near Hillsborough. Extensive cliffs of anhydrite occur on the south side of Wilson Brook, several km south of Hillsborough. Chemical analyses by R.A. Rogers: I. bluish grey, opaque, earthy anhydrite from property of Albert Manufacturing Company, CaO 40.21, MgO 0.04, Fe_2O_3 0.04, Al_2O_3 0.08, SO_3 57.31, CO_2 0.47, H_2O 1.35, insol. 0.46, total 99.96; II. bluish grey, translucent, vitreous anhydrite from property of Albert Manufacturing Company, CaO 40.68, MgO 0.03, Fe_2O_3 0.06, Al_2O_3 0.08, SO_3 58.27, CO_2 0.31, H_2O 0.06, insol. 0.44, total 99.93; III. bluish white, earthy anhydrite from Wilson Brook, CaO 39.77, MgO 0.03, Fe_2O_3 0.05, Al_2O_3 0.05, SO_3 55.65, CO_2 0.97, H_2O 3.30, insol. 0.26, total 100.08 (L.H. Cole and R.A. Rogers, 1933: Can. Dept. Mines, Mines Br. Publ., 732).

Newfoundland

11 O/14
12 B/2
12 B/3
12 B/7
Large massive gypsum deposits outcrop at numerous places in the area southeast of St. George's Bay between St. George's and Searston. Most of these deposits contain anhydrite (R.K. Collings, 1959: Can. Dept. Mines, Mines Br. Info. Circ., 114, p. 8).

12 B/7 Light blue to blue grey semi-transparent anhydrite is associated with gypsum at the Flat Bay gypsum quarry (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 157).

23 H/9 Pale mauve anhydrite is a major constituent of a mica schist excavated during construction of the hydro-electric project at Churchill Falls. It has also been found in veins (C.S. Butchins and R. Mason, 1973: Min. Mag., 39, p. 488).

Nova Scotia

11 E/3 Outcrops of anhydrite and gypsum occur along the west bank of the Shubenacadie River between South Maitland and Urbania. Chemical analysis of greyish white, earthy anhydrite by R.A. Rogers: CaO 37.32, MgO 0.18, Fe_2O_3 0.04, Al_2O_3 0.02, SO_3 53.18, H_2O 8.55, insol. 0.40, total 99.69 (L.H. Cole and R.A. Rogers, 1933: Can. Dept. Mines, Mines Br. Publ., 732).

11 E/4 Chemical analyses of anhydrite that outcrops near Latties Brook: I. from high face near cave east of Burton on Andrew Hayes property, CaO 39.60, MgO trace, SO_3 55.20, CO_2 0.78, H_2O_3 4.05, total 99.63; II. from the Geary property east of Burton on the railway, CaO 38.80, SO_3 53.40, H_2O 8.05, insol. 0.40, total 100.65 (W.F. Jennison, 1911: Can. Dept. Mines, Mines Br. Rept. No. 84, pp. 68-9).

11 E/4
21 A/16
21 H/1
An area underlain by gypsum and anhydrite extends over 380 km^2 between the Avon River, a few km southwest of Windsor, and South Maitland. It is not possible to list all occurrences of anhydrite in this district and only a few representive ones will be mentioned.

Anhydrite occurs in irregular patches on the 'Meadows' property of the Canadian Gypsum Company at Windsor. Chemical analysis of a representative sample, by R.A. Rogers: CaO 38.07, MgO 0.16, Fe_2O_3 0.06, Al_2O_3 0.08, SO_3 54.08, CO_2 0.62, H_2O 6.30, insol. 0.46, total 99.83.

Good exposures of anhydrite are reported along the west shore of the Avon River at Mount Denison, and on the Scott estate and Hannah property.

Prominent cliffs of gypsum and anhydrite are exposed on the south side of the St. Croix River above the St. Croix bridge and an almost continuous series of outcrops extends from here to Newport Station.

At Noel to the east of Walton, anhydrite occurs in round spire-like pinnacles protruding through the gypsum (L.H. Cole and R.A. Rogers, 1933: Can. Dept. Mines, Mines Br. Publ. 732).

11 E/6 Numerous outcrops of anhydrite and gypsum occur in the area drained by the Shubenacadie River. Chemical analyses of two anhydrite samples from the farm of Leonard Carter near Brookfield, by W.F. Jennison: I. CaO 38.20, MgO 1.06, SO_3 53.80, CO_2 1.17, H_2O 5.16, insol. 0.10, total 99.49; II. CaO 39.88, SO_3 51.28, CO_2 1.80, H_2O 7.16, total 100.12. At Beaver Brook, southeast of Truro, and also on the west side of the Shubenacadie River opposite Eagles Nest Point, beds of gypsum have an anticlinal structure with a core of anhydrite. Chemical analysis of this anhydrite, by W.F. Jennison: CaO 38.40, Fe_2O_3 and Al_2O_3 1.60, SO_3 54.44, H_2O 5.76, insol. 0.60, total 100.80 (L.H. Cole and R.A. Rogers, 1933, Anhydrite in Canada: Can. Dept. Mines, Mines Br. Publ. 732).

11 E/7 Gypsum occurrences in the vicinity of Bridgeville contain abundant anhydrite (L.H. Cole and R.A. Rogers, 1933, Anhydrite in Canada: Can. Dept. Mines, Mines Br. Publ. 732).

11 F/10
11 F/11
Irregular patches of anhydrite occur in gypsum beds that outcrop on the north shore of Madame Island to the south of Lennox passage. The most prominent outcrops are about 1.6 km back from the shore.

Cliffs of anhydrite from 9 to 18 m high occur near Port Hastings on the east side of the road running from Port Hastings to Hawkesbury, Chemical analysis of anhydrite from this locality, by W.F. Jennison: CaO 40.48, SO_3 55.48, H_2O 3.90, insol. 0.44, total 100.30 (L.H. Cole and R.A. Rogers, 1933, Anhydrite in Canada: Can. Dept. Mines, Mines Br. Publ. 732).

11 F/15
11 K/2
The Washabuck peninsula between St. Patrick's Channel and Bras d'Or Lake is noted for numerous outcrops of anhydrite.

Chemical analysis of a sample of anhydrite from Lieutenant Pond, a few km north of Iona, by W.F. Jennison: CaO 40.16, SO_3 55.60, H_2O 4.52, insol. 0.13, total 100.41.

Chemical analyses of two specimens of anhydrite from quarries at Ottawa Brook, by R.A. Rogers: I. CaO 39.09, MgO 0.49, Fe_2O_3 0.06, Al_2O_3 0.06, SO_3 54.45, CO_2 1.07, H_2O 4.44, insol. 0.42, total 100.08; II. CaO 40.94, MgO 0.23, Fe_2O_3 0.04, Al_2O_3 0.08, SO_3 57.48, CO_2 0.31, H_2O 0.53, insol. 0.32, total 99.93.

Large cliffs composed largely of anhydrite are exposed along the banks of the Washabuck River and along the road from the Washabuck River to Little Narrows, at Nineveh, and Cain Mountain by

R.A. Rogers: CaO 39.96, MgO 0.10, Fe_2O_3 0.06, Al_2O_3 0.02, SO_3 54.65, CO_2 1.14, H_2O 2.85, insol. 0.80, total 99.58 (L.H. Cole and R.A. Rogers, 1933, Anhydrite in Canada: Can. Dept. Mines, Mines Br. Publ. 732).

11 K/2 Many outcrops of anhydrite occur between Baddeck Bay and Big Harbour.

Chemical analysis of a specimen taken from a large cliff exposed on the west bank of Bevis Creek about 4.8 km west of Ross Ferry, by R.A. Rogers: CaO 37.68, MgO 0.16, Fe_2O_3 0.06, Al_2O_3 0.02, SO_3 52.68, CO_2 0.49, H_2O 8.02, insol. 0.44, total 99.55.

Chemical analysis of anhydrite from the property of J.H. McLeod at the head of Baddeck Bay, by R.A. Rogers: CaO 40.10, MgO 0.10, Fe_2O_3 0.04, Al_2O_3 0.04, SO_3 52.97, CO_2 1.89, H_2O 3.90, insol. 0.26, total 99.30 (L.H. Cole and R.A. Rogers, 1933: Can. Dept. Mines, Mines Br. Publ. 732).

11 K/7 Chemical analysis of anhydrite from a quarry at Goose Cove, St. Ann's Harbour, by W.F. Jennison: CaO 42.80, SO_3 56.16, H_2O 0.73, insol. 0.80, total 100.49 (W.F. Jennison, 1911: Can. Dept. Mines, Mines Br. Rept. 84).

11 K/9 Considerable anhydrite is encountered in the lower workings of a quarry on the north side of Ingonish Harbour (L.H. Cole and R.A. Rogers: Can. Dept. Mines, Mines Br. Publ. 732).

11 K/15
11 K/16 Occasional patches of anhydrite are exposed in gypsum beds at Aspy Bay, on the east shore of Cape Breton. Some of the anhydrite contains crude petroleum as shown in the following chemical analysis by W.F. Jennison: CaO 41.30, SO_3 57.91, H_2O 0.82, insol. 0.07, bitumen 0.08, total 100.18 (W.F. Jennison, 1911: Can. Dept. Mines, Mines Br. Rept. 84).

Ontario

30 M/4 Lens-like deposits of anhydrite and gypsum are associated with limestone and dolomite in the Salina Group rocks south of Hamilton. These deposits are mined underground at Hagersville and Caledonia (R.K. Collings, 1959: Can. Dept. Mines, Mines Br. Info. Circ., 114, p. 11).

31 C/7 Anhydrite is found as colourless to white platy aggregates in close association with very coarse-grained calcite and finely granular gypsum in cavities in Ordovician limestone. The cavities are located at a road-cut on Highway 38, about 800 m north of Highway 401 (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 7).

31 C/16 A specimen of massive purple anhydrite in the National Mineral Collection is reported to have been collected at McLaren's phosphate mine, lot 4, conc. VIII, North Burgess Township, Lanark County.

31 F/4 A specimen of anhydrite in the Royal Ontario Museum mineral collection is from the Faraday Mine in lots 16 and 17, conc. XI, Faraday Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 31).

42 A/6 Veins of anhydrite occur in the quartz-ankerite zone at the McIntyre Mine in the Porcupine gold camp (G.B. Langford and E.G. Hancox, 1936: Econ. Geol., 31, pp. 600-9).

42 I/14 Anhydrite is present in gypsum beds interbedded with limestone and shale at Moose River (crossing), Canfield Township. A specimen is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 31).

Quebec

31 F/10 Pale violet to colourless anhydrite mixed with carbonate, and deep mauve, coarsely crystalline anhydrite have been encountered in a deep drillhole cutting Grenville limestone at Calumet Mines Limited, Calumet Island (F. Fitz Osborne, 1941: Univ. Toronto Stud., Geol. Ser., 46).

31 H/12 Anhydrite has been identified as a constituent of alkaline gabbro rocks taken from a tunnel at Mount Royal (F. Fitz Osborne, 1941: Univ. Toronto Stud., Geol. Ser., 46).

Yukon

115 G/2 A good-sized deposit of gypsum and anhydrite is exposed in a mountain and canyon east of Bullion Creek at about 61°01'N, 138°41'W (J.E. Muller, 1967: Geol. Surv. Can., Memoir 340, p. 115).

ANIMIKITE

This name, from Animikie-Thunder, was given by Wurtz (Eng. and Mining J., 27, 1879) to a supposed silver antimonide mineral occuring in the silver ore at Silver Islet, Thunder Bay district, Ontario. The material is now believed to have been mixture of antimonian silver and dyscrasite.

ANKERITE

$$Ca(Fe,Mg)(CO_3)_2$$

The problem of nomenclature for minerals of the dolomite group is complicated by the fact that iron and manganese may substitute for both calcium and magnesium in the dolomite structure. The pure calcium-iron end member of the group, $CaFe(CO_3)_2$, is known in nature and all ankerite contains a considerable amount of magnesium. Palache, Berman and Frondel in Dana's System of Mineralogy, Seventh Edition, arbitrarily divide the dolomite group at Mg:Fe=1:1; material with Mg>Fe is referred to as dolomite and material with Fe>Mg is referred to as ankerite. According to this system a great many specimens previously called ankerite would be called ferroan dolomite. Many mineralogists prefer to extend the range of composition of ankerite to include material having a $FeCO_3$ content of more than 10 per cent (Mg:Fe <5:1) thereby including most of the material that weathers characteristically dark brown to reddish brown and that, in the past, has been commonly referred to as ankerite. Most of the ankerite of Canadian deposits would be classified as ferroan dolomite according to Dana's System.

British Columbia

92 H/7 Ankerite is the main cementing material in breccia zones containing ore minerals at lead-zinc deposits on the north side of Whipsaw Creek, about 19 km from its junction with the Similkameen River (H.M.A. Rice, 1947: Geol. Surv. Can., Mem. 243).

92 I/7
92 I/10
92 I/15 Ankerite occurs abundantly as an alteration product of lavas, tuffs and breccias at many of the ore deposits in the Nicola map-area. These deposits include: Corona Group on Swakum Mountain, 14 km north of Nicola; Mercury Group, 24 km south of Savona on the Merritt highway

about 1.6 km east of Tunkwa Lake; North Line and South Line claims on the south side of Kamloops Lake about 4.8 km by road east of Savona; Charbonneau property, about 400 m east of Savona; Davis property (Sand T Group) on the southern slope of Mount Uren, about 1.6 km east of Savona Station on the Canadian National Railway; MacMercury Group on Criss Creek about 3.2 km above its mouth on Deadman River; and on the lower western slope of Hardy Mountain, about 6.4 km by road from Copper Creek station (W.F. Cockfield, 1948: Geol. Surv. Can., Mem. 249).

93 A/13 Pyroblasts, disseminated grains, streaks and narrow veinlets of ankerite with varying manganese content are found in silty quartzites and in schists and limestones of the Cariboo group. Manganese-bearing ankerite, gold and some sulphides occur in the quartz veins (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., paper 64-37).

104 N/12 Ankerite occurs as a gangue mineral in shear zones at the Atlin Ruffner silver-lead deposit near Crater Creek, a small tributary of Fourth of July Creek (J.D. Aitken, 1959: Geol. Surv. Can., Mem. 307, p. 71).

Northwest Territories

34 C Lenticular masses of ankerite enclosed in thick beds of chert are reported to occur on the Nastapoka Islands, off the east coast of Hudson Bay (A.P. Low, 1900: Geol. Surv. Can., Ann. Rept. XIII, 9 and 30 DD).

Nova Scotia

11 E/5 Large masses of ankerite, altered in part to limonite iron ore, occur on the south flank of the Cobequid Mountains, near Londonderry in Colchester County. Ankerite was quarried by early operators of the iron mines and used as a flux in blast furnaces (L.J. Weeks, 1948: Geol. Surv. Can., Mem. 245).

Chemical analyses of ankerite from Londonderry as reported by R.A.A. Johnston (Geol. Surv. Can., Mem. 74, p. 21); I, II, III by Louis (Nova Scotia Inst. Nat. Sci., V, 47-50, 1879-82); IV average of a number of analyses by Louis; V by Dawson; VI, VII by Jackson: VIII by How (A.R.C. Selwyn: Geol. Surv. Can., Rept., 1872-3, p. 27):

	I	II	III	IV
$CaCO_3$	53.64	49.32	54.96	53.75
$FeCO_3$	23.29	23.11	21.92	22.70
$MnCO_3$	0.77	0.68	1.29	0.80
$MgCO_3$	21.48	26.29	21.42	22.75
Fe_2O_3	tr		1.05	
Insol.	0.57	0.12	0.19	
Total	99.75	99.52	100.83	100.00

	V	VI	VII	VII
$CaCO_3$	54.0	43.80	49.20	51.61
$FeCO_3$	23.3	23.45	20.30	19.59
$MnCO_3$		0.80		
$MgCO_3$	22.0	30.80	30.20	28.67
Insol.	0.5	0.10		0.13
Total	99.7	98.95	99.70	100.00

11 E/7 Veins of ankerite are reported to occur in slates at Glencoe Brook, Pictou County (H. Fletcher, 1890-1: Geol. Surv. Can., Ann. Rept., V, 101P).

21 H/8 Veins of ankerite are reported to occur in slates and sandstone at Clarke's Head and Crane Point in Cumberland County (H. Fletcher, 1890-1: Geol. Surv. Can., Ann. Rept., V, 101 P).

Ontario

31 C/12 Gold-bearing ankerite-quartz-arsenopyrite veins are present at the Deloro Mine, lot 9, conc. VIII, Marmora Township. A specimen is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Sur., MP70, p. 32).

41 J/5 Ankerite is associated with chalcopyrite in quartz veins at the Rock Lake Mine, 22.5 km north of the village of Bruce Mines (E.D. Ingall, 1902: Geol. Surv. Can., Ann. Rept. XV, 251 A).

42 A/6 Ankerite occurs in the gold-bearing veins and in the wall rocks at the Porcupine camp. Chemical analyses of ankerite from Curts vein, West Dome Mine: I. $CaCO_3$ 50.63, $MgCO_3$ 29.57, $FeCO_3$ 14.15, insol. 1.73, total 96.08; II. $CaCO_3$ 51.28, $MgCO_3$ 29.82, $FeCO_3$ 14.70, total 95.80 (A.G. Burrows, 1912: Ont. Dept. Mines, Ann. Rept., vol. 21 Pt. 1).

Quebec

23 J/10 The X-ray powder pattern of ankerite from Schefferville, Quebec, has the following spacings and intensities for the five strongest lines: 2.90 (10), 2.201 (3), 2.022 (2), 1.816 (3), 1.798 (4). The c_0 dimensions calculated from the 0009 reflection is 16.18 Å, corresponding to an FeO content of about 12 per cent (X-ray Laboratory, Geol. Surv. Can.).

24 C/14 Masses of ankerite occur with thin beds of jaspery magnetite in cherty limestone on the banks of the Koksoak River (Kaniapiskau River) immediately below Shale Chute, a few km below Cambrian Lake, Ungava district (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, 18 R).

32 D/6 Ankerite is a common mineral in ore deposits in the Noranda district where it occurs in veins and shear zones and cementing breccia (M.E. Wilson, 1941: Geol. Surv. Can., Mem. 229).

ANNABERGITE

$Ni_3(AsO_4)_2.8H_2O$

Newfoundland

2 E/13 Tilt Cove Mines, Newfoundland's oldest copper producers, are located at Tilt Cove on the northeast shore of Notre Dame Bay. The West Mine also had nickel ore consisting of the following minerals: maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Ontario

31 C/13 Annabergite is reported to have been observed as a stain on quartzite containing some arsenopyrite at lot 1, conc. I, Limerick Township, Hastings County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 21).

31 M
41 P Many of the ore veins in the Cobalt-Gowganda district contain annabergite formed as an alteration product of cobalt-nickel arsenides (W.G. Miller, 1910: Ont. Bur. Mines, Ann. Rept., vol. 19, Pt. II, p. 19).

41 I/6 A specimen of gersdorffite from the Gersdorffite Mine, lot 12, conc. III, Denison Township, Sudbury district, is reported to have been coated with botryoidal, globular and mammillary

crusts of annabergite. The annabergite may have formed during storage of the specimen in a mineral cabinet for several years (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, 103-4 H).

52 A/6 Annabergite has been noted on specimens of ore from the Silver Islet Mine, off Thunder Cape, Lake Superior (E.D. Ingall, 1887-8: Geol. Surv. Can., Ann. Rept., III, 28 H).

ANTHOPHYLLITE

$(Mg,Fe)_7(Si,Al)_8O_{22}(OH)_2$

Anthophyllite is an orthorhombic member of the amphibole group. It occurs in metamorphic rocks that have high magnesia and alumina and low lime contents. Cordierite is a common associate. The name gedrite is applied to aluminian anthophyllite.

Manitoba

63 K/16 Brown prismatic aggregates of anthophyllite are found with kyanite, staurolite, garnet, anhydrite and cordierite at the Anderson Lake copper mine located on Highway 395 about 1.9 km from its junction with Highway 392 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 63).

63 N/2 A band of anthophyllite-rich rock has been traced from east to west through the Batty Lake map-area. Two chemical analyses were made by R.J.C. Fabry (1949). Grey-green bladed crystals from Star Lake; SiO_2 44.03, Al_2O_3 19.06, FeO 19.77, CaO 1.30, MgO 15.20, TiO_2 0.47, total 99.83. Brownish pink bladed crystals from north of the lake 3.2 km north of the west end of Batty Lake; SiO_2 45.32, Al_2O_3 22.74, FeO 14.15, CaO 1.11, MgO 16.90, TiO_2 0.25, total 100.47 (D.S. Robertson, 1953: Geol. Surv. Can., Mem. 271, p. 19).

Newfoundland

12 H/1 Greyish fibrous and rosette-like aggregates of anthophyllite are associated with cordierite, andalusite, and chlorite at the Gullbridge Mine, a former copper producer located at Mineral Point on the west side of Gull Lake (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 108).

23 G/2 Anthophyllite has been found in the Wabush, Labrador, iron-formation in two places: in the Smallwood Mine, with specularite, quartz, and a small amount of talc; and in Wabush deposits nos., 6 and 7 associated with quartz, magnetite, specularite, and manganocummingtonite. Fibrous varieties of anthophyllite occur as lenticular bands parallel to the regional foliation (K.L. Chakraborty, 1963: Can. Mineralogist, 7, p. 738).

Northwest Territories

85 I/12 Gedrite, the aluminous variety of anthophyllite, occurs in metasedimentary rocks east of Sparrow Lake. Chemical analysis: SiO_2 43.64, TiO_2 0.31, Al_2O_3 16.42, Fe_2O_3 1.26, FeO 24.52, MnO 0.77, MgO 8.95, CaO 0.42, Na_2O 1.23, K_2O 0.20, H_2O^+ 2.36, H_2O^- 0.20, total 100.28 (D.C. Kamineni and A.S. Wong, 1973: Can. Mineralogist, 11, p. 1012).

Ontario

31 E/1 Gedrite is an abundant constituent of amphibolite which occurs as a narrow belt along the north shore of Fishtail Lake, lot 11, conc. IX, Harcourt Township. The anthophyllite occurs with garnet, cordierite, and lesser amounts of quartz, biotite, rutile, magnetite and ilmenite. Chemical analysis of carefully purified sample, by Evans: SiO_2 44.32, Al_2O_3 16.04, Fe_2O_3 2.80, FeO 16.88, MnO 0.09, CaO 0.77, MgO 15.95, H_2O 1.31, K_2O and Na_2O 1.86, total 100.02 (H.N. Evans and J.A. Bancroft, 1908: Am. J. Sci., Ser. 4, XXV, pp. 509-512).

Chemical analyses by W. Herdsman of gedrites from the north shore of Fishtail Lake, Harcourt Township: SiO_2 42.08, 41.34; TiO_2 0.51, 0.82; Al_2O_3 14.37, 13.99; Fe_2O_3 5.63, 6.48; FeO 15.42, 17.14; MnO 0.54, 0.28; MgO 16.50, 14.85; CaO 0.48, 0.54; Na_2O 1.81, 2.01; K_2O 0.27, 0.11; H_2O 2.45, 2.30; total 100.06, 99.86 (R.K. Lal and W.W. Moorhouse, 1969: Can. Jour. Earth Sci., 6, p. 145).

Anthophyllite specimens in the Royal Ontario Museum mineral collection are from the following localities.

31 M/4 Cuniptau Mine, 6.4 km north of Temagami, Strathy Township.

41 I/10 MacDonald occurrence, west half of lot 12, conc. I, Loughrin Township.

42 F/4 Geco Mine, south-central part of Gemmell Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 35).

Quebec

12 L/14 A meta-gabbro mass composed mainly of coarse actinolite contains gedrite, some chlorite and a little epidote. The mass outcrops as a prominent topographic feature along the banks of Romaine-Est River, upstream for 4 km from a point 800 m north of the mouth of the Metivier River (J.A. Retty, 1944: Que. Dept. Mines, Geol. Rept., No. 19, p. 17).

21 E/11 Brownish fibrous aggregates of anthophyllite occur in the host rock at the Weedon Mine, located 2.1 km from Fontainbleau (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 38).

21 E/14 Colourless to greyish-white flaky and fibrous anthophyllite occurs with serpentine at the Continental Mine, 2.6 km west of Coleraine (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 46).

31 I/16 Anthophyllite, as greyish to silvery brown radiating fibrous or platy aggregates, occurs abundantly and is commonly associated with cordierite and phlogopite at the Montauban Mine near Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 89).

31 I/16 Anthophyllite is an abundant constituent of the ore zone at the Tetreault Mine, Montauban-les-mines, Portneuf County. The association cordierite-anthophyllite is a characteristic feature of that part of the ore zone that occurs in sillimanite-garnet gneiss (J.J. O'Neill and F. Fitz Osborne, 1938: Que. Dept. Mines, Prelim. Rept., 138, p. 18).

Saskatchewan

63 K/12 Anthophyllite is one of the principal gangue minerals at the Coronation Mine located near the shore of Phil Lake, 25.8 km from Creighton via Highway 167 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

Yukon

115 O/9 A hand specimen of anthophyllite submitted to the X-ray Laboratory, Geol. Surv. Can., is reported to have been found on Australia Mountain, about 26 km east of Granville.

anthraxolite

(see HYDROCARBONS)

antigorite

(see SERPENTINE)

ANTIMONY

Sb

British Columbia

92 I/15 At Criss Creek, 800 m from the road along Deadman River and about 19 km north of Savona, Kamloops Lake, native antimony occurs as small droplets (0.2 to 1.0 mm) within native arsenic associated with colloform dolomite in a breccia-type vein (J.S. Stevenson, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 88).

92 O/4 Native antimony, associated with pyrite and hessite, is a minor consituent of the ore at Pellaire Mines, located on Falls River about 8 km southwest of Taseko Lake (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 83).

104 M/8 Native antimony is associated with native gold and calaverite at the Engineer Mine on the east shore of Taku Arm of Tagish Lake (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 40).

104 P/5 Scattered grains of native antimony occur in a vein composed chiefly of galena, sphalerite and magnetite. The vein cuts dolomitized limestone at the Contact Group located between the head waters of McDame and Cottonwood Creeks at an elevation of 1830 m (R.M. Thompson, 1954: Am. Mineralogist 39, p. 527).

Manitoba

52 L/6 Arsenian antimony occurs as an exsolved phase in allemontite from the Odd West pegmatite about 1 km north of the western end of Rush Lake in the Bird River area. Electron probe analysis: Sb 87.74, As 10.87, total 98.61 (P. Černý and D.C. Harris, 1973: Can. Mineralogist, 11, p. 978).

New Brunswick

21 G/14 Native antimony, sometimes in large masses, occurs with stibnite and kermesite in quartz veins at a deposit near George Lake, Prince William parish, York County (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 19 T).

Northwest Territories

85 J/8 Native antimony believed to be of hypogene origin occurs as small grains within massive stibnite in the gold ores of the Yellowknife Bay area (L.C. Coleman, 1953: Am. Mineralogist 38, p. 520).

Nova Scotia

11 E/4 A small amount of native antimony occurs with stibnite and kermesite in quartz veins at the West Gore antimony mine in Hants County (A.R.C. Selwyn, 1892-3: Geol. Surv. Can., Ann. Rept., VI, 58 A).

Ontario

31 C/12 Chemical analysis of native antimony, found in small amounts at the Dufferin iron mine, lot 18, conc. I, Madoc Township, Hastings County, by R.A.A. Johnston: Sb 99.89, As 0.02, Fe trace, total 99.91 (G.C. Hoffmann, 1900: Geol. Surv. Can., Ann. Rept., XIII, 13 R).

42 B/1 Antimony, berthierite and stibnite are reported at an antimony-arsenic deposit explored by Card Lake Copper Mines Limited in Sewell Township at about 48°12'N, 82°00'30"W. The occurrence is 6.8 km by road south of Highway 101 from a junction 19.3 km west of the Little Star Lake road (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 154).

42 E/10 Native antimony occurs as tiny blebs and patches within stibnite and berthierite in gold ores at Talmora Longlac Mines in Errington Township (E.G. Pye, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. VI, p. 57).

Quebec

21 E/13 Lamellar to fine granular native antimony is reported to occur with stibnite, kermesite and valentinite in schists along a diabase-serpentine contact at an old mine on lot 28, range I, South Ham Township, Wolfe County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 876, and H.C. Cooke, 1937: Geol. Surv. Can., Mem. 211, p. 153).

ANTLERITE

$Cu_3SO_4(OH)_4$

Antlerite is a secondary mineral found in the oxidized zone of copper deposits in arid regions. It is the principal ore mineral of copper in the oxidized zone of the large deposit at Chuquicamata, Chile.

New Brunswick

21 P/5 Transparent, emerald-green, granular and botryoidal antlerite occurs as coatings and encrustations on sulphides and host rock at the Key Anacon Mine. The mine is located 6 km east of Highway 331, at a point 18.8 km south of Bathurst, Gloucester County (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 117).

Quebec

32 C/4 Ore specimens encrusted with emerald green antlerite were collected at the Louvem Mine in Louvicourt Township. The mine is located 3.2 km by road from Highway 59 at a junction 20 km from Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 120).

Saskatchewan

63 K/12 Emerald green encrustations of antlerite have been reported at the Coronation Mine near the

shore of Phil (McNally) Lake. The mine may be reached via Highway 167, about 9.6 km beyond the Birch Lake Mine. (Ann. P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

APATITE

$Ca_5(PO_4)_3(F,Cl,OH)$

Apatites contain varying amounts of fluorine, chlorine and hydroxyl and the names fluorapatite, chlorapatite and hydroxyl-apatite have been given to varieties rich in one of these constituents. Some apatites also contain several per cent of carbon dioxide. Substitutional solid solution between calcium and many other elements is common in apatites; strontium, manganese, cerium group rare earths, and uranium are the most common elements involved.

Manitoba

52 L/6 Indigo-blue to prussian-blue manganiferous apatite occurs in irregular aggregates up to fist size and as distinct crystals of short prismatic habit up to 1 cm in diameter along the footwall contact of the main pollucite body at the Montgary property, Chemalloy Minerals Limited, near the west end of Bernic Lake (M.H. Frohberg, 1960: private communication).

New Brunswick

21 J/10 Masses of crystals of apatite that fluoresces deep yellow under "short" ultraviolet rays occur at the Burnt Hill tungsten mine, in York county. This mine is accessible by gravel road from Maple Grove Station, a distance of about 26 km (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 128).

Ontario

Apatite is of common occurrence in the Grenville rocks of eastern Ontario and adjoining Quebec where it was mined at the turn of the last century as a major world source of phosphate. It occurs in calcite masses and veins and is associated with various amounts of pyroxene, mica, hornblende, scapolite, titanite, zircon, fluorite, microcline and spinel. Well-developed crystals, often very large, in various shades of green and brown are common. Many fine specimens of apatite crystals, associated with crystals of diopside and phlogopite, in a matrix of salmon-orange calcite have been collected in this region. No attempt has been made to list all occurrences of apatite, instead a representative list of localities taken from Johnston (Geol. Surv. Can., Mem. 74, pp. 35-6, 1915) is given here.

	COUNTY	TOWNSHIP	CONCESSION - LOT
31 C/7	Frontenac	Bedford	II - 4
31 C/8	Frontenac	Bedford	IV - 6
31 C/9	Frontenac	Bedford	VII - 7,32,33,34
31 C/10	Frontenac	Bedford	VIII - 28
31 C/15	Frontenac	Bedford	XII - 3
	Frontenac	Bedford	XIII - 4,6
	Frontenac	Bedford	XVII - 1
	Frontenac	Hinchinbrooke	I - 29,30
	Frontenac	Loughborough	VII - 2
	Frontenac	Loughborough	VIII - 11,12,14,16
	Frontenac	Loughborough	IX - 4,10,11,12, 13,15,17
	Frontenac	Loughborough	X - 7,8,10,13,19,24
	Frontenac	Loughborough	XI 8,9,10,15
	Frontenac	Loughborough	XII - 19,22,24
	Frontenac	Loughborough	XIII - 24,25
	Frontenac	Oso	I - 6
	Frontenac	Oso	V - 1,2
	Frontenac	Oso	VI - 14
	Frontenac	Oso	VIII - 4
	Frontenac	Storrington	XV - 8,23
31 D/16	Haliburton	Cardiff	XII - 8
31 E/1	Haliburton	Cardiff	XIV - 22
31 E/2	Haliburton	Cardiff	XVI - 8
	Haliburton	Cardiff	XXII - 7
	Haliburton	Dudley	III - 4
	Haliburton	Dysart	I - 28
	Hailburton	Dysart	V - 11
	Haliburton	Harcourt	XI - 21
	Haliburton	Monmouth	X - 3
	Haliburton	Monmouth	XI - 12,13,14,15,17
31 F/14	Hastings	Monteagle	VI - 26
31 C/15	Lanark	Bathurst	VIII - 10
31 C/16	Lanark	Bathurst	IX - 8,20
	Lanark	North Burgess	III - 15,16
	Lanark	North Burgess	IV - 11
	Lanark	North Burgess	V - 4,7,8,9,10,16, 18,19,20,21
	Lanark	North Burgess	VI - 13,14,15,16, 18,19
	Lanark	North Burgess	VII - 5,6
	Lanark	North Burgess	VIII - 1,2,3,4,5,6
	Lanark	North Burgess	IX - 5
	Lanark	North Elmsley	VI - 30
	Lanark	North Elmsley	VIII - 24,25,26,27
	Lanark	South Sherbrooke	VII - 11
31 C/9	Leeds	South Crosby	VI - 12
	Leeds	South Crosby	VII - 15
	Leeds	North Crosby	II - 19
	Leeds	North Crosby	III - 20
	Leeds	North Crosby	IX - 29
	Leeds	North Crosby	X - 21
31 D/16	Peterborough/Anstruther		XVII - 39
31 F/6	Renfrew	Sebastopol	VII - 32
31 F/10	Renfrew	Sebastopol	X - 27,28,
	Renfrew	Sebastopol	X - 31
	Renfrew	Sebastopol	XI - 31
	Renfrew	Sebastopol	XII - 32
	Renfrew	Ross	I - 7
	Renfrew	Ross	VI - 13
	Renfrew	Ross	IX - 7

31 C/7 Chemical analysis of massive, compact apatite with dull lustre and dull red colour from conc. X, lot 10, Loughborough Township, Frontenac County: CaO 48.475, Ca 4.168, MgO 0.158, Fe_2O_3 0.905, Al_2O_3 0.835, P_2O_5 40.868, F 3.731, Cl 0.428, CO_2 0.105, insol. 1.150, total 100.823; S.G. 3.1641 (G.C. Hoffmann, 1877-8: Geol. Surv. Can., Rept. Prog., 6 H).

31 C/7 Blue to greenish blue apatite up to 25 cm across occurs in veins consisting of very large crystals of mica (3 m in diameter), pyroxene (15 cm across and 45 cm long), sphene (10 cm across) and zircon (12 mm across and 3.7 cm long). These veins were properties of the Lacey Mica Mine which was operated for about 25 years by the General Electric Company. The mine is located at about 27 km north of Kingston and 8 km west of the Kingston-Westport-Perth Road. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 25).

31 C/8 Chemical analysis of apatite from conc. VI, lot 14, Storrington Township, Frontenac County: massive, compact, dull lustre, greyish to reddish white with reddish brown bands: CaO

47.828, Ca 3.732, MgO 0.151, Fe_2O_3 0.151, Al_2O_3 0.609, P_2O_5 40.373, F 3.311, Cl 0.438, CO_2 0.026, insol. 3.890, total 100.509; S.G. 3.1593 (G.C. Hoffmann, 1877-8: Geol. Surv. Can., Rept. Prog., 3 H).

31 C/9 Apatite occurs as light greenish-blue crystals, measuring up to 2.5 cm across, and as granular masses, in roadcuts on Highway 15 about 45.2 to 45.5 km north of Kingston (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 45).

31 C/10 Apatite-bearing crystalline limestone is exposed at a roadcut on the Westport Road about 11 km from Godfrey which is located on Highway 38, 42 km north of Kingston. The apatite has been found as sea-green transparent to translucent crystals measuring up to 4 cm by 18 cm and as crystal masses (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 16).

31 C/15
31 C/16 Study of apatite crystal from South Sherbrooke Township, Lanark County. Colour deep green. Lustre vitreous. Transparent only in thin splinters. Forms present include first and second order prisms and first order pyramids. Indices of refraction: E=1.628 O=1.635 ± 0.001, S.G. 3.165. Clayey material and a little hematite are present as impurities. Chemical analysis: CaO 55.38, MnO 0.04, Fe_2O_3 0.51, Al_2O_3 0.23, Na_2O 0.16, K_2O 0.12, P_2O_5 41.05, F 2.35, Cl 0.48, CO_2 0.22, H_2O 0.13, insol. 0.35, total (100.02) less O for F (1.09) 99.93 (A.S. Dadson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 55).

31 C/16 Apatite occurs in greyish white feldspar at the Byrnes Mine at a contact of gneiss and pyroxenite. It occurs also as a massive red variety with dark brown mica in the northernmost phosphate pits. The phosphate mine is located about 360 m east of the Kingston-Westport-Perth Road and about 76.4 km along the road to the north of Kingston (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 31).

31 C/16 Chemical analysis of apatite from conc. III, lot 16, North Burgess Township, Lanark County; massive, lustre subvitreous, colour dull red. S.G. 3.1603: CaO 46.327, Ca 4.258, MgO 0.548, Fe_2O_3 1.290, Al_2O_3 1.190, P_2O_5 39.046, F 3.791, Cl 0.476, CO_2 0.096, insol. 3.490, total 100.512 (G.C. Hoffmann, 1877-8; Geol. Surv. Can., Rept. Prog., 4 H).

Study of apatite crystal from Elmsley Township, Lanark County. Colour emerald green. Lustre vitreous. Transparent only in thin splinters. Indices of refraction: E=1.637, O = 1.642 ± 0.001, S.G. 3.167. Crystal forms present include first order prism and one pyramidal termination. Chemical analysis: CaO 55.25, MnO 0.01, Fe_2O_3 0.36, Al_2O_3 0.35, P_2O_5 41.12, F 3.31, Cl 0.88, CO_2 0.33, H_2O 0.11, insol. 0.27, total (101.99) less O for F (1.58) 100.41 (A.S. Dadson 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 56).

31 C/16 Red and green granular apatite occurs with amber to dark brown mica and altered scapolite crystals at a deposit consisting of several pits and dumps about 400 m west of the Silver Queen Mine, located about 73.2 km (road log) north of Kingston about 5 km off and to the west of the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 31).

31 C/16 Apatite has been mined from a deposit which includes a mica-apatite mine in marble and a feldspar mine in pegmatite. The mines were operated by Silver Queen Mines. The apatite occurs as blue, light green, fine- to coarse-granular masses and as crystals measuring up to 20 cm long. Also found in the mica-apatite mine are small clusters of mica, tremolite-asbestos, calcite, scapolite and tourmaline. Another apatite occurrence is exposed along the road about 1.6 km before reaching Silver Queen Mines. The mine is located about 73.2 km (road log) north of Kingston along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 C/16 Blue-green granular and crystalline apatite is associated with dark brown mica, green pyroxene and minor amounts of pink to orange calcite and pyrite in a quartz-feldspar matrix. Jet black massive tourmaline crystals and reddish-brown transparent titanite crystals and masses occur sparingly in quartz. The deposit was known as the McLaren mine and is located on the property of Mrs. W.L. McLaren, west of Otty Lake and approximately 7.2 km south of Perth (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 35).

31 E/1 Bluish green apatite crystals from conc. XV, lot 35, Monmouth Township, Haliburton County have been cut and polished as gemstones. The apatite is said to cut well en cabochon but is rather brittle (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 46).

Asparagus-green apatite crystals up to 45 cm long and 12 cm in diameter occur in nepheline syenite in conc. XV, lot 32, Faraday Township, Hastings County. Associated minerals include crystals of biotite and plagioclase and irregular masses of fluorite, magnetite and pyrite. The crystals exhibit the forms c (0001), m $(10\bar{1}0)$, and x$(10\bar{1}1)$ and many are doubly terminated. Chemical analysis by H.C. Rickaby: CaO 55.10, MgO 0.23, MnO 0.12, FeO 0.36, Al_2O_3 0.12, P_2O_5 41.24, F 3.65, CO_2 0.73, insol. 0.22, total (101.77) less O for F (1.54) 100.23 (T.L. Walker, and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 22).

Study of apatite crystal from Faraday Township, Hastings County. Colour asparagus green. Lustre vitreous. Clear and transparent except where fractures are filled with dull rust-coloured material. Indices of refraction: E=1.630, O = 1.634 ± 0.001, S.G. 3.176. Chemical analysis: CaO 55.16, MnO 0.12, FeO 0.14, Fe_2O_3 0.63, Al_2O_3 0.24, P_2O_5 41.30, F 3.67, Cl 0.09, CO_2 0.50, H_2O 0.01, insol. 0.28, total (102.14) less O for F (1.56) 100.58. The CO_2 found on analysis is believed due to finely disseminated calcite (A.S. Dadson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 53).

31 E/1 Apatite from the Basin property, lot 31, concession XV, Faraday Township is a well-known reference fluorapatite and has been examined in detail. Chemical analysis of clear green crystals by USGS: CaO 54.7, MnO 0.15, SrO 0.18, Na_2O 0.18, RE oxides, 0.76, P_2O_5 40.9, CO_2 0.57, F 4.0, total 101.44 less O=F 1.68, total 99.76; S.G. 3.220 (A. Gulbrandsen, J.R. Kramer, L.B. Beatty and R.E. Mays; 1966: Am. Mineralogist, 51, p. 819-823).

31 F/10 Light green and maroon red apatite crystals occur with sphene, pyroxene and zircon in hornblende pegmatite on the farm of Fred Ross, about 3.2 km west of Foresters Falls on lot 4, conc. IV, Ross Township. Crystals of red apatite were mined in 1883 at Elliott's Mine about 800 m north of Forestors Falls on lot 6,

conc. IX, Ross Township (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 61).

31 F/11 Study of apatite crystals from Eganville, Renfrew County. Colour dull reddish brown. Forms present include first order prisms and pyramids and base. The crystals have numerous inclusions of hematite which are responsible for the reddish colour. Indices of refraction: E = 1.630, O = 1.634 ± 0.001, S.G. 3.197. Chemical analysis: CaO 53.96, MnO 0.01, MgO 0.10, Fe_2O_3 1.28, Al_2O_3 0.98, P_2O_5 39.70, F 3.40, Cl 0.11, CO_2 0.47, H_2O 0.23, insol. 1.16, total (101.40) less O for F (1.45) 99.95 (A.S. Dadson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 52).

52 F/13 Zones rich in blue-green apaptite occur in a radioactive pink pegmatite dyke exposed along the north shore of Kimber Lake at the east end of the lake, in Docker Township (A.P. Pryslak, 1976: Ont. Div. Mines, GR 130, p. 50).

53 A/13 A specimen of apatite in the mineral collection of the Royal Ontario Museum is from Camp Lake, 4.8 km south of Big Beaver House at 52°55'N, 89°54'W, Kenora district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 39).

Quebec

Many occurences of apatite have been found in Grenville rocks in the counties of Gatineau, Papineau and Pontiac. The following list is taken largely from R.A.A. Johnston (Geol. Surv. Can., Mem. 74, p. 26, 1915).

	COUNTY	TOWNSHIP	RANGE AND LOT
31 G/5	Gatineau	Hull	VII - 18,19
31 G/12	Gatineau	Hull	X - 15,17
	Gatineau	Hull	XI - 9,14
	Gatineau	Hull	XII - 9,10,14
	Gatineau	Hull	XIII - 1
	Gatineau	Hull	XIV - 10
	Gatineau	Hull	XV - 12
	Gatineau	Hull	XVI - 13,14,15,16
31 G/12	Gatineau	Wakefield	I - 12,17
	Gatineau	Wakefield	II - 17,18
	Gatineau	Wakefield	V - 22,23,24
	Gatineau	Wakefield	IX - 30
31 G/11	Papineau	Bowman	IV - 1,2,3,4
31 G/12	Papineau	Buckingham	XI - 26
31 G/13	Papineau	Buckingham	XII - 17,18,19,26
	Papineau	Portland	VIII - 9
	Papineau	Templeton	VII - 3,4,5,6,7
	Papineau	Templeton	IX - 16
	Papineau	Templeton	X - 7,9,10
	Papineau	Templeton	XI 6,7,8,9,10,11
	Papineau	Templeton	XII - 2,8
	Papineau	Templeton	XIII - 6,7,22
	Papineau	Villeneuve	I - 31
31 F/15	Pontiac	Huddersfield	IV - 20
	Pontiac	Huddersfield	V - 20

21 L/3 Colourless tabular crystals of apatite up to 1 cm in diameter and not more than 2 millimetres thick have been found in drusy quartz boulders used for construction of a stone fence about 8 km northwest of Black Lake, near the road leading to St. Ferdinand de Halifax. Colourless quartz crystals are superimposed upon the transparent apatite plates, which rest on massive white quartz (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Museum Bull. 27, pp. 81-2).

22 C/5 Constituents of a pegmatite dyke at the McGie Mine on the northeast shore of Charlotte Lake include good crystals of tourmaline, garnet, beryl and small amounts of apatite. Attractive specimens consisting of sheets of clear mica enclosing crystals of deep red garnet and of sea green apatite are also found (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 100).

22 D/11 Variable amounts of light green to colourless apatite occur in the ore at the St-Charles Titanium Deposit on the north shore of the Saguenay River (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 109).

32 F/15 Apatite crystals up to 30 cm in length are found in a skarn zone with fluorite, pyroxene and pink calcite on the Yates Uranium Mines property on lot 20, range IV, Huddersfield Township. Chemical analysis: P_2O_5 38.26, CO_2 0.88, SiO_2 1.76, SO_3 0.72, CaO 53.91, SrO 0.28, Y_2O_3 0.15, Ce_2O_3 1.23, La_2O_3 0.44, Na_2O 0.28, Fe_2O_3 0.13, F 3.92, H_2O 0.29, total 102.25 less O for F 1.65, total 100.60 (W.E. Trzcienski, G. Perrault and P. Hebert, 1974: Can. Mineralogist, 12, p. 289).

31 G/5
31 G/11
31 G/12
31 G/13 Many occurences of apatite are known in the Gatineau area north of Ottawa, and are described in detail with directions to reach them in Geol. Surv. Can., Papers 68-51 and 69-50, by Ann P. Sabina.

31 G/11 The old Grant Mine, range XII, lot 18, Buckingham Township has yielded one of the largest apatite crystals in the world. This crystal which weighs 250 kg and measures 159 cm in circumference is housed in Ottawa in the National Mineral Collection. Chemical analysis of massive, fine granular, greyish green apatite from the Grant Mine: CaO 44.198, Ca 3.062, MgO 0.422, Fe_2O_3 0.120, Al_2O_3 1.979, P_2O_5 34.032, F 2.855, Cl 0.101, CO_2 2.848, insol. 2.050, Fe + S 8.877, total 100.544, S.G. 3.2441. Chemical analysis of massive, vitreous, pale greenish grey apatite from the Grant Mine: CaO 49.161, Ca 3.803, MgO 0.158, Fe_2O_3 0.125, Al_2O_3 0.705, P_2O_5 41.080, F 3.474, Cl 0.260, CO_2 0.370, insol. 0.370, total 99.506, S.G. 3.1493 (G.C. Hoffmann, 1877-8: Geol. Surv. Can., Rept. Prog., 4-7 H).

31 G/12 Chemical analysis of massive granular, greenish white apatite from range I, lot 6, Portland Township: CaO 49.041, Ca 3.603, MgO 0.205, Fe_2O_3 0.083, Al_2O_3 0.267, P_2O_5 40.158, F 3.377, Cl 0.086, CO_2 0.855, insol. 1.630, total 99.665, S.G. 3.1676.

Chemical analysis of massive, lamellar, vitreous, bright sea-green apatite from range VII, lot 7, Portland Township: CaO 49.335, Ca 4.195, MgO 0.180, Fe_2O_3 0.094, Al_2O_3 0.566, P_2O_5 41.139, F 3.863, Cl 0.229, CO_2 0.223, insol. 0.060, total 99.884, S.G. 3.1884.

Chemical analysis of massive, waxy, pale greenish white apatite from range XII, lot 12, Templeton Township: CaO 49.102, Ca 3.763, MgO 0.620, Fe_2O_3 0.125, Al_2O_3 0.565, P_2O_5 40.812, F 3.554, Cl 0.040, CO_2 0.518, insol. 0.630, total 99.729, S.G. 3.1750 (G.C. Hoffmann, 1877-8: Geol. Surv. Can., Rept. Prog., 5-6-8 H).

A vitreous, light sea-green apatite crystal from Battle Lake, Templeton Township, has indices of refraction, E = 1.629, O = 1.634 ± 0.001; S.G. 3.174. Chemical analysis: CaO 55.48, MgO 0.26, Fe_2O_3 0.58, Al_2O_3 0.36, Na_2O 0.18, K_2O 0.22, P_2O_5 40.31, F 3.47, Cl 0.30, CO_2 0.14, H_2O 0.11,

insol. 0.42, total (101.83) less O for F (1.52) 100.31 (A.S. Dadson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 54).

31 G/12 Chemical analyses of apatite from Templeton Township by Carnot (1896): I. outer portion of crystal, CaO 52.90, MgO trace, FeO 1.20, Fe_2O_3 0.30, P_2O_5 41.64, F 1.17, Cl 0.42, CO_2 2.31, insol. 0.37, total 100.31; II. inner portion of crystal, CaO 52.90, MgO trace, FeO 1.30, Fe_2O_3 0.22, P_2O_5 41.50, F 1.26, Cl 0.37, CO_2 2.30, insol. 0.30, total 100.15 (Bull. Soc. Min. France, XIX, p. 43).

31 G/15 Small grains and prisms of transparent blue apatite are common in the limestone at the Rockway Valley Marble Quarry, west of Arundel (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 68).

31 G/16 Blue aptite is found at the Laurel diopside occurrence, south of Sixteen Island Lake (Ann P. Sabina, 1969: Geol. Surv. Can., Paper, 68-51, p. 57).

31 J/11 Cobalt-blue massive apatite occurs at the Val-Barrette quarries (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 57).

Saskatchewan

74 O/13 Radioactive apatite-rich veins occur in the Nisikkatch and Northwest Lakes region, 56 to 64 km northeast of Uranium City. Orange, red, brown and green apatite is associated with allanite, thorite and monazite. Chemical analysis of brown apatite by Mines Branch, Ottawa, gave 4.48 per cent total rare earths and 0.40 per cent thoria. The cerium group rare earths predominate in the red and brown apatite; yttrium group rare earths predominate in the orange and green apatite (D.D. Hogarth, 1957: Can. Mineralogist, 6, pp. 140-150).

APLOWITE

$CoSO_4.4H_2O$

Nova Scotia

21 H/1 Aplowite is a new mineral species found at the Magnet Cove Barium Corporation mine located about 4 km southwest of Walton. It is closely associated with the hexahydrate, moorhouseite, also a new mineral. X-ray fluorescence analysis showed the mineral to be a manganiferous-nickeliferous variety having the following cation atomic ratios Co:Mn:Ni:Cu:Fe:Zn:= 100:50:45:3:2:2. The name is for A.P. Low (1861-1942), Canadian geologist and one-time Director of the Geological Survey of Canada (J.L. Jambor and R.W. Boyle, 1965: Can. Mineralogist, 8, p. 166-171).

APOPHYLLITE

$KCa_4Si_8O_{20}(F,OH).8H_2O$

Apophyllite is a relatively uncommon mineral which is found most often in association with zeolites. Like the zeolites it has a high content of water, but structurally it is more closely akin to the micas.

British Columbia

82 F/4 Apophyllite is reported to be one of the most common minerals that occur as crystals in vugs and fissures in the gold-copper-silver mines of the Rossland camp, West Kootenay district. The mineral occurs in cube-like forms, also as elongate prisms with pyramidal terminations, and as flat tabular crystals. The colour varies from colourless to pink.

Nova Scotia

21 A/NW
21 H/SE Many fine specimens of apophyllite have been collected along the shores of Minas Channel and the south of the Bay of Fundy in Annapolis, Cumberland and King's counties. The mineral occurs as easily cleavable masses and rosette-like crystal aggregates in cavities and fissures in basalt. Localities that have yielded specimens include: Ile Haute, Cape d'Or, Partridge Island, Amethyst Cove, Hall Harbour, Scott Bay, Chute Cove, Hampton, Margaretville, Port George, and Bennett Brook. A.L. Parsons (Univ. Toronto Stud., Geol. Ser. 14, p. 39, 1922) has studied the morphology of crystals from this area, and reports the following chemical analysis of apophyllite from Ste. Croix River: SiO_2 52.02, Al_2O_3 1.02, Fe_2O_3 0.07, CaO 24.74, Na_2O 0.70, K_2O 4.28, MgO 0.05, H_2O 16.23, F 1.88, total (100.99) less O for F (0.79) 100.20.

The following list of localities and associated minerals was compiled from the detailed account by Ann P. Sabina, 1964: Rocks and Minerals for the Collector, Bay of Fundy Area; Geol. Surv. Can., Paper 64-10.

	Locality	Associated Minerals
21 A/14	Hampton (Chute Cove) Annapolis County	chalcedony, natrolite, epidote
	Port Lorne, Annapolis County	jasper, chalcedony, stilbite, mesolite, thomsonite, laumontite
21 H/2	Canada Creek, Black Rock, Kings County	stilbite, mordenite, heulandite, mesolite, laumontite, prehnite, gyrolite.
21 H/2	Halls Harbour, Kings County	stilbite, heulandite, laumontite, thomsonite, amethyst
	Morden, Kings County	stilbite, laumontite, mordenite, analcime, heulandite, mesolite
21 H/3	Margaretsville, Annapolis County	heulandite, laumontite, analcime, gyrolite, mesolite, stilbite, scolecite, natrolite
21 H/3	Port George, Annapolis County	chalcedony, stilbite, heulandite, analcime, mesolite, laumontite, gyrolite, thomsonite
21 H/7	Horseshoe Cove, Cape d'Or Cumberland County	analcime, stilbite, laumontite, chabazite, thomsonite, mesolite, natrolite, heulandite, jasper, copper, calcite
21 H/8	Partridge Island, Cumberland County	stilbite, laumontite, natrolite, heulandite, chabazite, analcime, quartz crystal, calcite, chalcedony, jasper

	Locality	Associated Minerals
21 H/8	Swan's Creek (Brook), Cumberland County	gmelinite, chabazite, analcime, natrolite, heulandite, calcite, stilbite
	Cape Blomidon - Cape Split, Kings County	heulandite, natrolite, stilbite, chabazite, analcime, gmelinite, laumontite, mesolite, thomsonite, amethyst, jasper, agate, celadonite

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21 H/8 Chemical analysis of apophyllite from Cape Blomidon: SiO_2 50.52, TiO_2 0.06, Al_2O_3 1.03, MnO 0.03, CaO 24.69, MgO 0.69, K_2O 5.60, Na_2O 0.38, P_2O_5 0.07, F 1.17, H_2O^+ 16.40, less O for F 0.49, total 100.15 (F. Aumento and C. Friedlaender, 1966: Min. Soc. India, I.M.A. Volume, p. 149-154.

Ontario

52 A/3 Apophyllite is reported to occur in foliated masses or plates associated with calcite at the Prince's Mine on Spar Island, Thunder Bay district (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 20 T).

Quebec

21 E/13 At the Jeffrey Mine, apophyllite occurs as clear colourless crystals up to 4 cm long and 2 cm wide, as translucent grey-white crystals, and as clear colourless coatings less than 5 mm thick on albite. The mine is at 45°46'25"N, 71°57'12"W, lots 9-10, ranges II and III, Shipton Township, Richmond County (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

21 L/3 Large crystals of apophyllite, intimately associated with pectolite occur in a granite or aplite rock in the serpentine deposits at Thetford Mines (A.L. Parsons, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 55).

31 H/11 Apophyllite has been identified in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire. (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

ARAGONITE

$CaCO_3$

Aragonite is polymorphous with calcite. It is isostructural with witherite, strontianite and cerussite, three carbonates of metals having atomic radii greater than that of calcium. The calcite structure is the stable one for calcium and ions of smaller atomic radii. Aragonite is formed in low-temperature environments and it may invert to calcite at normal temperatures in the presence of water.

British Columbia

82 E/6 A large specimen of white acicular aragonite in the National Mineral Collection was collected at Penticton.

82 F/3 A large body of aragonite is reported to occur 1.6 km north of the south fork of Salmon River, on the south slope of "Staghorn Mountain" (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 29).

82 F/14 Aragonite is reported to have been found lining a large vug or cavity over No. 3 level, Standard Mine, Slocan camp (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 29).

Also reported as large groups of radiating, acicular, colourless crystals and as compact masses filling fissures at the Wonderful Mine, Slocan camp (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 130).

82 K/11 Fine specimens showing masses of radiating translucent crystals of aragonite have been collected near the head of Gainer Creek which flows into Lardeau Creek, east of Ferguson Creek and about 16 km northeast of Trout Lake, in the West Kootenay district (R. Bell, 1902-3: Geol. Surv. Can., Ann. Rept., XV, 51 AA).

93 A/6 Aragonite has been observed filling amygdaloidal cavities in dark greenish grey basalt along the Horsefly River, which flows into Horsefly Bay, Quesnel Lake (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, 13 R).

Newfoundland

12 B/10 Aragonite is associated with barite and celestite at Port au Port (G.C. Riley, 1962: Geol. Surv. Can. Mem. 323, p. 55).

Nova Scotia

11 E/5 Aragonite has been reported to occur in fissures and cavities in ankerite, and implanted on barite and calcite at Londonderry, Colchester County (G.C. Hoffmann, 1888-9; Geol. Surv. Can., Ann. Rept., IV, 21 T).

Ontario

31 M/5 Aragonite has been noted at the O'Brien Mine, Coleman Township, and other mines in the Cobalt district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 29).

52 A Aragonite has been observed in the trap rocks in the Thunder Bay district north of Lake Superior (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 21 T).

Quebec

21 E/14 Aragonite occurs in druses as thin-bladed individuals and radiating groups, associated with vesuvianite, diopside, garnet and chlorite at the Montreal Chrome Pit, about 1.2 km east of the south end of Little Lake St. Francis in Coleraine Township, Megantic County (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Museum Bull. 27, pp. 25-6).

21 E/14 Small aggregates of transparent, platy aragonite are associated with pyroaurite at the Belmina mine, located northwest of Disraeli about 4 km north of St-Jacques (Stenson).

Transparent, radiating bladed aggregates of aragonite have also been noted at the Montreal Chrome Pit, east of Little Lake St. Francis (Ann P. Sabina, 1967: Geol. Surv. Can., Paper, 66-51, p. 45, 48).

21 L/3 Tiny white aragonite crystals occur with garnet, vesuvianite, diopside, zoisite, chlorite, hydrocalcite, artinite, magnetite and serpentine at the Union mine, near Grabtree village in the Black Lake area (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 51).

31 H/8 Patches of white, fibrous aragonite have been noted on schist at the Huntingdon mine on the

east side of the road between Eastman and Bolton Centre, Brome county (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 9).

Yukon

105 D/11 Vesicles in basalt contain white radiating tufts of acicular aragonite, white botryoidal calcite and crystals of dog-tooth spar. The basalt is exposed at rapids along the Yukon River at the Whitehorse power dam in Whitehorse (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 50).

116 C/7 Coarse radiating fibrous aggregates of white vitreous aragonite occur with serpentine at the Clinton Creek asbestos deposit on Porcupine Hill overlooking Clinton Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 111).

ARFVEDSONITE

$(Na,K,Ca)_3(Fe^{++},Mg,Mn,Fe^{+++},Al,Ti)_5(Si,Al)_8O_{22}(OH,F)_2$

Newfoundland

13 E/15 Chemical analysis of arfvedsonite from the Red Wine complex: SiO_2 49.20, Al_2O_3 1.70, TiO_2 0.96, FeO 26.64, Fe_2O_3 7.50, MnO 0.98, MgO 0.40, CaO 0.90, Na_2O 7.22, K_2O 3.39, H_2O 1.64, total 100.53 (F.C. Hawthorne, 1976: Can. Mineralogist, 14, p. 346).

13 K/5 There is no firm agreement as to definition of the species arfvedsonite and riebeckite. The latter mineral is generally considered to have two alkali atoms instead of three and a higher ferrous : ferric ratio than arfvedsonite. The soda amphibole, found with soda pyroxene in the paragneiss at beryllium deposits in the vicinity of Ten Mile Lake in the Seal Lake area, approaches the formula given above for arfvedsonite. The two minerals occur predominantly in layers up to several millimeters thick but also as individual grains in feldspar. Chemical analysis by Miss E. Mark: SiO_2 50.16, BeO 0.18, Al_2O_3 1.10, TiO_2 1.64, Nb_2O_5 0.14, Fe_2O_3 9.12, FeO 20.60, MnO 2.27, MgO 0.92, CaO 1.32, Na_2O 6.85, K_2O 3.61, H_2O (+110°) 1.64, H_2O (-110°) 0.04, F 0.39, total 99.98 less O for F 0.16, 99.82 (E.H. Nickel and E. Mark, 1965: Can. Mineralogist, 8, p. 185-197).

Quebec

31 H/11 Arfvedsonite has been identified at Mount St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

argentite

(see ACANTHITE)

ARGYRODITE

Ag_8GeS_6

British Columbia

103 P/12 This rare sulpho-germanate mineral has been identified in specimens from the Dolly Varden Mine, located about 27 km north of Alice Arm near the head of the Kitsault River. The mineral occurs in small amounts with acanthite in veinlets and fissures. It is closely associated with pyrite and has not been observed in areas of massive acanthite away from pyritized quartz. Galena, chalcopyrite, sphalerite, tetrahedrite, polybasite, pyrargyrite and native silver are also present in the specimens (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 545).

ARGYROPYRITE

Ag, Fe sulphide

Ontario

31 M/5 Argyropyrite is reported to occur with stromeyerite and native silver in a specimen collected at the Foster Mine, Cobalt district (R.A.A. Johnston, 1907: Geol. Surv. Can., Sum. Rept., p. 96). No data is given to substantiate the reported occurrence. Argyropyrite is of doubtful validity as a mineral species.

arquerite

(see SILVER)

ARROJADITE

$Na_2(Fe,Mn)_5(PO_4)_4$

Yukon

117 A/9 Arrojadite is one of several phosphate minerals collected from a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is 1.5 km upstream from the juncture of the two streams. Also present are kulanite, lazulite, wardite, vivianite, childrenite, ludlamite, metavivianite, augelite and brazilianite (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

ARSENIC

As

British Columbia

82 F/11 Native arsenic occurs in large nodules associated with arsenopyrite and pyrrhotite at Eight Mile Creek, which flows north into the west arm of Kootenay Lake about 12.8 km northeast of Nelson (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept. XI, 14 R).

92 B/12 Native arsenic has been reported in small veins outcropping along the Koksilah River which flows northeast into Cowichan Bay, Victoria district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 31).

92 F/2 A specimen of native arsenic in the National Mineral Collection is listed as having been collected at Port Alberni on Vancouver Island.

92 F/14 Native arsenic has been identified in specimens from the Mount Washington copper mine located near the summit and on the northeast slope of Mount Washington about 24 km northwest of Courtenay (X-ray Laboratory, Geol. Surv. Can.).

92 I/15 Colloform masses of native arsenic and dolomite form the matrix of a vein breccia that cuts carbonatized argillaceous sediments at Criss Creek, 800 m from Deadman River road, north of the west end of Kamloops Lake (J.S. Stevenson, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 83).

92 O/1 Veins containing native arsenic have been found on Watson Bar Creek, about 11 km from its junction with the Fraser River (G.C. Hoffmann, 1886: Geol. Surv. Can., Ann. Rept., II, 9 T).

103 B/6 An occurrence of native arsenic has been reported on Alder Island, 52°27'N, 131°19'W, north of Burnaby Island, Queen Charlotte Islands (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 31).

Newfoundland

12 H/9 Native arsenic has been found in the Whalesback and Little Bay copper mines on the Springdale peninsula, Notre Dame Bay. The largest mass, 1 m long and 5 cm thick, fills a fracture in an altered basic dyke on the 450 m level of the Little Bay Mine. (V.S. Papezik, 1967: Can. Mineralogist, 9, p. 101-108).

Ontario

31 M/5 Native arsenic has been reported from the Conisil Mine on the east shore of Giroux Lake, about 460 m south of the Lawson Mine (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 45).

41 I/16 Crystalline native arsenic has been noted at the Long Lake gold mine, near the south end of Long Lake and 2.8 km west of Wavy Lake, Sudbury district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 31).

52 A/7 Native arsenic has been identified from Edward Island in Lake Superior about 48 km east of Fort William (W.F. Ferrier: Canadian Record of Sciences, IV, p. 472).

Quebec

31 H/12 Fist-size specimens of native arsenic were found in nepheline syenite on the northwest flank of Mount Royal at the Corporation Quarry, Outremont (Montreal). Chemical analysis by N.N. Evans: As 98.14, Sb 1.65, S 0.16, insol. 0.15, total 100.10; S.G. 5.73-5.75 (N.N. Evans, 1903: Am. J. Sci., Ser. 4; and F.D. Adams, 1901: Geol. Surv. Can., Ann. Rept., XIV, 23 O).

ARSENOBISMITE

$Bi_2(AsO_4)(OH)_3$

New Brunswick

21 G/7 Pale green encrustations of arsenobismite occur with scorodite on the walls of the 600 adit at the Mount Pleasant deposit of Brunswick Tin Mines (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

ARSENOLITE

As_2O_3

British Columbia

92 F/14 Arsenolite has been identified as a greyish white powder on native arsenic from the Mount Washington copper mine located near the summit and on the northeast slope of Mount Washington about 24 km northwest of Courtenay (X-ray Laboratory, Geol. Surv. Can.).

92 O/1 Arsenolite occurs as a white coating on native arsenic from Watson Bar Creek, about 11 km from its junction with the Fraser River (G.C. Hoffmann, 1892-3: Geol. Surv. Can., Ann. Rept., VI, 30 R).

Ontario

31 C/12 Arsenolite occurs as an alteration product of arsenopyrite at the Deloro Mine, lot 9, conc. VIII, Marmora Township, Hastings County (W.G. Miller, 1902: Ont. Bur. Mines, Ann. Rept., vol. 11, p. 195).

31 M Arsenolite has been noted in silver-bearing veins in the Cobalt camp (G.C. Hoffmann, 1892-3: Geol. Surv. Can., Ann. Rept., VI, 30 R).

31 M/5 A specimen of arsenolite in the Royal Ontario Museum mineral collection is from the Christopher Mine, lot 2, conc. III, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 49).

ARSENOPYRITE

FeAsS

Arsenopyrite, also known as mispickel, is the most abundant arsenic-bearing mineral and is found widely distributed throughout Canada in various environments. It is a common mineral in gold-bearing quartz veins, nickel-silver-cobalt, and lead-zinc-silver veins, and high temperature tin-tungsten veins. Danaite is a name given to cobaltian arsenopyrite. Known occurrences of arsenopyrite are too numerous to list here, and only a few localities that have yielded good specimens are mentioned.

British Columbia

82 F/4 Good specimens of cobaltian arsenopyrite have been obtained from the Josie and Evening Star mines near Rossland. Chemical analysis by Johnston: As 46.41, S 19.21, Fe 28.91, Co 2.97, insol. 3.86, total 101.36. S.G. 6.166. Analysis recalculated to 100 per cent after deducting siliceous impurities: As 47.60, S 19.70, Fe 29.65, Co 3.05 (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 13 R).

82 F/10 Short prismatic and deeply striated crystals of arsenopyrite of exceptional quality have been collected at the Bluebell Mine on the east side of Kootenay Lake (J.D. Grice and R.A. Gault, 1977: Mineralogical Record, 8, p. 33).

92 J/15 Danaite, bearing 1 to 6 per cent cobalt, occurs on the Gem Group, about 40 km northwest of the main Bridge River camp. It is found in pegmatite lenses near the contact of the Coast Range batholith. Associated minerals are allanite, molybdenite, and uraninite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 43).

104 K/12 Gold-bearing arsenopyrite, commonly as needle-like crystals has been mined at the Polaris-Taku Mine on the southern slope of Whitewater Mountain, on the west side of Tulsequah River about 9.6 km upstream from its mouth on Taku River (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 61).

Manitoba

63 J/13 Finely crystalline arsenopyrite is the most common mineral present at the Rex (Laguna) gold mine located 60 m from the east shore of Herb Lake about 2 km north of the former settlement of Herb Lake and opposite Campbell Island. The association of native gold with arsenopyrite is also found at the Bingo, Moose Horn and Kiski mines in the same area (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 54).

63 J/13 Crystals of arsenopyrite and tourmaline occur with native gold at the McCafferty Mine, east of the narrows between Wekusko Lake and Crowduck Bay (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 58).

63 K/16 Good crystals of arsenopyrite have been found in mica schist at the Minto claim near Snow Lake in the Herb Lake district (National Mineral Collection).

63 K/16 The ore at the Nor Acme Mine consisted of native gold associated with needle-like bunches of arsenopyrite. The mine operated from 1949 to 1958 and gave rise to the village of Snow Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 67).

63 K/16 The ore of the Chisel Lake Mine consists mainly of massive sphalerite, pyrite, pyrrhotite, chalcopyrite, galena and arsenopyrite. Minor amounts of gudmundite, meneghinite, tetrahedrite, bournonite and native gold are present. The orebody lies below the southern end of Chisel Lake at about 54°49.5'N, 100°08'W (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 65).

New Brunswick

21 G/7 Arsenopyrite is common in the ore zones at the Mount Pleasant property of Brunswick Tin Mines (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

21 J/10 Arsenopyrite, pyrite, pyrrhotite and molybdenite are the most abundant sulphides occurring with wolframite at the Burnt Hill Mine in York County. The mine is about 26 km north of Maple Grove Station (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 128).

21 P/5
21 P/12 Arsenopyrite is a minor constituent of the lead-zine-copper deposits of the Bathurst camp, at the Nigadoo River, Key Anacon and Brunswick No. 6 mines (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 114, 117, 118).

Newfoundland

2 E/10 Stibnite, arsenopyrite and pyrite are associated at an antimony mine on the steep side of a hill at the south shore of Frost (Cross) Cove on the west side of Moreton's Harbour, New World Island, Notre Dame Bay. A similar association is found at a mine on the east side of the opening of Little Harbour, a small inlet on the east side of Moreton's Harbour (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, pp. 97, 100).

Northwest Territories

55 K/7 Auriferous gossans composed of arsenopyrite with minor chalcopyrite and pyrrhotite were sampled by Tavane Explorations Limited at the MAR claims on the northwestern shore of Pistol Bay, 35.4 km north of Whale Cove (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 31; Dept. Indian and Northern Affairs).

85 J/8 Most of the gold mined at Yellowknife is believed to occur as submicrosopic inclusions and possibly in solid solution in arsenopyrite. Fine blebs of native gold have been found around the grain boundaries and in fractures of arsenopyrite (R.C. Tait, 1961: Bull. Can. Inst. Mining Met., vol. 54, No. 588, p. 302).

Nova Scotia

11 D/12 Pyrite and arsenopyrite occur as crystals and irregular masses, generally in quartz, at the Montague gold mine, located about 8 km to the north of Dartmouth. Masses of arsenopyrite over 22 kg in weight were encountered in the early days, and the mine was worked for arsenic in the 1920's (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 5).

11 D/15 At Moose River Gold Mines, a settlement north of Lake Charlotte, arsenopyrite occurs as prismatic crystals about 12 mm long and 12 mm across, associated with pyrite, galena, scheelite, chalcopyrite, calcite and gold, in quartz veins cutting slate (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 10).

11 D/16 Specimens of large individual and twinned arsenopyrite crystals 5 cm long are common in quartzite in the dumps at the Harrigan Cove gold mine, located about 800 m from the Harrigan Cove post office. Some fine crystals of gold were also recovered from this mine (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 12).

11 E/1 Crystals of arsenopyrite up to 7 cm by 2 cm are common in the slate and quartzite at the Goldenville (Sherbrooke) gold mine near the settlement of Goldenville in Guysborough County (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 12).

11 F/5 Well-formed crystals of arsenopyrite up to 1.2 cm in cross-section have been found in fine-grained mica schist near Guysborough (National Mineral Collection).

Ontario

31 C/12 Many fine specimens of arsenopyrite have been collected at the Deloro Mine, lot 9, conc. VIII, and Gawley Mine, lot 19, conc. IX, in Marmora Township, Hastings County.

31 M/5 Massive, silver-white to steel-grey danaite was found forming a vein up to 1.8 m wide at the 120 m level of the O'Brien Mine at Cobalt. It was originally thought to be smaltite but was found to contain only 3.5 per cent Co. It has been studied using X-ray (by M.A. Peacock), polished section, and chemical analysis (M.H. Frohberg, 1960: private communication).

31 M/4 Arsenopyrite in massive form, and as aggregates of microscopic crystals with pyrite, occurs on mine dumps at the Little Dan gold mine near the shore of Arsenic Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 8).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16 Electron probe microanalyses of arsenopyrite from the Cobalt-Gowganda ores: (1) Fe 33.8, As 46.2, S 20.1, total 100.1; (2) Fe 32.74, As 48.64, S 19.78, total 101.16; (3) Fe 32.37, As 45.15, S 21.28, total 98.80 (W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 179).

41 I/6 Massive arsenopyrite occurs in a deposit worked for nickeliferous pyrrhotite in lot 6, conc. III, Graham Township, Sudbury district. Chemical analysis by Johnston: As 40.16, S 17.92, Fe 31.69, Co 3.89, Ni 0.88, Sb 0.57, Au trace, insol. 4.77, total 99.88; S.G. 5.988. Analysis recalculated to 100 per cent after deducting siliceous impurities: As 42.22, S 18.84, Fe 33.32, Co 4.09, Ni 0.93, Sb 0.60 (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 19 R).

Specimens of danaite have been obtained from a locality in Graham Township, conc. IV, lot 4, in the Algoma district (National Mineral Collection).

Quebec

31 F/10 Danaite occurs in Pontiac County, Calumet Township, range IX, lot 12 (National Mineral Collection).

Saskatchewan

63 K/12 Gold-bearing arsenopyrite occurs in masive form and as well-formed crystals in massive quartz and in chlorite schist at the Newcor Mine near Douglas Lake, about 4.2 km south of Creighton. Arsenopyrite is also present on the Henning Maloney property, 2.7 km south of the Newcor Mine (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 22).

63 L/9 The association of native gold with arsenopyrite is found at several properties in the vicinity of Amisk Lake. Massive arsenopyrite is found as lenses measuring 30 to 76 cm wide and several meters long at the Sonora deposit on the east shore of the larger of two islands immediately south of Waverly Island (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 35).

63 L/10 Crystals of arsenopyrite occur with massive galena and sphalerite and lesser amounts of pyrite, pyrrhotite, chalcopyrite, acanthite and tetrahedrite in the Western Nuclear Mine orebody, located beneath Hanson Lake, 180 m east of the shore between Bertrum and McIlvenna Bays (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 17).

73 P/7 Arsenopyrite crystals occur in quartz stringers and in gabbro at a deposit worked by Mr. Vern Studer of LaRonge and located on the narrows of a large south-trending peninsula in Sulphide Lake. Native gold has been reported in fractures in the arsenopyrite (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 6).

Yukon

105 D/2 Gold-bearing arsenopyrite and silver-bearing galena have been mined at the Arctic Caribou and Venus mines in the Windy Arm (Tagish Lake) area. The Arctic Caribou is at 1700 m elevation on the west side of Sugarloaf Hill, a peak on the north side of Montana Mountain. The Venus Mine is on the eastern slope of Montana Mountain (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 44-45).

105 D/6 Arsenopyrite and galena are the most common minerals at the Union Mine, a former silver-lead mine at the 1070 m level on the east side of Idaho Hill which overlooks Annie Lake (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 43).

115 I/3 The silver-gold ores of Mount Nansen Mines Limited (Webber and Huestis properties) and Brown-McDade Mines Limited in the Nansen Creek-Webber Creek area at 62°03'N, 137°07' to 137°10'W, contain considerable arsenopyrite (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 34).

ARTINITE

$Mg_2CO_3(OH)_2.3H_2O$

A low temperature hydrothermal mineral found originally in serpentinized ultrabasic rocks in Italy and subsequently in Serbia, and at several places in the United States. Not previously reported from Canada.

Quebec

21 L/3 Artinite occurs as transparent, colourless to white, slightly greenish tinted, radiating fibrous aggregates (fibres up to 12 mm long) with satin lustre, with small magnetite octahedra on dark greenish black, massive serpentine in pit No. 9 at the Union Mine, near Crabtree village in the Black Lake area (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 51).

asbestos

(see SERPENTINE, ACTINOLITE, ANTHOPHYLLITE, CROCIDOLITE)

ASHCROFTINE

$KNaCaY_2Si_6O_{12}(OH)_{10}.4H_2O$

Quebec

31 H/11 Ashcroftine has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

ashtonite

(see MORDENITE)

ASTROPHYLLITE

$(K,Na)_3(Fe,Mn)_7Ti_2Si_8O_{24}(O,OH)_7$

Quebec

31 H/11 The rare titanium silicate, astrophyllite, has been identified as a contituent of veins and vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

ATACAMITE

$Cu_2(OH)_3Cl$

Saskatchewan

63 L/9 The secondary copper mineral, atacamite, has been identified with brochantite and devilline as powdery coatings on sulphides and volcanic rocks at the Birch Lake Mine, located at the north end of a small island in Birch Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 26).

ATHABASCAITE

Cu_5Se_4

Northwest Territories

56 D/2 Athabascaite, berzelianite and umangite have been found as fracture fillings in carbonatized mafic intrusive rock from Christopher Island, Baker Lake. The athabascaite and berzelianite occur as intergrowths, forming angular plates among hematite blades in coarser parts of the veins. Electron microprobe analyses of the athabascaite gave:

Cu	52.3	52.1	52.9	51.8
Se	43.5	43.1	43.1	43.4
S	3.3	3.3	3.6	3.6
Fe	0.2	0.4	0.1	1.5
Total	99.3	98.9	99.7	100.3

(G.J. Pringle and A.R. Miller, 1977: Geol. Surv. Can., Paper 77-1B, p. 113)

Saskatchewan

74 N/10 Athabascaite is a new copper selenide from the Martin Lake Mine located at the northeast corner of Martin Lake, in the neck of land between Beaverlodge Lake and Martin Lake. The mineral occurs as lath-shaped inclusions in umangite and as stringers and veinlets in hematite- stained carbonate veins in basalt. Electron microprobe analyses: Cu 51.1, Se 49.7, total 100.8; Cu 52.0, Se 44.0, S 2.7, total 99.7 (D.C. Harris, L.J. Cabri and S. Kaiman, 1970: Can. Mineralogist, 10, p. 207-215).

AUGELITE

$Al_2(PO)_4)(OH)_3$

Yukon

117 A/9 Augelite is one of several phosphate minerals collected from a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Minerals found at the locality include kulanite, lazulite, wardite, vivianite, childrenite, ludlamite, metavivianite, arrojadite and berzelianite (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

AUGITE

$Ca(Mg,Fe,Al)(Al,Si)_2O_6$

Augite is the most abundant variety of pyroxene occurring in igneous rocks. It is especially common in basic and ultrabasic rocks such as diabase, gabbro, basalt and andesite.

Ontario

41 P Augite is the chief ferromagnesian mineral of diabase in the Gowganda mining division, Timiskaming district. It is faint reddish brown in transmitted light and shows no crystal outlines except in incomplete crystallized basaltic rock types. By decomposition it changes to a hornblende with strong blue-green pleochroic coloration. Chemical analysis by M.F. Connor (1913): SiO_2 48.00, Al_2O_3 4.31, Fe_2O_3 3.06, FeO 17.34, MgO 9.82, CaO 14.84, Na_2O 0.91, K_2O 0.15, H_2O^+ 1.00, H_2O^- 0.07, TiO 0.91, total 100.40 (100.41) (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 347).

The mineral collection of the Royal Ontario Museum includes specimens of augite from the following localities:

31 C/5 Highway 7, 3.2 km east of Marmora, Marmora Township;
31 D/5 Snowdon Iron Mine, Snowdon Township;
31 D/16 near Cheddar; and from lot 8, conc. XXII, Cardiff Township;
31 E/1 lot 3, conc. I, Harcourt Township; roadcut at Diamond Lake, lot 31 or 32, conc. III or IV, Herschel Township;
31 F/4 MacDonald Mine, lot 18, conc. VII, Monteagle Township;
42 D/16 Red Sucker Cove, east of Port Coldwell, McCoy Township;
52 C/10 Bad Vermilion Lake, 48°44'N, 92°40'W, east of Rainy Lake (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 53).

Quebec

31 G/8
31 G/9 Sodian augite is the common pyroxene of the carbonate and ijolitic rock types, and titanaugite occurs in jacupirangite and alnoite rock types of the Oka Complex. The Complex is located 32 km west of Montreal on the north shore of the Lake of Two Mountains. Chemical analyses by H. Ulk (X, XI) and W.H. Herdsman (XII) are as follows: X, titanaugite from nepheline jacupirangite, SiO_2 39.89, Al_2O_3 14.94, TiO_2 2.30, Fe_2O_3 5.62, FeO 2.01, MnO 0.21, MgO 10.14, CaO 24.33, Na_2O 0.10, K_2O 0.03, P_2O_5 0.16, H_2O^+ 0.13, H_2O^- 0.07, total 99.87, S.G. 3.399; XI, sodian augite from calcite rock, SiO_2 48.75, Al_2O_3 2.04, TiO_2 0.66, Fe_2O_3 5.32, FeO 5.30, MnO 1.83, MgO 11.73, CaO 22.12, Na_2O 1.58, K_2O 0.04, P_2O_5 0.05, H_2O^+ 0.08, H_2O^- 0.01, total 99.51, S.G. 3.570; XII, sodian augite from melteigite, DDHG15, 330 feet, SiO_2 47.16, Al_2O_3 1.49, TiO_2 0.24, Fe_2O_3 5.33, FeO 6.61, MnO 1.36, MgO 10.92, CaO 23.70, Na_2O 1.07, K_2O 0.04, P_2O_5 0.59, H_2O^+ 1.14, total 99.65, S.G. 3.518 (D.P Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126.)

31 G/9 Alkaline rocks composed mainly of augite and analcime, with varying amounts of olivine and phlogopite outcrop just northwest of St-Monique-des-Deux-Montagnes,, 36.8 km northwest of Mount Royal (K.L. Currie, 1976: Geol. Surv. Can., Bull. 239, p. 68).

31 H/11 Chemical analysis of a crystal of augite from olivine dolerite comprising a large part of Mont St. Bruno, Chambly Township: SiO_2 49.40, Al_2O_3 6.70, Fe_2O_3 7.83, CaO 21.88, MgO 13.06, Na_2O 0.74, volatile 0.50, total 100.11; S.G. 3.341 (T. Sterry Hunt, 1858: Geol. Surv. Can., Rept. Prog., p. 183).

AURICHALCITE

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

British Columbia

82 K/2 Aurichalcite, woodruffite, gunningite and hydrozincite are associated with smithsonite in specimens from the Moonshine silver-lead-zinc claims worked by Willet Mines Limited, near Lardeau. The aurichalcite occurs as light blue flaky aggregates in the smithsonite. (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 257)

Yukon

105 M/13
105 M/14 The secondary mineral, aurichalcite, has been identified as a rare constituent of the Galena Hill-Keno Hill deposits (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 91).

AUROSTIBITE

$AuSb_2$

This mineral was described for the first time in 1952 from two localities in Canada. In polished section the mineral resembles galena but has a

slight pinkish tinge (A.R. Graham and S. Kaiman, 1952: Am. Mineralogist, 37, p. 461).

Northwest Territories

85 J/9 Aurostibite occurs at the Giant Yellowknife Mine in dolomitic carbonate and quartz with gold, freibergite, stibnite, jamesonite, chalcostibite, bournonite, arsenopyrite, pyrite, chalcopyrite and sphalerite.

Ontario

32 D/4 At the Chesterville Mine, Larder Lake area. aurostibite occurs in quartz with gold, galena, tennantite, chalcopyrite, sphalerite, arsenopyrite, gersdorffite and pyrite.

awaruite

(see NICKEL-IRON)

AXINITE

$Ca_2(Mn,Fe)Al_2BSi_4O_{15}OH$

British Columbia

92 H/8 Axinite is found as fine brown crystals and crystalline masses at the contact between monzonite and sedimentary rocks on the western slope of Nickel Plate Mountain, north of the junction of Hedley Creek and the Similkameen River. Chemical analysis by Johnston: SiO_2 42.18, B_2O_3 5.22, Al_2O_3 18.12, Fe_2O_3 0.98, FeO 7.20, MnO 3.89, ZnO 0.09, CaO 19.91, MgO 1.43, H_2O 0.35, total 99.37; S.G. 3.296 (R.A.A. Johnston, 1910: Geol. Surv. Can., Summ. Rept., p. 259).

Manitoba

63 K/16 Pink crystals of axinite have been identified as a rare mineral at the Nor Acme Mine near Snow Lake village (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 67).

Ontario

31 C/5 Axinite occurs in joints and thin seams in dark hornblende schist near a contact with granite gneiss at the extreme southeastern lot in Marmora Township, Hastings County. The mineral has a brilliant lustre when fresh but becomes dull purplish grey on exposure. It occurs as crystals as large as 4 cm in diameter, but with poor crystal forms. Chemical analysis by E.W. Todd: SiO_2 41.46, Al_2O_3 19.94, Fe_2O_3 0.96, FeO 4.56, MnO 5.44, CaO 19.57, MgO 1.99, H_2O 1.61, B_2O_3 4.88, total 100.41; S.G. 3.221 (T.L. Walker and A.L. Parsons, 1923; Univ. Toronto Stud., Geol. Ser., 16, p. 31).

31 M/5 Axinite is reported with epidote and chalcopyrite in calcite at the Christopher Mine south of Brady Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 50).

31 M/5 A specimen of axinite in the Royal Ontario Museum mineral collection is from the Lawson Mine, lot 3, conc. IV, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 54).

41 P/10 The silver-bearing veins at the Castle-Trethewey Mine are reported to contain axinite (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 79).

41 P/10 Well-formed, clear crystals of axinite have been found in veins in diabase (Nipissing) at the Morrison property, Gowganda area. Crystal faces are usually visible and crystal aggregates 2 to 3 cm in diameter have been noted (J.L. Jambor, 1971: Can. Mineralogist, 11, p. 249).

42 A/6 Axinite has been found in vein quartz and calcite at the Moneta gold mine near Timmins. Chemical analysis by E.W. Todd: SiO_2 42.34, Al_2O_3 19.68, Fe_2O_3 1.90, FeO 5.28, MnO 3.38, CaO 20.27, MgO 1.24, H_2O 1.23, B_2O_3 5.16, total 100.48; S.G. 3.274 (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser. 20, p. 20).

42 A/6 Axine has been reported in the Timmins area at the Hollinger and Paymaster gold mines (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 135, 145).

42 A/6 A specimen of axinite from the Cincinnati Mine (Clifton Mine) in the northeast part of Deloro Township is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 54).

42 A/10 Mauve to almost white axinite has been found in a quartz-carbonate matrix on the dump at the Goldhawk Mine. The deposit is situated on the eastern tip of the south end of the peninsula at the north end of Night Hawk Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 124).

Quebec

31 M/3 Grey crystalline aggregates and scattered crystals of axinite in a quartz-calcite vein cutting diabase are reported to occur in lot 7, range VI, N, Fabre Township, Timiskaming district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 37).

31 D/1 Specimens of pale purple, massive axinite were collected from an open-cut on the property of the O'Brien Mine about 0.8 km northwest of Cadillac (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 74).

33 N/11 Axinite is reported to occur at Manitounuck Sound on the east shore of Hudson Bay (G.M. Dawson, 1899: Geol. Surv. Can., Ann. Rept., XII, 193 A).

33 N/15 An occurrence of axinite, associated with epidote, in calcite and quartz is reported about 2.4 km south of Little Whale River on the east side of Hudson Bay (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22 T).

Yukon

105 H/16 Axinite is associated with scheelite in the skarn zone of the Canada Tungsten Mine located at 61°57'N, 128°15'W in the Logan Mountains at an elevation of 1680 m, overlooking the Flat River valley (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 22).

115 P/10 Axinite has been identified by X-ray diffraction pattern in a specimen from May Creek in the McQuesten River valley (X-ray Laboratory, Geol. Surv. Can.).

AZURITE

$Cu_3(CO_3)_2(OH)_2$

Very few good specimens of azurite have been found in Canada. It usually occurs with malachite as a stain or light incrustation on copper minerals or copper-bearing rocks.

British Columbia

82 E/2 King Solomon Mine, near Greenwood (G.C. Hoffmann, 1900: Geol. Surv. Can., Ann. Rept., XIII, 20 R).

82 F/6 Eureka Mine, Nelson area (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 37).

82 F/14 Kaslo River, Ainsworth mining division (A.R.C. Selwyn, 1892-3: Geol. Surv. Can., Ann. Rept., VI, 77 A).

82 G/12 Near Fort Steele (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 37).

82 N/5 Azurite and malachite occur with anglesite, cerussite and minor smithsonite in oxidized lead-zinc ores on the Waverley property located just north of Tangier Pass and accessible from Albert Canyon (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

92 I/2 Quartz-calcite veins carrying azurite, malachite, chrysocolla, chalcocite, bornite and chalcopyrite occur at 1680 m elevation on Iron Mountain, 8 km south-southeast of Merritt. A similar occurrence is at 880 m to 1200 m elevations on Clapperton Creek, 16.8 km northeast of Merritt (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 142-4).

104 G/12 Azurite and malachite with minor chalcopyrite and chalcocite occur in tabular bodies and discontinuous veins up to 60 cm wide and 30 m long at 57°31.5°N, 131°31.6'W, on Strata Creek, 9.6 km south of Stikine River, 48 km southwest of Telegraph Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 534).

104 P/3 Azurite and malachite occur with chalcopyrite, pyrite, and hematite in two deposits in the McDame map-area: 2.4 km south of the mouth of Nizi Creek on the east side of the trail along Four Mile River; 3.2 km north of McDame. Both deposits are in greenstone (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 113).

114 P/10 Stains and crusts of azurite and malachite are present on copper minerals at the Mineral Mountain Mine and Copper Butte Mine located on the steep southwest side of Mineral Mountain and on the west side of Copper Butte Ridge, northwest and north, respectively, of the hairpin turn at Km 83.5, Haines Road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

New Brunswick

21 G/1 Azurite is found on Frenchman Creek in Saint John County (W.L. Goodwin, 1938: Geology and Minerals of New Brunswick, 1st. Edition, Industrial and Educational Pub. Co., Gardenvale, Que.).

21 H/4 At Beveridge Cove in Saint John County, in a shear zone (F.J. Alcock, 1938: Geol. Surv. Can., Mem. 216).

21 H/10 At Little Ridge and Midway in Albert County, in sandstone and conglomerate (W.J. Wright, 1951: New Brunswick, Mines Br., Paper 51-2 P).

21 H/10 At the copper deposit on the Copp farm near Germantown, and at the Horton (Vernon) Mine, rare azurite is associated with chalcocite, malachite, chalcopyrite and covellite in grey sandstone. The copper minerals occur as veins and as intergrowths with fibres of fossil plants (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 24).

21 H/15 Near Dorchester, Westmorland County (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, 284 A).

Newfoundland

1 L/14 At the St. Lawrence fluorite mines, azurite, malachite and chrysocolla are found in pockets in the fluorite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 87).

Northwest Territories

58 B/15 Malachite and azurite occur in fissures and along bedding planes over a distance of 0.8 km along a fault cutting carbonates at 72°50'45"N, 93°42'45"W, in the northern part of Somerset Island (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 156; Dept. Indian and Northern Affairs).

Nova Scotia

11 E/6 At the Smithfield lead mine, about 8 km from Middle Stewiacke, azurite is associated with galena, pyrite, arsenopyrite, chalcopyrite, sphalerite, calcite, quartz, barite, malachite, in limestone and limestone conglomerate (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 44).

21 H/1 Azurite is one of the supergene minerals at the Magnet Cove barium-lead-zinc-silver deposit, 4 km southwest of Walton (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104).

Ontario

31 C/12 A specimen of azurite in the mineral collection of the Royal Ontario Museum is from the Eldorado Copper Mine, lot 17, conc. V, Madoc Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 55).

32 D/4 Morrissette Township (D.G.H. Wright, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. VI, p. 62).

41 P/5 Azurite has been noted at a prospect on the south side of a narrow peninsula near the outlet of Clam Lake, Chester Township; also at the Lawrence Group showings on the east side of Mesomikenda Lake in the northeast corner of Chester Township (H.C. Laird 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. III, pp. 27, 33).

41 P/9 Conc. II, lot 10, and conc. III, lots 10 and 11 in Bryce Township (W.W. Moorhouse, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. IV, p. 35).

52 A/3 Batchewanung Bay and Spar Island, Thunder Bay district, Lake Superior (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22 T).

52 C/15 A specimen of azurite collected at 48°45'N, 92°37'W, near Mine Centre, Rainy River district, is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 55).

52 F/15 Dryden gold-mining area (Ellis Thomson, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 180).

52 O/4 An azurite specimen in the Royal Ontario Museum mineral collection is from near Slate Falls, North Bamaji Lake, 51°11'N, 91°36'W, Kenora district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 55).

Quebec

21 L/12 At the Black River Mine, St. Flavien, Lotbiniere County (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22 T).

22 A/13 Minor amounts of azurite and malachite occur in the Copper Mountain and Needle Mountain orebodies of Gaspé Copper Mines Limited at Murdochville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81).

31 H/10 Prince of Wales Mine, Upton, Bagot County (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22 T).

31 H/10 Azurite, brochantite, posnjakite and malachite are secondary minerals formed from chalcopyrite and bornite at the Acton Mine at Acton Vale, Bagot county (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 25).

Saskatchewan

73 P/6 Azurite and malachite are conspicuous as powdery to finely crystalline encrustations on gneiss at the Anglo-Rouyn Mine situated on the northwest shore of Lac La Ronge between Waden and Pipestone bays about 25.7 km northeast of the village of La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5).

Yukon

The following occurrences of azurite are recorded by D.B. Craig and P. Laporte, 1972, in Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northen Development.

105 B/1 The Fiddler-West or Wolframite showing of the Luck Group (60°07'N, 130°26'W) is located along Boulder Creek north of a point 8 km from its junction with the Rancheria River. The showing consists of quartz veins containing wolframite, cassiterite, chalcopyrite, galena, malachite, azurite, limonite, fluorite and minor beryl.

115 A/3 Abundant azurite and malachite staining is present at the property of Jack Pot Copper Mines Limited, 9.6 km southwest of Dalton Post and 4.8 km north of the Yukon - British Columbia border (60°03'N, 137°07'W).

115 I/6 Azurite and malachite are associated with massive and disseminated chalcopyrite at the Yukon Revenue property (62°21'N, 137°12'W) on Revenue Creek on the south side of the valley of Big Creek, 56 km northwest of Carmacks.

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105 D/14 Bright royal blue fibrous and granular aggregates of azurite occur with malachite, chrysocolla, and massive bornite in a road-cut on the Alaska Highway, 3.9 km north of the cut-off to Whitehorse (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 52).

baddeckite

(see MUSCOVITE)

BADDELEYITE

ZrO_2

Northwest Territories

59 G/8 Baddeleyite is an accessory mineral in two gabbros from the western part of Axel Heiberg Island at 79°27'15"N, 90°42'W, and 79°29'50"N, 90°47'10"W. Average of 35 electron microprobe spot analyses: ZrO_2 97.8, HfO_2 0.93, SiO_2 0.08, FeO 1.3, TiO_2 0.56, total 100.67 (K. Keil and P E. Fricker, 1974: Am. Mineralogist, 59, p. 249).

Quebec

31 H/12 Baddelyite has been identified as straw-yellow to tan coloured scaly aggregates associated with calcite, fluorite, barite and strontianite in the lower level at the Francon quarry on Montreal Island (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 16).

BARICITE

$(Mg,Fe^{++},Fe^{+++})_3(PO_4)_2(OH)_x \cdot 8-xH_2O$

Yukon

117 A/9 Baricite, the magnesium analogue of vivianite, has been described as a new species in specimens from a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is 1.5 km upstream from the juncture of the two creeks. XRF analysis by E.J. Brooker: MgO 15.36, Fe_2O_3 25.41, P_2O_5 31.28, H_2O 28.96, total 101.01. Other minerals present are: kulanite, lazulite, wardite, vivianite, childrenite, ludlamite, metavivianite, arrojadite, augelite and brazilianite (B.D. Sturman and J.A. Mandarino, 1976: Can. Mineralogist, 14, p. 403).

BARITE

$BaSO_4$

Barite is of widespread occurrence in Canada and has been mined since about 1866. The first production is reported to have come from Bass River, near Five Islands, Colchester County, Nova Scotia. Barite occurs in vein or bedding replacement deposits in many types and ages of host rock but is most commonly found replacing limestone of Paleozoic and Precambrian age. The minerals usually associated with barite are: quartz, calcite, fluorite, dolomite, siderite, celestine, galena, sphalerite and chalcopyrite.

British Columbia

82 E/1 A specimen of barite from the Rock Candy Mine, located about 24 km north of Grand Forks is in the National Mineral Collection.

82 F/14 The Ottawa Mine, Calumet, Hekla and Myrtle claims, Slocan City mining division, have yielded barite (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 38).

82 G/4 Barite from Phillips Creek, near Roosville, near the International Boundary east of the Kootenay River, is represented in the National Mineral Collection.

82 G/6 The national Mineral Collection includes barite from near Elko.

82 K/2 The orebodies at the Mineral King Mine, 45 km southwest of Invermere consist essentially of galena and sphalerite in a predominantly barite gangue. Barite was produced from this deposit in 1959 and shipped to Rosalind, Alberta, for grinding and bagging (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 40).

82 K/8 During 1959, barite was mined by open-pit methods from a vein on the Harrobee claim, about 16 km west of Invermere (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 41).

82 K/16 A barite deposit located 6.4 km by road west of Brisco siding has been worked annually on a seasonal basis since 1945. The main barite zone is more than 12 m wide and 240 m long, and occupies a fault zone in dolomitic limestone (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 39).

The tailings pond at the abandoned Giant Mine, located 11.2 km west of Spillimacheen contains an estimated 730,000 tonnes of material containing 40 per cent barite (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 42).

82 M/4 Barite veins and stringers up to 9.1 m wide cut sheared pyritiferous talcose quartz sericite schists at about 900 m elevation about 4.8 km west along the Squaam Bay-Louis Creek road from the head of Squaam Bay on Adams Lake (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1970, p. 317).

82 N/2 A barite vein deposit, located 9.6 km by road southwest of Parson, has been mined annually on a seasonal basis since 1941 (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 38).

92 B/13 Tyre and Mount Sicker copper mines, northwest of Duncan, contain barite (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 38).

92 I/2 A galena-barite vein occurs in a strong shear zone at 1680 m elevation on Iron Mountain, 8 km south-southeast of Merritt (B.C. Dept. Mines and Pet. Res., Geol. Exp and Mining in B.C., 1972, p. 142).

93 A/6 Barite is associated with lignite along the Horselfy River (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, 99 A).

93 N/9 High grade barite is exposed on the Omineca Queen claims at 55°31.5'N, 124°06.5'W, at 823 m elevation about 800 m south of Manson Creek on the east bank of a small tributary stream 3 km east of the bridge where the Omineca Road crosses Manson Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 373).

94 K/10 Exploration work has been carried out on a barite deposit near km 639 on the Alaska Highway (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 43).

94 M/8 A large witherite-fluorite-barite deposit occurs near km 801 on the Alaska Highway (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 43).

94 N/4 Large deposits of barite occur near km 759 on the Alaska Highway and on nearby Sulphur Creek (K.R. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 77).

104 P/3 Barite with sparsely disseminated galena was noted along the north bank of Dease River, south of Atan Lake, McDame map-area (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 114).

Manitoba

62 P/7 Barite occurs in veins in serpentine on Pipestone Island, Lake Winnipeg (J.B. Tyrrell, 1898: Geol. Surv. Can., Ann. Rept., XI, 54 G).

New Brunswick

21 B/15 Small veins containing barite have been noted at the northern head of Grand Manon Island, Charlotte County (L.W. Bailey, 1897: Geol. Surv. Can., Ann. Rept., X, 125 M).

21 G/2 Barite occurs on Frye Island in Charlotte County (W.L. Goodwin, 1928: Geology of Minerals of New Brunswick, 1st. Edition, Industrial and Educational Pub. Co., Gardenvale, Que.).

21 H/5 Barite occurs associated with manganese at Quaco Head, in Saint John County (New Brunswick Mines Br. files).

21 H/10 The gangue material at the Teahan Prospect at the junction of Kierstead and Bartlet Brooks on the head waters of Upper Salmon River, includes barite, quartz, and calcite. Ore minerals not in sufficient quantity for economical mining, include pyrite, chalcopyrite, tennantite, sphalerite and galena (A.J. Smith, 1962: Geol. Surv. Can., Paper 62-22, p. 11).

21 H/11 Barite occurs associated with manganese at Markhamville in Kings County (New Brunswick Mines Br., files).

21 I/2 Barite occurs in sulphide-bearing veins in shale at Gouldville in Westmoreland County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, 1st Edition, Industrial and Educational Pub. Co., Gardenvale, Que.).

21 I/2 White barite and green and purple fluorite are the most abundant minerals at the East Memramcook barite deposit in Westmorland County. They are associated with galena, chalcocite, malachite, azurite and quartz, cutting red shale (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 27).

21 J/4 White to greyish-white massive barite containing small amounts of galena occurs on the Russell Saunders farm, about 6.4 km from Woodstock on the road to Mortonville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 133).

21 J/10 Barite occurs as nodules in slate on Lower Birch Island in York County (W. H. Poole, 1960: Geol. Surv. Can., Paper 60-15).

21 O/16 Barite occurs associated with sulphides on the Jacquet River, in Restigouche County (New Brunswick Mines Br., files).

21 P/5 Crystals of barite occur in the gossan above the orebody at Brunswick No. 6 Mine, and as clusters up to 2.5 cm across on magnetite-hematite-pyrite specimens at the Austin Brook iron mine. The mines are located a few miles from Highway 331, on the road to Grand Falls, about 26 km from Bathurst (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118-120).

21 P/11 White calcite containing patches of pink platy barite and fine-granular galena occurs in fractures in sandstone cliffs near the wharf at Stonehaven (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 122).

Newfoundland

1 L/14 Barite is abundant as dense pink platy aggregates in the fluorite-bearing veins of the St. Lawrence district (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 87).

1 L/16 White to salmon pink platy barite occurs in veins exposed along 18 m high shoreline cliffs on the east side of Placentia Bay at the following localities: Otterrub, 0.8 km north of Cuslett Cove; south side of Perch Cove, 2.4 km south of Cuslett Cove; and at Cross Point, 3.2 km south of Cuslett Cove (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 77).

1 M/10 Small amounts of barite occur at Cape Mille and on the west side of English Harbour East (D.A. Bradley, 1962: Geol. Surv. Can., Mem. 321, p. 55).

1 N/12 Veins of coarse-grained barite occur on the southeast shore of Collier Bay, 1.6 km southwest of Collier Point. Chemical analyses of two specimens gave: BaO 61.53, 61.09; SrO 4.14, 2.95; SO_3 35.44, 34.46; Fe_2O_3 0.10, 0.42; FeO 0.09, 0.05, total 101.29, 98.97 (W.D. McCartney, 1967: Geol. Surv. Can., Memoir 341, p. 121).

1 N/12 Veins of pink to white barite are exposed in road-cuts along the Trans-Canada Highway about 2.4 km south of the turn-off to Chance Cove (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 83).

12 A/15 The zinc-lead-copper ore at the Buchans Mine on the northwest shore of Red Indian Lake contains about 30 per cent barite gangue. An estimated 155,000 tonnes of barite enters the tailing pond at this mine each year (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, 44).

12 B/10 Barite and celestite are associated with calcite, aragonite, galena and pyrite at Portau Port (G.C. Riley, 1963: Geol. Surv. Can., Mem. 303, p. 55).

Northwest Territories

75 L/7 A barite-calcite vein having a maximum width of 15 m outcrops for a distance of 60 m about 6.4 km southwest of Snowdrift (F.Q. Barnes, 1951: Geol. Surv. Can., Paper 51-6, p. 29).

Nova Scotia

11 E/3 A barite deposit near Middle Stewiacke, Colchester County was mined in the late 1890's (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 44).

11 E/5 Fine specimens of barite crystals have been found in veins in slates exposed along the Bass and East rivers, Colchester County (H. Fletcher, 1890-1: Geol. Surv. Can., Ann. Rept. V, 192 P).

11 E/5 White, pink and flesh-coloured barite crystals have been noted in ankerite veins near Londonderry (H. Louis: Nova Scotia Inst. Nat. Sci., V, pp. 47-57).

1 E/6 Barite occurs abundantly in a brecciated zone between rocks of the Horton and Windsor groups at the Brookfield deposit about 19 km south of Truro, Colchester County (I.M. Stevenson, 1958: Geol. Surv. Can., Mem. 297, p. 70).

11 E/12 Crystalline aggregates of barite occur in conglomerate at Atkinson, Cumberland County (R. Bell, 1902-3: Geol. Surv. Can., Ann. Rept., XV, 166 AA).

11 E/15
11 F/10
11 F/14
11 F/15 R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 39, reports the following barite occurrences: Hodson, 8 km east of John River, Pictou County; L'Archeveque, Richmond County; Judique, near Cap Rouge, Inverness County; and Loch Lomond, Richmond County.

11 K/3 Large reserves of barite are known to occur in veins at the Campbell-MacMillan, Trout Brook, Johnson, McDougal, McKinnon and other deposits in the Lake Ainslie district, Inverness County, Cape Breton Island (J.S. Ross, 1960: Can. Dept. Mines, Mines Br. Info. Circ., 126, p. 44).

21 H/1 The Magnet Cove Barium Corporation Mine and Quarry is located about 4 km southwest of Walton. The primary minerals in the deposit are barite, galena, sphalerite, pyrite, tennantite, proustite, chalcopyrite, argentite, gersdorffite, hematite, siderite, dolomite, calcite and chlorite. The majority of the barite is fine grained, often with a microcrystalline sugary texture. It is pink, red or cream in colour; banded or mottled in appearance, and contains inclusions of bitumen and/or petroleum (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104).

21 H/7
21 H/8
21 H/9 R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 39, reports the following barite occurrences: Two Islands, Cumberland County; Five Islands, Colchester County; and on the south bank of Black Brook, near Springhill, Cumberland County.

Ontario

30 M/3 A specimen of barite in the Royal Ontario Museum mineral collection is from the MacLachlan quarry, 6.4 km south of Beamsville, lot 20, conc. IX, Clinton Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 57).

31 C/6 Barite from the Kilpatrick Mine, lot 9, conc. XIV, Huntingdon Township is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 56). The National Mineral Collection includes a specimen from lot 13, conc. XII, Huntingdon Township.

31 C/7 Barite occurs with anthraxolite in veins in conc. IV, lots 16 and 17, and conc. V, lots 15 and 16, Kingston Township, Frontenac County (R. Bell, 1901: Geol. Surv. Can., Ann. Rept., XIV, 181 A).

31 C/7 Tiny clusters of cream-white platy barite occur on coarsely-crystalline, white, pink or lilac coloured calcite. These minerals are associated with galena, sphalerite and chalcopyrite at the Frontenac (Frontenac Draper Lake) lead mine. The mine is located about 27 km north of Kingston along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 24).

31 C/7 The Royal Ontario Museum mineral collection includes barite from lot 5, conc. VIII and IX, Portland Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 56).

31 C/8 Barite occurs as white tabular aggregates within calcite lined cavities in limestone at the Frontenac Quarries. The cavities are fairly large and the calcite varies from colourless to

pink. The quarry is located near Highway 2 approximately 140 m east of Division Street in Kingston (Ann P. Sabina, 1968: Geol. Surv. Can., 67-51, p. 24).

31 C/8 Dog Lake, Storrington township, Frontenac County (E.D. Ingall, 1900: Geol. Surv. Can., Ann. Rept., XIII, 138 A).

31 C/9 Concession X, lot 24, Bastard Township, Leeds County (G.M. Dawson, 1900: Geol. Surv. Can., Ann. Rept. XIII, 138 A).

31 C/10 Barite veins in crystalline limestone have been reported in conc. VI, lot 16, Bedford Township and conc. I, lot 1, Hinchinbrooke Township, Frontenac County (W.D. Harding, 1947: Ont. Dept. Mines, Ann. Rept., vol. 56, Pt. VI, p. 41).

31 C/10 Massive and coarsely-crystalline white barite is closely associated with white to pale mauve calcite at the Hickey-Murphy lead mine. Two old shafts and several pits are present on the Hickey and Murphy farms located along the Westport road, 15.2 km from Godfrey (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 17).

31 C/11 A specimen of barite from the Wilson Bailey farm, lot 6, conc. VIII, Madoc Township is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 57).

31 C/11 Concession IV, lot 1 and conc. X, lot 9, Madoc Township, Hastings County (specimens in the National Mineral Collection).

31 C/12 Concession VI, lot 15, Madoc Township, Hastings County (E.D. Ingall, 1897: Geol. Surv. Can., Ann. Rept., X, 136 S).

31 C/15 Barite veins occur in crystalline limestone in conc. I, lot 25, and conc. VI, lot 16, Oso Township, Frontenac County (W.D. Harding, 1947: Ont. Dept. Mines, Ann. Rept., vol. 56, Pt. 6, pp. 40-1).

31 C/16 Barite veins are reported in conc. VIII, lot 2; conc. IX, lot 4; and conc. X, lot 20; North Burgess Township, Lanark County. A small amount of barite was produced from the latter deposit in the early 1920's (W.R. Rogers, 1922: Ont. Dept. Mines, Ann. Rept., vol. 32, Pt. I, p. 2).

31 D/8 Dummer and Galway Townships, Peterborough County (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22 T).

31 D/10 Summerville Township, Victoria County (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22 T).

31 F/1 Concession IV, Ramsay Township, Lanark County (W.G. Miller, 1900: Ont. Dept. Mines, Ann. Rept., p. 195).

31 F/2 Concession I, lot 22, Lavant Township, Lanark County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 39).

31 F/8 Massive and coarsely crystalline barite occurs in Trenton limestone in conc. VII, lot 27, Huntley Township, Carleton County (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, 19 R).

31 F/8 Concession XI, lot 3, Pakenham Township, Lanark County (A.R.C. Selwyn, 1886: Geol. Surv. Can., Ann. Rept., II, 59 A).

31 F/9 Strontian barite (barytocelestite) is reported from the Kingdon lead mine at Galetta. A chemical analysis gave 81.5 per cent $BaSO_4$, 18.5 per cent $SrSO_4$ (E.L. Bruce and M. Light, 1927: Am. Mineralogist 12, p. 396).

31 G/5 Concession IV, lot 21, March Township, Carleton County (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, 19 R).

31 G/5 Massive buff-coloured barite occurs at the Frazer Duntile quarry near Ottawa (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 85).

31 L/3 A barite specimen in the mineral collection of the Royal Ontario Museum was obtained from Highway 11, 1.6 km south of Callander, lot 3, conc. XXV, North Himsworth Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 57).

31 L/5 Red crystals of barite are reported from Iron Island in Lake Nipissing (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 23 T).

41 P/9 Barite is fairly abundant near Elk Lake, Timiskaming district (W.W. Moorhouse, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. 4, p. 19).

41 P/15 Two barite veins, 1.5 and 1.8 m wide, separated by a band of quartzite occur near Yarrow Lake, Yarrow Township, Timiskaming district (A.G. Burrows, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 238).

Barite has been reported in veins occupying post-ore faults at the Lake Shore and Wright-Hargreaves Mine, Kirkland Lake district (J.E. Hawley, 1948: Ont. Dept. Mines, Ann. Rept., vol. 57, Pt. V, p. 122).

42 A/1 A barite vein occurs in a red syenite at the Biederman deposit on the west shore of Browning Lake in the northern part of Cairo Township, Matachewan area (A.G. Burrows, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 237).

42 A/6 Barite has been mined at the Premier Langmuir Mine on Night Hawk River about 24 km southeast of South Porcupine (L. Smith, et al., 1945: Ont. Dept. Mines, Ann. Rept., vol. 54, Pt. II, p. 2).

42 A/6 The Royal Ontario Museum mineral collection includes a specimen of barite from the Delnite Mine in the northwest part of Deloro Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 56).

42 B/1 A barite vein occurs in sheared pegmatite at the Ravena deposit, near Tionaga in Penhorwood Township (T.L. Gledhill, 1924: Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. VI, pp. 15-17).

42 D/13 McKay's Harbour, Rossport Station, Thunder Bay district (specimen in National Mineral Collection).

42 D/13 Salmon-pink platy crystals of barite occur with amethyst, colourless quartz and purple fluorite at rock cuts along the Trans-Canada Highway, 10.9 to 13.3 km west of the western turnoff to Rossport (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 23).

42 D/14 A narrow barite-fluorite vein assaying 68 gm of silver per tonne was found in a fault at the 27 m falls near the mouth of Black River. Small veins of barite were also noted in porphyritic

hornblende-biotite granite near mileage seven on the railway between Selim and Horn siding (P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. IV, pp. 7-8).

42 F/4 A specimen of barite from the Geco Mine in south-central Gemmell Township is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 58).

52 A/3 Barite veins occur on Jarvis, McKellar and Pie Islands in the Thunder Bay district, Lake Superior (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22-3 T).

52 A/5 Barite occurs with amethyst, smoky and rose quartz, fluorite, and fluorescent calcite at a number of old silver deposits that are accessible from the Silver Mountain highway (588) southwest of Stanley village at the following mileages: Victoria Mine - 30 m north of the highway at km 2.7; Beaver Junior Mine - about 360 m southwest of the highway at km 7.9; West Beaver Mine 45 m south of the highway at km 9.2; Climax Mine - 800 m by road south from the highway at km 10.1; Badger Mine - 1.2 km by road west from the highway at km 10.8 (Ann P. Sabina, 1963; Geol. Surv. Can., Paper 63-18, p. 33).

52 A/6 Barite is abundant in many veins in Neebing Township (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 22-3 T).

52 A/10 Orange-red, radiating platy crystals of barite occur with amethyst, smoky and colourless quartz crystals, galena, and fluorescent calcite at the Enterprise Mine located about 1.1 km east of Highway 17, along Road 69-13, from a point 2.4 km north of Pearl (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 23).

52 A/10 A barite specimen from the Williamson occurrence, Mineral Lot A, Bowker Mountain, McTavish Township, is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 58).

Quebec

21 E/5 At the Aldermac Moulton Hill Mine, quartz, barite and magnesite are the gangue minerals for the copper-lead-zinc ore. The mine is located 4.8 km south of Highway 1 at a point 8.4 km east along Highway 1 from 10th Street in Sherbrooke (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 29).

22 A/3 Barite has been noted at Port Daniel and along the streams flowing into the Gaspé Basin, Bonaventure County (R.W. Ellis, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 115 R).

22 C/7 White, coarsely-crystalline barite containing cubes of galena up to 12 mm to the edge, is found at the Roy and Ross Mine, about 1.6 km south of Highway 10, 1.1 km west of St-Fabien (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 68).

31 G/11 Tabular aggregates of barite are associated with galena and sphalerite at a deposit on the Dan Gorman farm about 6.4 km west of Buckingham. Barite also occurs at the Pedneaud quarry near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 6, 21).

31 G/11 A barite vein, 15 to 35 cm wide, is reported to occur at range IV, lot 21, Buckingham Township, Papineau County (E.D. Ingall, 1897: Geol. Surv. Can., Ann. Rept., X, 135 S).

31 G/12 In Hull Township, Gatineau County: range X, lot 7; range XI, lot 3; and range XII, lot 4 (R.W. Ells, 1899: Geol. Surv. Can., Ann. Rept., XII, 43 G and 135 J); also range XII, lot 2 (specimen in National Mineral Collection).

In Templeton Township, Papineau County: range VI, lots 11 and 28 (B.J. Harrington, 1873-4: Geol. Surv. Can., Rept. Prog., p. 220); range XI, lot 10, Blackburn Mine, North of Perkins Mills (K.K. Landes, 1938: Am. Mineralogist 23, p. 372); range XII, lot 12 (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 66-7 T).

31 G/12 Massive white barite occurs in a vein with fluorite, calcite and dolomite at the Foley Mine north of Hull. Veinlets of barite have also been noted at the Scott Mine near Old Chelsea (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 17, 38).

31 H/12 Barite occurs as white, platy, and pale-yellow to peach-pink crystal aggregates in cavities at the Francon Quarry, Montreal Island (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 67).

31 I/9 At the St-Marc-des-Carrières Quarries, white barite, in massive form and as bladed aggregates, is associated with crystalline calcite (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 87).

Yukon

105 F/14 Barite veins ranging from 30 cm to 3 m in width occur on Barite mountain, mainly above 1460 m elevation (61°50'N, 133°00'W), near km 190 on the Canol Road (E.D. Kindle, 1946: Geol. Surv. Can., Paper 45-21, 2nd Edition, and L.H. Green and C.I. Godwin, 1964: Geol. Surv. Can., Paper 64-36, p. 40).

105 J/16 Barite occurs with pellyite, hedenbergite, quartz, andradite, taramellite, gillespite, sanbornite, chalcopyrite and witherite at a contact metasomatic deposit near the headwaters of the Ross and Pelly Rivers about 3.2 km southwest of Gillespite Lake (J.H. Montgomery, R.M. Thompson and E.P. Meagher, 1972: Can. Mineralogist, 11, p. 444).

105 O/1 Extensive barite deposits occur on the Moose claims at 63°04'N, 130°12'W. The property is about 400 m northwest of the Canol Road at a point 19.3 km southwest of MacMillan Pass (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 21).

105 P/14 Abundant smithsonite occurs with barite, cerussite and hydrozincite in a fault zone at the ART-EKWI property at 63°51'N, 129°12'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

115 J/10 Barite-quartz veins containing native silver, galena, sphalerite and minor chalcopyrite and pyrite occur at the Bomber showing of Casino Silver Mines Limited, located on a tributary of Casino Creek at 62°43'N, 138°49'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 39).

BARYLITE

$BaBe_2Si_2O_7$

Newfoundland

13 K/5 Barylite is associated with lenticular bodies of alkali syenite intruding Precambrian rocks at

Seal Lake, Labrador. Chemical analysis of a nearly pure concentrate of light pink barylite, by D.J. Charette: BeO 15.00, BaO 46.12, SiO_2 38.52, Fe_2O_3 0.08, Al_2O_3 0.04, CaO 0.15, H_2O 0.11, total 100.02, D (meas) = 3.96 (E.H. Nickel and D.J. Charette, 1962: Am. Mineralogist, 47, p. 764).

Quebec

31 H/11 Barylite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

BARYTOCALCITE

$CaBa(CO_3)_2$

British Columbia

94 M/8 Barytocalcite has been identified by X-ray powder pattern as a major constituent in a specimen of drill core from a deposit north of the Alaska Highway at about mile 498 (km 801) (X-ray Laboratory, Geol. Surv. Can.).

BASSANITE

$CaSO_4.1/2\ H_2O$

The name bassanite appears to have priority over soluble anhydrite, hemi-hydrate of gypsum, and vibertite.

Nova Scotia

21 H/16 Bassanite is reported to be an abundant constituent in the upper 300 m of well borings drilled at Nappan, Cumberland County (N.R. Goodman, 1957: Geology of Canadian Industrial Mineral Deposits, special publication of the C.I.M.M., p. 111).

BASTNAESITE

$(La,Ce)FCO_3$

British Columbia

82 F/13
82 F/14 Small amounts of bastnaesite have been identified in granodiorite augen gneiss near the mouth of Gwillim Creek (X-ray Laboratory; Geol. Surv. Can.).

82 M/12 Bastnaesite was identified by X-ray diffraction in a thin section cut from drill core from hole 207, Rexspar fluorite property, near Birch Island, North Thompson River. It occurs with fluorite, celestine and phlogopite in massive tuffs (X-ray Laboratory, Geol. Surv. Can., specimen submitted by W.D. McCartney).

Manitoba

52 L/6 Greyish-green bastnaesite occurs as an alteration product of allanite in the central of three small pegmatites on the southeastern shore of Shatford Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 561).

Ontario

31 D/16
31 E/1 Bastnaesite has been identified (X-ray Laboratory, Geol. Surv. Can.) in mineral specimens from the following localities in the Bancroft area. (1) Blue Rock Cerium Mines Limited property in lots 18, 19, 20, concs. V, VI, Monmouth Township, Haliburton County. (2) Centre Lake property, Bicroft Uranium Mines Limited, lots 26, 27, conc. XI, Cardiff Township, Haliburton County (3) Croft property, Bicroft Uranium Mines Limited, at the intersection of Cardiff, Herschell and Faraday Townships, Haliburton and Hastings counties. (4) Lot 9, conc. XVI, Chandos Township, Peterborough County.

31 D/16 Bastnaesite has been identified in specimens from the following localities: (1) Rare Earth Mining Company Limited, No. 1 shaft, lot 20, conc. VIII, Monmouth Township; (2) Road-cut on Highway 503 at a point 560 m from its junction with Highway 121 in Tory Hill; (3) Nu-World Uranium Mines Limited property in Glamorgan Township near Gooderham (Ann P. Sabina, 1977: Geol. Surv. Can. Paper 77-1A, p. 335).

31 E/1 At the Desmont Mining Corporation property near Wilberforce, bastnaesite occurs in calcite and is associated with stillwellite, monazite and uranothorite (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

31 E/12 Dull black laths of bastnaesite are reported in a pegmatite worked for feldspar in Cecebe village near the top of a steep ridge on the north side of Cecebe Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 77).

31 F/4 Dull black laths of bastnaesite were found in specimens from the Watson feldspar mine in the north half of lot 22, conc. VI, Monteagle township; and the Cairns feldspar mine, lot 21, conc. VII, Monteagle Township (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

31 F/6 Greyish green to greyish brown bastnaesite laths have been observed in road-cuts on both sides of Highway 512 at a point 12.5 km south of its junction with Highway 60 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 49).

31 F/11 Dull greyish green to tan-coloured bastnaesite occurs with sphene and magnetite in a road-cut on Highway 60, 3.7 km west of its junction with Lake Doré road at Golden Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 49).

31 K/4 Bastnaesite occurs as dull yellow to brownish red laths in pegmatite at the Carey feldspar quarry 3.2 km north of Mackey (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 64).

42 D/9 A specimen of bastnaesite in the mineral collection of the Royal Ontario Museum was found in a road-cut on Highway 17, 1.6 km south of the Marathon turnoff in Pic Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 59).

52 L/2 Bastnaesite has formed by alteration of allanite in pegmatitic bands in granitic rocks on the southeastern shore of Roughrock Lake on the Winnipeg River 14.5 km north-northwest of Minaki (Petr Černý and Iva Černa, 1972: Can. Mineralogist, 11, p. 541-3).

Quebec

31 H/11 Bastnaesite is a rare constituent of siderite vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

BAUMHAUERITE

$3PbS.\ 2(As,Sb)_2S_3$

Ontario

31 C/6
31 C/11 Small amounts of antimonian baumhauerite were found in polished sections of specimens from a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed. Taylor of Madoc. Electron probe microanalyses by G.R. Lachance: Pb 48, 47.5; Sb 19, 19.5; As 12.5,12; S 21.5,21: totals 101.0, 100.0 (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 209-210).

BAVENITE

$Ca_4BeAl_2Si_9O_{24}(OH)_2$

Manitoba

52 L/6 Soft white decomposition products of beryl from the Huron claim pegmatite consist largely of bavenite occasionally contaminated by chlorite. The pegmatite is located 0.8 km from the south-east shore of the Winnipeg River about 15 km above Pointe du Bois (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

BAYLEYITE

$Mg_2UO_2(CO_3)_3.18H_2O$

Saskatchewan

64 L/4 The uranyl carbonates, bayleyite and liebigite, were found as coatings on the northern wall of the pit at the fourth level of the Rabbit Lake uranium mine, at 58°11'00"N, 103°42'36"W, west of Wollaston Lake (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1C, p. 95).

BECQUERELITE

$CaU_6O_{19}.11H_2O$

Saskatchewan

73 P/8 The secondary uranium minerals, becquerelite and liebigite have been identified in specimens from the LaRonge concession of LaRonge Uranium Mines Limited near Nistowiack Lake (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed. p. 307).

74 N/10 Becquerelite occurs as bright orange crusts surrounding areas of yellow-green uranopilite on surfaces of massive hematite- pitchblende intergrowths. It has been identified at two deposits in the Beaverlodge area, Lake Athabasca (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 71).

BEHOITE

$Be(OH)_2$

Quebec

31 H/11 Behoite has been identified from Mont St-Hilaire. (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99)

BENJAMINITE

$(Ag,Cu)_3(Bi,Pb)_7S_{12}$

Northwest Territories

86 E/9
86 F/12 Benjaminite occurs as finely disseminated grains and irregular shapes up to 100 microns in size associated closely with matildite in a specimen from the property of Terra Mining and Exploration Company located southeast of Great Bear Lake in the Camsell River district. An electron microprobe analysis gave: Cu 1.3, Ag 13.6, Pb 2.3, Bi 65.4, S 17.7, total 100.3 (D.C. Harris and T.T. Chen, 1975: Can. Mineralogist, 13, p. 402).

Ontario

31 M/4 A mineral first identified as pavonite by W. Petruk et al (Can. Mineralogist, 11, p. 217) has been re-examined and identified as benjaminite. The mineral occurs at the Canadian Keeley Mine at the abandoned settlement of Silver Centre. It is intergrown with bismuthinite, matildite, native bismuth, chalcopyrite, sphalerite and pyrite. An electron microprobe analysis gave: Cu 2.9, Ag 9.6, Pb 1.3, Bi 69.0, S 18.1, total 100.9 (D.C. Harris and T.T. Chen, 1975: Can. Mineralogist, 13, p. 402).

BERRYITE

$Pb_2(Cu,Ag)_3Bi_5S_{11}$

British Columbia

93 L/2 Berryite has been identified in a Cu-Pb-Ag-Zn ore from a prospect near Owen Lake, northwest of the west end of Francois Lake. Aikinite, gold, matildite and tennantite are also present. An electron microprobe analysis gave: Pb 20.9, Cu 5.3, Ag 7.4, Bi 49.5, S 17.0, total 100.1 (D.C. Harris and D.R. Owens, 1973: Can. Mineralogist, 11, p. 1016).

BERTHIERITE

$FeSb_2S_4$

British Columbia

92 H/3 Berthierite is reported from the Rainbow Claim located along the Sumallo River near the confluence with the Skagit River in Manning Provincial Park (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 78).

103 P/14 Slender needles of berthierite have been identified in a specimen of quartz vein from Kitsault Lake, 32 km north of Alice Arm at the headwaters of the Kitsault River (R.M. Thompson, 1951: Am. Mineralogist 36, p. 504).

New Brunswick

21 G/14 Berthierite is reported to have been found at the old antimony mine north of Lake George, in Prince William parish (G.C. Hoffmann, 1888-9: Geol. Surv. Can., Ann. Rept., IV, 23 T).

Northwest Territories

85 J/8 Berthierite occurs mainly with abundant pyrite or arsenopyrite in gold deposits of the Yellowknife Bay area (L.C. Coleman, 1953: Am. Mineralogist 38, p. 516).

Ontario

31 F/2 Berthierite, jamesonite and tetrahedrite have been identified in specimens from Flower Station, near Clyde Forks in Lanark County. (X-ray Laboratory, Geol. Surv. Can.)

42 B/1 Berthierite and arsenopyrite are the principal antimony and arsenic minerals respectively at a deposit explored by Card Lake Copper Mines Limited in Sewell Township at 48°12'N, 82°0.5'W. The deposit is 6.8 km by road south of Highway 101 from a junction 19.3 km west of the Little Star Lake road. Stibnite, native antimony, ullmannite, tetrahedrite and valentinite are also present (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 154).

42 E/10 Ellis Thompson has identified berthierite in two polished sections of ores from the Little Long Lac Mine and Talmore Mine in Errington Township. The mineral is closely associated with arsenopyrite and stibnite (E.G. Pye, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. VI, p. 57).

52 N/4 At the Cochenour Willans Mine, Dome Township, berthierite occurs in massive steel-grey aggregates up to the size of a fist. It is closely associated with stibnite near the fringe of high-grade ore shoots. Other associated minerals include jamesonite, tetrahedrite, pyrite, pyrrhotite, arsenopyrite and gold. The berthierite has been identified by X-ray powder pattern by E.W. Nuffield and R.M. Thompson (M.H. Frohberg, 1960: private communication).

Quebec

21 E/13 Berthierite occurs with stibnite, native antimony and gudmundite at the Lac Nicolet (South Ham) antimony mine, located 13.7 km west of Highway 1 on Highway 34 (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 44).

BERYL

$$Be_3Al_2(SiO_3)_6$$

Beryl is the most common beryllium mineral. It occurs in granite pegmatites, high-temperature and pegmatitic quartz veins, and as disseminations in granite. In pegmatite, beryl is usually concentrated with quartz and muscovite, although in well-zoned lithium-bearing pegmatites it is mostly found outside the lithium and quartz-rich core zones. Cleavelandite and tourmaline are commonly associated, and topaz may occur under similar conditions. Beryl is found with molybdenite in the Priessac-Lacorne district, Quebec, and with wolframite at the Burnt Hill Mine in New Brunswick. The occurrences listed below, unless otherwise noted, are taken from Geol. Surv. Can., Paper 60-21: Beryllium Occurrences in Canada, by R. Mulligan (1960), or from Geol. Surv. Can., Econ. Geol. Rept. 23, Geology of Canadian Beryllium Deposits, by R. Mulligan (1968).

British Columbia

82 F/7 Beryl was found as large blue-green crystals, associated with garnet, magnetite and tourmaline in a pegmatite dyke just south of Midge Creek about 1.6 km from Kootenay Lake.

82 F/9 Small crystals and larger irregular masses of whitish beryl occur in a pegmatite exposed along the road to the Boy Scout property, which is about 4.8 km south of St. Mary Lake. Beryl is reported to have been found also on Angus Creek. Minerals associated with beryl in the pegmatite include muscovite, tourmaline and galena.

82 F/16 Blue-green beryl occurs locally with tourmaline in pegmatites along the borders of the White Creek batholith. One particular locality is west of peak 9,010 on the ridge between the sources of White and Skookumchuck creeks.

A few crystals of pale glossy beryl have been found in pegmatite dykes cutting Aldridge quartzite and dioritic intrusions north of the first west fork of Burnt Creek, a tributary of Skookumchuck Creek, and also north of Burnt Creek about 3.2 km farther upstream.

82 L/16 Beryl is reported to occur in a pegmatite dyke at the lower edge of the great snowfield on the northeast side of Mount Begbie, about 13 km south of Revelstoke. It is associated with black, and a little red and green tourmaline, garnet and lepidolite.

82 M/16
83 D/1 Beryl is reported in pegmatites at the head of Yellow Creek at about 52°00'N, 118°22'W. The pegmatite intrudes mica-kyanite-garnet schist. The deposit is one of several old commercial mica occurrences in the area.

82 N/4 Pegmatites containing beryl have been found on the Snowflake trail a short distance from the railway. The trail follows Woolsey (Silver) Creek about 3.2 km west of Albert Canyon.

83 D/14 Beryl has been identified at the Bonanza mica mine, on Mica Mountain about 11 km south of Tete Jaune Cache. Topaz has also been reported from this locality.

94 C/7 Pale bluish green beryl has been found in a pegmatite dyke in the Butler Range, west of Findlay River. Pegmatites are particularly abundant in the area 8 to 16 km south of Fort Grahame.

94 D/8 Beryl crystals have been observed in a block of pegmatite in a moraine near the source of Dortatelle Creek.

104 O/9 Beryl is associated with scheelite in pegmatite on the Blue Light claims at 59°39'N, 130°28'W.

104 O/13 Small bluish green crystals and irregular masses of beryl are reported to occur in granitic dykes in the Jennings River area at latitude 59°59'30"N, longtitude 131°36'W.

104 P/4 Quartz-greisen veins at Limestone Peak, 59°13'30"N, 129°51'W, contain beryl and molybdenite.

104 P/7 Pegmatites composed of feldspar, quartz, muscovite, tourmaline, garnet and minor beryl occur at the heads of three westerly flowing creeks, known locally as Moosehorn, Camp and Mica creeks, about 5.6 km northwest of the highest peak (2230 m) in the Horseranch Range.

Manitoba

52 E/11 On the Lucy and Artdon claims, located 800 m north of the Trans-Canada Highway at a point 10.6 km east of the East Braintree turnoff, beryl is reported to have been found in pegmatite dykes, where it is associated with spodumene and abundant tourmaline.

52 L/6 Cesian beryl occurs rarely in the spodumene-rich zones of the Tanco pegmatite at Bernic Lake as large crystals with a colourless core overgrown by a pale pink zone, or as small colourless prisms. Partial chemical analysis of the pink outer zone of a large crystal gave: BeO 9.58, MgO 0.32, CaO 0.01, FeO 0.12, MnO 0.02, Li_2O 1.61, Na_2O 1.30, K_2O 0.80, Rb_2O 0.18, Cs_2O

7.16 (P. Černý, 1972: Can. Mineralogist, 11, p. 719).

52 L/6 Chemical analysis of beryl from the Tanco pegmatite by K. Ramlal and R.M. Hill: SiO_2 62.00, Al_2O_3 17.71, Fe_2O_3 0.018, BeO 11.32, MgO 0.017, CaO 0.030, MnO 0.004, Li_2O 1.13, Na_2O 1.68, K_2O 0.266, Rb_2O 0.109, Cs_2O 3.27, H_2O^+ 2.06, H_2O^- 0.07, total 99.68 (F.C. Hawthorne and P. Černý, 1977: Can. Mineralogist, 15, p. 414).

52 L/6 Chemical analyses of beryl from the Tanco pegmatite by K. Ramlal and R. Chapman: (1) SiO_2 62.35, Al_2O_3 17.50, Fe_2O_3 0.27, MnO 0.007, CaO 0.007, MgO 0.001, BeO 11.66, Li_2O 0.98, Na_2O 1.38, K_2O 0.046, Rb_2O 0.071, Cs_2O 2.47, H_2O^+ 1.96, H_2O^- 0.08, total 98.54; (2) SiO_2 63.35, Al_2O_3 16.77, Fe_2O_3 0.073, MnO 0.001, CaO 0.120, MgO 0.003, BeO 11.21, Li_2O 1.29, Na_2O 1.68, K_2O 0.069, Rb_2O 0.068, Cs_2O 2.92, H_2O^+ 2.10, H_2O^- 0.05, total 99.70 (P. Černý and F.M. Simpson, 1977: Can. Mineralogist, 15, p. 489).

52 L/6 At the Buck and Coe claims at the east end of Bernic Lake, beryl occurs as a minor component of zoned lithium-bearing pegmatite dykes.

52 L/6 A number of pegmatite bodies near the east end of Shatford Lake contain beryl. Associated minerals include muscovite, lithian muscovite, topaz, monazite, columbite-tantalite, euxenite and gadolinite.

52 L/6 Several claims in the vicinity of Greer Lake, south of Winnipeg River, have been examined for beryllium. At the Huron claim, yellow-green beryl crystals up to 45 cm across are exposed in the sides of a pit. Columbite-tantalite, cleavelandite, quartz, tourmaline and mica are also present. Rich pockets of beryl are reported on the Clare No. 1, Captain, and Top of the World claims.

52 L/6 Crystals of milky white, and greenish to colourless transparent beryl have been found in a zoned pegmatite dyke on the Bear (Silverleaf, Bob) claim located 4.8 km south of east from Lamprey Falls on the Winnipeg River. Chemical analysis of the greenish beryl: SiO_2 65.83, Al_2O_3 19.01, BeO 12.74, Fe_2O_3 0.49, CaO 0.84, MgO 0.08, Na_2O 0.43, H_2O 0.08, total 99.50 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 156).

52 L/6 Silver Leaf Mining Syndicate, lot 17, range 16, Oiseau River map-area, Manitoba. Chemical analysis of beryl by R.J.C. Fabry (1928): SiO_2 64.59, Al_2O_3 22.98, Fe_2O_3 0.21, FeO 0.11, MgO 0.23, CaO 0.41, Na_2O 1.08, K_2O 0.33, H_2O 0.22, TiO_2 nil, P_2O_5 nil, MnO 0.02, Li_2O 0.14, BeO 10.06, total 100.38. Note: K_2O includes Rb_2O, Cs_2O (J.A. Maxwell, et al., 1965: Geol. Surv. Can., Bull. 115, p. 345).

52 L/11 Beryl is a minor constituent of spodumene-bearing pegmatites that occur around Cat Lake at latitude 50°37'N, longitude 95°27'W.

63 I/12 Several occurrences of beryl have been noted in pegmatites on islands north and south of Cross Island in Cross Lake.

63 J/13 Beryl was found in the outer zones of three pegmatite dykes north of a small lake about 4 km southeast of Crowduck Bay, Wekusko Lake. A few crystals of golden beryl are reported to have been found in a trench 800 m west of the narrows of Crowduck Bay.

64 C/7 A few green crystals of beryl were found in a pegmatite dyke exposed on an island in Granville Lake.

New Brunswick

21 G/8 In the Square Lake area, southwest of Welsford, beryl is reported in association with wolframite and molybdenite in quartz veins and greisen.

21 J/2 Small crystals of beryl, associated with tourmaline and a little molybdenite, occur in pegmatite stringers cutting granite on a ridge about 2.4 km west of Zealand Station.

21 J/10 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.

21 P/12 Beryl occurs as small crystals disseminated in granite, northwest of Pabineau Lake about 16 km southwest of Bathurst. The beryl is associated with molybdenite. In one trench beryl was found as sheaves of crystals 6 mm across and 7.5 cm long.

Newfoundland

2 F/4 Pegmatites containing beryl intrude quartz granodiorite at 49°09'N, 53°34'W, near Wesleyville. (W.D. Fogwill, 1965: Nfld. Min. Res. Div., Info. Circ. 11).

11 O/9 Several crystals of beryl, the largest about 2 cm in diameter were found in pegmatite at Western Head, near Cinq Cerf at 47°41'N, 58°09'W. (J.R. Cooper, 1954: Geol. Surv. Can., Memoir 276, p. 28).

11 O/10 An occurrence of beryl has been reported in pegmatite at Rose Blanche, 47°37'N, 58°41'30"W.

12 B/9 A pegmatite body at a sharp bend in the highway south of Oxback Pond is reported to contain beryl as an accessory mineral with tourmaline, ziron, uraninite and magnetite.

Northwest Territories

75 M/2 Scattered hexagonal prisms of pale greenish white to cream beryl up to 10 cm long occur in pegmatite about 5.6 km east of Susu Lake at 63°01'N, 110°38'W (W.W. Heywood and A. Davidson, 1969: Geol. Surv. Can., Memoir 361, p. 33).

75 N/12
75 N/15 Beryl has been reported as a minor constituent in pegmatite at latitude 63°44'N, longitude 109°55'W, Reid Lake; and at latitude 63°59'N, longitude 108°32'W, Aylmer Lake area.

76 O/9 A pegmatite at latitude 64°44'N, longitude 110°19'W, northwest of Paul Lake, contains minor beryl.

85 I/1 More than one tonne of beryl crystals have been stockpiled at the Moose No. 2 dyke, the easternmost of two pegmatite bodies located just north of Hearne Channel, Great Slave Lake. The beryl occurs as white irregular crystals and masses chiefly in cleavelandite-quartz-muscovite intermediate zones and is commonly associated with spodumene. Scattered beryl crystals have also been noted in the Moose No. 1 dyke about 1,460 m west of No. 2.

85 I/1 On the Tan claims, latitude 62°12'N, longitude 112°22'W, four pegmatite bodies are grouped around a small lake just west of 'Johnson' Lake, about 2.4 km east of the southeast corner of Blatchford Lake. One of these dykes contains fine beryl crystals distributed around the margin of a pod of quartz.

85 I/1 Creamy white beryl is scattered throughout a cleavelandite-quartz-muscovite zone in a large pegmatite dyke which has been quarried on the Best Bet property. The property lies just northwest of the north-central part of a lake about 4.8 km long that is known locally as Drever Lake, at latitude 62°14'N, longitude 112°18'W.

85 I/7 A few crystals of beryl, associated with some spodumene and columbite-tantalite, were found in a zoned pegmatite dyke on the north shore of Buckham Lake at latitude 62°20'N, longitude 112°40'W. The pegmatite dyke occurs on claims which have been known variously as Lit 1 and 2, Lita 5 and 6, and 'Campbell pegmatites'.

Beryl, amblygonite, lithiophilite and tantalite-columbite occur in a zone rich in spodumene in a pegmatite dyke about 8 km southwest of the north end of Buckham Lake, at latitude 62°18'N, longitude 112°46'W. The property has been known variously as Lit 3, 'McDonald pegmatite', Ramona Group, and Lita 1 to 4.

85 I/8 Numerous beryl crystals occur with coarse spodumene, cleavelandite and quartz in a zoned pegmatite dyke, one of several large dykes that are located less than 800 m east of the east arm of 'Tanco Lake', southeast of Francois Lake at latitude 62°26'N, longitude 112°11'W.

85 I/11 Minor amounts of beryl have been noted in a zone of narrow pegmatite dykes extending some 490 m southeastward from Sproule Lake, latitude 62°44'N, longitude 113°29'W. Other minerals present include spodumene, amblygonite, lithiophilite, cassiterite and tantalite-columbite.

Beryl occurs in numerous dykes in the area between Ross and Redout Lakes. The best concentrations and largest crystals occur in well-zoned pegmatites that contain a core of quartz and perthite.

85 I/11 A pegmatite dyke is exposed on the peninsula north of the narrowest part of Thompson Lake at 62°37'N, 113°29'W. Beryl crystals up to 7 cm in diameter are fairly common in cleavelandite and quartz segregations. Spodumene and columbite-tantalite are also present. A few small crystals of beryl were seen in another pegmatite near the water's edge just west of the south peninsula.

85 I/12 Beryl is fairly abundant in some small pegmatites near the east shore of Sparrow Lake at about 62°37'N, 113°37'W. Beryl has also been noted in a pegmatite on the north shore of the easternmost part of Hidden Lake at 62°33'N, 113°31'W.

85 I/12 A.W. Jolliffe reports occurrences of beryl in 56 out of 100 pegmatites within an area of 26 km^2 located about 3.2 to 6.4 km north of Prelude Lake. The dykes are reported to be distinctly zoned. Tourmaline and some tantalite-columbite are present but lithium minerals are generally absent.

85 I/13 Beryl has been noted by A.W. Joliffe in 32 out of nearly 50 pegmatite dykes examined in the area around Blaisdell Lake. Most of these pegmatites carry tourmaline but no appreciable amounts of lithium minerals.

Several beryl and spodumene-bearing pegmatites occur north of Blaisdell Lake at latitude 62°50'N, longitude 113°34'W, immediately southwest of 'Schist Lake'.

85 J/9 A pegmatite dyke just east of Bighill Lake contains beryl crystals associated with cleavelandite, quartz, and abundant muscovite. Six occurrences of beryl are reported around the south end of a large granite mass east of Prosperous Lake.

86 B/3 Beryl was observed in a sample from a pegmatitic granite body in the Ranji Lake area and also in the Ghost Lake area to the south.

Nova Scotia

11 F/5 Beryl is reported to occur at Mile Brook, Guysborough County, 45°19'N, 61°47'W.

20 P/11 An occurence of beryl is reported at Hartz Point, Shelburne County, 43°44'N, 65°20'30"W.

20 P/14 Beryl is present, along with smaller amounts of tourmaline and molybdenite, in parts of a high-temperature quartz vein that has been exposed by trenching about 800 m east of a point 4.8 km by road north of Jordan Falls, Shelburne County.

20 P/15 Beryl has been found in pegmatites at several localities along a 27 km strip of coast-line from Sandy Cove to Western Head, Queens County. The occurrences are in granite near its contact with quartzites and schists of the Meguma series. Some of the best showings are on the west shore of the southern part of Mouton Island; other occurrences are at Sandy Cove, Hunts Point, Wharf, Western Head, and in boulders at Summerville Beach.

21 A/10 Beryl was one of a large variety of minerals found in the early 1900's in a small pegmatite at Reeves Farm, about 800 m south of a point 4.8 km by road west of New Ross, Lunenburg County.

Ontario

31 E/14 Crystals of beryl, 0.6 to 5 cm in diameter, occur in granite pegmatite at 45°46'N, 79°03'W, in Butt Township on the south half of lot 15, conc. XIV (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Min. Rept. 21, p. 38).

31 E/14 Beryl crystals having an aquamarine colour are reported to have been found with pink feldspar, quartz and muscovite, in a pegmatite dyke in conc. IV, lot 6, Paxton Township (private communication: G. Brown, Kearney, Ontario).

31 F/6 Beryl has been recovered and stockpiled at two pegmatite occurrences in conc. XV, Lyndoch Township - one on lot 23, and one on lots 30 and 31. The beryl is associated mainly with cleavelandite, quartz and reddish perthite. Columbite, euxenite, cyrtolite and monazite have also been found in these workings. Chemical analysis of beryl crystals from lot 23, by H.C. Rickaby: SiO_2 64.40, Al_2O_3 18.08, Fe_2O_3 0.97, BeO 14.38, CaO 0.18, MgO 0.33, MnO 0.04, K_2O 0.18, Li_2O 0.18, Na_2O 0.35, H_2O 1.08, total 100.17; S.G. 2.726 (H.V. Ellsworth, 1932: Geol.

Surv. Can., Econ. Geol. Ser., 11, p. 229) (T.L. Walker and A.L. Parsons, 1927: Univ. Toronto Stud., Geol. Ser., 24, p. 12, also 1932, vol. 32, p. 23; and 1934, vol. 36, p. 19).

31 L/2
31 L/7 Beryl occurs in a pegmatite dyke just south of the road on conc. IV, lot 13, Calvin Township. Beryl has also been reported to be present in a dyke about 1.6 km northwest of Eau Claire Station, and at the old Purdy Mica Mine about 4.8 km north of Eau Claire Station, in Mattawan Township.

32 E/4 Beryl, spodumene, pollucite and columbite-tantalite occur in a pegmatite dyke in the Case batholith near its contact with metasedimentary rocks in lot 5, conc. V, Steele Township.

41 H/15 A few specimens of massive greenish blue beryl and several smaller crystals were found by H.V. Ellsworth (1932) at the Besner feldspar mine on lot 5, conc. B, Henvey Township.

42 L/10 Pegmatites near Saga Lake (latitude 50°41'N, longitude 86°52'W) are reported to contain small amounts of beryl.

52 B/5 Beryl is reported in a zone of spodumene-bearing pegmatites at Maligne River, 48°23'N, 91°55"W.

52 B/6 Beryl crystals up to 15 cm long are reported in granite pegmatite in Quetico Park at latitude 48°24'N, longitude 91°48'W (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Mineral Rept., 21, p. 38).

52 B/13 Translucent yellow-green crystals of beryl 5 cm long were found in a pegmatite dyke at Turtle Lake, latitude 48°57'N, longitude 91°58'W.

52 F/13 Beryl was found in noteworthy amounts in two places on the east shore of Medicine Lake in Tustin Township, about 56 km east of Kenora. A length of about 300 m has been stripped and a number of trenches blasted out.

52 F/15 Small green crystals of beryl have been found in samples of pegmatite from lots 17, concs. VII and VIII, about 16 km east of Dryden in Zealand Township. Beryl has also been reported in pegmatites northwest of Ghost Lake, about 4.8 km farther northeast.

52 H/1 At the M.N.W. property, about 2.4 km west of Cosgrave Lake, scattered white beryl crystals occur in the cleavelandite-quartz-muscovite zone of a pegmatite dyke. Beryl has also been found at the Swanson property in the same area.

52 H/4 An occurrence of beryl in albite pegmatite is reported at 49°00'N, 89°37'W, in the Dog River area (A.W. Jolliffe, 1933: Geol. Surv. Can., Sum. Rept. D, p. 15).

52 I/8 Beryl has been found in a spodumene-bearing pegmatite at 50°25'N, 88°25'W, in the Crescent Lake area.

52 I/10 Numerous quartz veins and granite and pegmatite dykes containing minor amounts of beryl outcrop in the vicinity of Linklater Lake.

52 L/7 A few small crystals of beryl have been noted in a pegmatite dyke on the east shore of the English River, 3.2 km northwest of Separation Rapids; and in a small dyke 4.8 km west of Oneman Lake.

Quebec

12 L/7 Beryl-bearing pegmatites have been reported at the following localities in Drucourt and Johan Beetz Townships: on an island off the point on the southeast side of the entrance to Quetachow Bay; on a small island near the west side of the bay at the mouth of Watshishow River; and on the tip of a long point forming the east side of the same bay.

21 M/9 A few crystals of beryl are reported to have been found at a pegmatite worked for mica prior to 1908 at Lac Pied des Monts, about 27 km northwest of La Malbaie, Charlevoix County.

22 C/5 Large beryl crystals were found in a pegmatite dyke in block G, north of Point aux Sauvages, Bergeronnes Township.

22 C/5 Good crystals of tourmaline, garnet, beryl and small amounts of apatite have been reported from the deposit at the McGie Mine on the northeast shore of Charlotte Lake. The beryl crystals measured 7.5 cm in diameter (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 100).

22 D/6 Two small beryl crystals were found in a pegmatite stringer on lot 1, range II, Kenogami Township, Chicoutimi County.

22 D/7 Beryl is reported to have been found on the dump of the Lac Xavier mica mine in Harvey Township, Chicoutimi County.

22 D/12 A pegmatite worked for mica prior to 1923 on lot 13, range V, Taché Township, Chicoutimi County, is reported to have contained some beryl and topaz.

22 D/12 Greenish coloured beryl occurs as rough crystals and in massive form at the Lac à la Mère Mica Mine near St. Nazaire north of the Saguenay River (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 110).

31 G/13 The Villeneuve Mine, on lot 31, range I, Villeneuve Township, Papineau County, is a large pegmatite body that has been worked extensively for mica. Beryl is reported to have been found in the dyke.

31 J/12 Beryl is reported to have been found in a pegmatite dyke at the north end of Lac des Iles, about 11 km by road southwest of Mont Laurier, on lot 25, range IV, Robertson Township, Labelle County.

31 J/16 One crystal of beryl is reported to have been found at the Maisonneuve pegmatite, located about 16 km northwest of St. Michel des Saints on lots 1 and 2, range II, Maisonneuve Township, Berthier County.

31 M/10 A massive pegmatite body near the northeast corner of Lac Expanse (Lac Simard) in Delbreuil Township, Temiskaming County, contains abundant crystals of green beryl. The crystals occur as clusters and as single individuals in feldspar, quartz and micropegmatite and are closely associated with muscovite. Cleavelandite and spodumene are minor constituents.

31 M/15
31 M/16
31 N/13
31 N/14 Scattered crystals of beryl have been found in pegmatites at the following localities: (1) a small island in Mourier Lake, Desroberts Township; (2) 2.4 km east of Mourier Lake in range VIII, Desroberts Township; (3) a small island just south of Carriere Bay in range IX, Jourdain Township; (4) range IX, Chabert

Township; (5) Rapide 7 road east of Ferguson Lake, Beraud Township; (6) lot 1, ranges IX and X, Darlens Township; (7) lot 40, range V, Basserode Township; (8) west of Grand Lake Victoria, Granet Township.

32 C/5 Beryl occurs in pegmatite bodies that are related to the Preissac-Lacorne batholith at a number of localities in Lacorne Township. Deep blue-green beryl is particularly abundant at the Lacorne molybdenite mine, in the southwest corner of the township, and has been recovered from a picking belt. The Massberyl property, in the southern part of range VIII, has been reported to be the most promising beryl property in the region. Beryl is also fairly abundant at the Valor property, in the southern part of lot 22, range VIII.

32 D/1 Pegmatitic quartz veins at the East Malartic Mine contain beryl. The mine is located on the south side of Highway 59, 1.6 km east of Malartic. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 93).

32 D/2 In Montanier Township, scattered crystals of pale green beryl occur in a spodumene-bearing pegmatite on the Rapid 11 road at about latitude 48°06'N, longitude 78°30'W. Pegmatites in Bellecombe Township are reported to carry some spodumene, beryl and molybdenite.

32 D/8 Beryl is associated with molybdenite and bismuthinite at the old Height of Land molybdenite mine on lot 22, range X, about 1.6 km north of Preissac village. Phenacite has also been found at this locality.

32 J/10 Pegmatites containing beryl and spodumene occur at Lac Anne, 50°44'N, 70°54'W.

32 J/11 White beryl crystals up to 20 cm across occur with spodumene in pegmatites cutting gneiss in an area 14.5 km northwest of Assinica Lake at 50°37'N, 75°27'W.

32 L/6 About a dozen pale green crystals of beryl were observed in a pegmatite mass surrounded by hornblende schist on the east shore of the Harricana River at about latitude 50°20'N, longitude 79°00'W (J.W. Remick, 1960: private communication).

Saskatchewan

63 L/15 Yellow and green beryl found in pegmatite at Birch Portage have been studied in detail. Yellow beryl has unit cell dimensions a = 9.201, c = 9.187; chemical analysis, SiO_2 63.66, Al_2O_3 20.89, Fe_2O_3 0.83, MnO 0.01, CaO 0.01, Na_2O 0.24, K_2O 0.05, BeO 12.49, H_2O^+ 0.74, H_2O^- 0.38, total 99.30. Green beryl has unit cell dimensions a = 9.254, c = 9.189; chemical analysis - SiO_2 63.94, TiO_2 0.01, Al_2O_3 20.98, Fe_2O_3 2.04, MnO 0.02, Na_2O 0.32, K_2O 0.09, BeO 10.08, H_2O^+ 1.15, H_2O^- 0.47, other 0.01, total 99.11. (Dennis Radcliffe and Finley A. Campbell, 1966: Can. Mineralogist, 8, p. 493-505). (See also M.W. Pyke, 1966: Sask. Dept. Min. Res., Rept. 93, p. 42-54).

63 L/15 Pale green to yellow-green beryl crystals averaging 1 cm in diameter occur in pegmatite exposed in an area 2.4 km west of the northern end of Hanson Lake and 5.6 km south of Winteringham Lake. Crystals up to 6 cm in diameter have been reported. The beryl is not of gem quality. (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 18).

Yukon

105 B/1 An occurrence of beryl in pegmatite is reported at 60°03'N, 130°22'W.

105 B/6 Scattered pale-green crystals of beryl have been observed in a pegmatite segregation in granitic rocks of the Cassiar batholith at about latitude 60°22'30"N, longitude 131°20'W.

BERZELIANITE

Cu_2Se

Northwest Territories

56 D/2 The copper selenide minerals, berzelianite, umangite, and athabascaite have been found as fracture fillings in carbonatized mafic intrusive rock from Christopher Island, Baker Lake. The berzelianite and athabascaite occur as intergrowths forming angular plates among hematite blades in coarser parts of the veins. An electron microprobe analysis of material believed to be close in composition to the true berzelianite gave: Cu 60.0, Se 37.2, S 2.9, Fe 0.3, total 100.4 (G.J. Pringle and A.R. Miller, 1977: Geol. Surv. Can., Paper 77-1B, p. 113).

Saskatchewan

74 N/10 This rare copper selenide has been identified by X-ray diffraction pattern in specimens collected at the Eagle Group showings and Martin Lake Mine in the Lake Athabasca uranium camp. The berzelianite is present in minor amounts and occurs as rounded grains in umangite (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 55).

BETA -

(Minerals with the prefix beta are entered following the main mineral name).

betafite

(see PYROCHLORE GROUP)

BEUDANTITE

$PbFe_3AsO_4SO_4(OH)_6$

New Brunswick

21 P Beudantite has been identified by X-ray diffraction as a constituent of gossans in the Bathurst-Newcastle area. Associated minerals include: pyrite, goethite, gypsum, melanterite and jarosite (X-ray Laboratory, Geol. Surv. Can.).

Quebec

22 G/1 Beudantite has been identified as a yellow, opaque, powdery coating on quartz and metallic minerals at the Candego Mine on the west side of the Marsoui River, 19.3 km by road south of Marsoui. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 75).

32 C/12 Brown beudantite has been identified on specimens from the mine dumps at the Barvue Mine. The mine is at Barville, 62 km from Val d'Or via Highway 64. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 110).

Yukon

105 M/14 Beudantite is a common constituent of oxidized ore zones in the Keno Hill-Sourdough Hill-Galena Hill area where it occurs as yellowish to greenish coatings on, and fills fractures in, hypogene galena, freibergite and arsenopyrite. Identification has been made by X-ray diffraction in specimens from the following mining properties: Comstock, Hector-Calumet, Helen Fraction, Klondyke vein, McLeod vein (Galkeno Mine), Mount Haldane (Little Big Horn Creek), Silver Basin Mine and Yukeno Mine (R.W. Boyle, 1955; 1957: Geol. Surv. Can., Papers 55-30, 57-1).

106 D/4 Beudantite has been found as a coating on arsenopyrite in heavy mineral concentrates from a placer at Dublin Gulch (X-ray Laboratory, Geol. Surv. Can.).

BEYERITE

$CaBi_2O_2(CO_3)_2$

Quebec

31 G/13 The secondary mineral, beyerite, occurs with bismutite as a light greenish yellow coating on native bismuth at the Evans-Lou mine situated near Wakefield Lake about 40 km north of Ottawa. (N.M. Miles, D.D. Hogarth and D.S. Russell, 1971: Am. Mineralogist, 56, p. 395).

BINDHEIMITE

$Pb_2Sb_2O_6(O,OH)$

New Brunswick

21 G/14 Canary yellow to yellowish orange, hair-like or fine fibrous patches and encrustations on quartz and quartzite from the Lake George antimony mine, have been identified as bindheimite. The mine may be reached via Highway 2, west of Fredericton for 29.8 km, and then south on the road to Lake George for 4.8 km. (Ann P. Sabina, 1967: Geol. Surv. Can., 66-51, p. 130).

Yukon

105 M/14 Bindheimite occurs as a yellow to yellowish green alteration product of hypogene minerals in oxidized ore zones in the Keno Hill-Sourdough Hill-Galena Hill area. Its occurrence at the following properties has been confirmed by X-ray powder pattern: Calumet-Hector, Comstock, Arctic and Mastiff, Dragon, and lower adit northwest of the Tin Can vein (R.W. Boyle, 1955: Geol. Surv. Can., Papers 55-30 and 57-1).

106 D/4 Bindheimite is of widespread occurrence in surface cuts on the Rex vein of Peso Silver Mines Limited in the Haggart and Secret Creeks area. The claims at lat. 64°00'N., long. 135°58'W., are 42 km by road from Proctor's sawmill on the Mayo-Elsa road, and are reached by a branch road, 8 km in length, which leaves the Haggart Creek road and follows the valley of Secret Creek. The Rex vein is about 4 km east-southeast of the main camp. (L.H. Green, 1965: Geol. Surv. Can., Paper 65-19, p. 22).

BIOTITE

$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$

British Columbia

82 F/12 Chemical analysis of biotite from hornblende-biotite porphyroblastic gneiss of the Valhalla complex at 49°42'N., 117°36'W., by G. Bender and S. Courville: SiO_2 36.40, Al_2O_3 14.6, TiO_2 4.0, Fe_2O_3 3.06, FeO 16.50, MgO 12.28, MnO 0.25, K_2O 9.33, Na_2O 0.07, CaO 0.04, BaO 0.30, H_2O^+ 2.47, H_2O^- 0.06, F 0.42, P_2O_5 0.06, total 99.84, less O for F 0.18, total 99.66 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

82 F/16 Chemical analyses of biotites from the White Creek batholith by G. Bender and S. Courville.

(1) biotite rich inclusion in hornblende-biotite granodiorite: SiO_2 37.78, Al_2O_3 15.39, TiO_2 1.66, Fe_2O_3 3.28, FeO 15.22, MgO 12.55, MnO 0.32, K_2O 8.96, Na_2O 0.25, CaO 0.85, BaO 0.16, H_2O^+ 3.32, H_2O^- 0.08, F 0.44, P_2O_5 0.10, total 100.28, less O for F 0.18, total 100.10.

(2) from biotite granodiorite, 1.6 km south of Sawtooth peak, 2,400 m elevation, at 49°48'N, 116°13'W: SiO_2 36.20, Al_2O_3 17.04, TiO_2 1.93, Fe_2O_3 3.13, FeO 15.80, MgO 12.14, MnO 0.45, K_2O 9.30, Na_2O 0.06, CaO 0.38, BaO 0.19, H_2O^+ 3.02, H_2O^- 0.08, F 0.47, P_2O_5 0.07, total 100.26, less O for F 0.20, total 100.06.

(3) from hornblende-biotite granodiorite: SiO_2 36.66, Al_2O_3 15.12, TiO_2 1.81, Fe_2O_3 3.62, FeO 15.70, MgO 11.96, MnO 0.34, K_2O 9.35, Na_2O 0.10, CaO 0.58, BaO 0.14, H_2O^+ 4.07, H_2O^- 0.10, F 0.50, P_2O_5 0.10, total 100.15, less O for F 0.21, total 99.94.

(4) from porphyritic biotite quartz monzonite, cirque west of Skookumchuck Mountains at 2,400 m elevation, at 49°51'N, 116°14'W: SiO_2 35.70, Al_2O_3 16.0, TiO_2 2.38, Fe_2O_3 3.54, FeO 17.05, MgO 11.04, MnO 0.40, K_2O 8.58, Na_2O 0.04, CaO 0.11, BaO 0.09, H_2O^+ 3.90, H_2O^- 0.10, F 1.18, P_2O_5 0.19, total 99.67. less O for F 0.50, total 99.17.

(5) from porphyritic biotite quartz monzonite at 49°50'N, 116°17'W at 1,350 m. elevation: SiO_2 36.20, Al_2O_3 15.97, TiO_2 2.52, Fe_2O_3 3.72, FeO 17.08, MgO 10.32, MnO 0.38, K_2O 9.32, Na_2O 0.10, CaO 0.23, BaO 0.09, H_2O^+ 2.69, H_2O^- 0.04, F 0.73, P_2O_5 0.29, total 99.69, less O for F 0.31, total 99.38.

(6) from quartz monzonite at 49°53'N, 116°22'W: SiO_2 34.70, Al_2O_3 16.38, TiO_2 2.93, Fe_2O_3 3.67, FeO 18.99, MgO 8.87, MnO 0.47, K_2O 8.61, Na_2O 0.04, CaO 0.34, BaO 0.23, H_2O^+ 3.73, H_2O^- 0.04, F 0.99, P_2O_5 0.21, total 100.20, less O for F 0.42, total 99.78. (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

82 K/2 Chemical analyses by G. Bender and S. Courville, biotite from quartz monzonite at 50°05'N, 116°51'W, 4.8 km up Fry Creek from footbridge: SiO_2 35.5, Al_2O_3 18.1, TiO_2 2.5, Fe_2O_3 2.1, FeO 21.67, MgO 6.0, K_2O 9.20, Na_2O < 0.2, CaO 0.12, H_2O^+ 3.50, F 0.83, total 99.72, less O for F 0.35, total 99.37. (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

Northwest Territories

65 C/14 Chemical analysis of biotite from quartz monzonite stock, 9.6 km southeast of Ennadai Lake at 60°45'30", 101°10'00", by G. Bender and S. Courville: SiO_2 34.9, Al_2O_3 14.7, TiO_2 3.3, Fe_2O_3 3.5, FeO 28.79, MgO 3.2, K_2O 8.2, Na_2O <0.2, CaO 0.05, H_2O^+ 3.30, < 0.63, total

100.77 less O for F 0.27, total 100.5 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

75 B/13 Chemical analysis by G. Bender and S. Courville of biotite from gneissic biotite-hornblende monzonite, on the south shore of Spitfire Lake at 60°53'N, 107°40'W: SiO_2 36.11, Al_2O_3 14.41, TiO_2 4.29, Fe_2O_3 2.37, FeO 23.18, MgO 6.78, MnO 0.20, K_2O 8.21, Na_2O 0.14, CaO 0.46, BaO 0.91, Rb_2O 0.05, H_2O^+ 2.80, H_2O^- 0.10, F 0.59, P_2O_5 0.03, total 100.58, less O for F 0.25, total 100.33 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

75 D/8 Chemical analysis by G. Bender and S. Courville of biotite from paragneiss from island of Bedareh Lake at 60°18'40"N, 110°02'00"W: SiO_2 37.00, Al_2O_3 17.2, TiO_2 3.4, Fe_2O_3 0.98, FeO 18.44, MgO 9.9, K_2O 9.1, Na_2O < 0.2, CaO 0.65, H_2O^+ 3.30, F 0.23, total 100.40, less O for F 0.10, total 100.3 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

85 N/7 Chemical analysis by G. Bender and S. Courville of biotite from porphyroblastic quartz monzonite from island in Maryleer Lake, at 63°28'10"N, 116°32'02"W: SiO_2 35.3, Al_2O_3 14.9, SiO_2 2.71, Fe_2O_3 3.67, FeO 22.63, MgO 7.56, MnO 0.43, K_2O 9.09, Na_2O 0.10, CaO 0.02, BaO 0.05, H_2O^+ 2.93, H_2O^- 0.04, F 0.49, P O_2 0.12, total 100.04, less O for F 0.21, total 99.83 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

86 B/13 Chemical analysis by G. Bender and S. Courville of biotite from biotite-cordierite schist at 64°46'25"N, 115°39'40"W: SiO_2 35.2, Al_2O_3 19.8, TiO_2 3.1, Fe_2O_3 1.9, FeO 20.82, MgO 6.40, K_2O 9.30, Na_2O < 0.2, CaO 0.27, H_2O^+ 3.70, F 0.51, total 101.2, less O for F 0.21, total 100.99 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

Ontario

31 C/12 Chemical analyses of biotites from the Blue Mountain area by S. Abbey, J.L. Bouvier and J.A. Maxwell:

(1) Fresh brown biotite from xenolith: SiO_2 33.80, Al_2O_3 19.22, TiO_2 2.05, Fe_2O_3 3.64, FeO 16.63, MgO 8.81, MnO 0.61, Cr_2O_3 0.02, NiO 0.02, V_2O_5 0.04, Li_2O 0.13, K_2O 9.69, Na_2O 0.22, CaO 0.05, BaO 0.05, Rb_2O 0.04, H_2O^+ 2.92, H_2O^- 0.60, F 0.45, Cl 0.68, P_2O_5 0.01, S 0.03, CO_2 0.20, total 99.90, less O for F, Cl 0.34, total 99.56.

(2) Green pegmatitic biotite partly altered to orange-yellow along fractures: SiO_2 33.58, Al_2O_3 17.69, TiO_2 1.27, Fe_2O_3 8.49, FeO 19.40, MgO 4.58, MnO 0.65, Cr_2O_3 0.04, NiO 0.01, V_2O_5 0.01, Li_2O 0.14, K_2O 9.59, Na_2O 0.27, CaO 0.04, BaO 0.02, Rb_2O 0.01, H_2O^+ 2.32, H_2O^- 0.68, F 0.65, Cl 0.20, P_2O_5 0.07, CO_2 0.12, total 99.83, less O for F, Cl 0.31, total 99.52.

(3) Orange-yellow alteration of biotite (2) above: SiO_2 32.19, Al_2O_3 17.97, TiO_2 1.12, Fe_2O_3 24.92, FeO 2.87, MgO 5.14, MnO 0.58, Cr_2O_3 0.04, NiO 0.02, V_2O_5 0.02, Li_2O 0.01, K_2O 6.73, Na_2O 0.26, CaO 0.46, BaO 0.12, Rb_2O 0.01, H_2O^+ 4.77, H_2O^- 1.68, F 0.60, P_2O_5 0.06, CO_2 0.00, total 99.55, less O for F 0.25, total 99.30 (J.H.Y. Rimsaite, 1867: Clays and Clay Minerals, Fifteenth Conference, Pergamon Press, p. 378).

31 E/1 Chemical analyses by G. Bender and S. Courville of biotites: (1) from gneiss at 45°01'N, 78°02'W, Cardiff Township: SiO_2 40.8, Al_2O_3 10.0, TiO_2 0.50, Fe_2O_3 2.1, FeO 13.85, MgO 16.3, MnO 0.40, K_2O 9.7, Na_2O 0.3, CaO 0.0, H_2O^+ 1.92, H_2O^- 0.88, F 3.73, total 100.5, less O for F 1.6, total 98.9.

(2) from coarse pegmatite segregation in skarn underground at 45°03'N, 78°01'W, Cardiff Township: SiO_2 39.6, Al_2O_3 10.6, TiO_2 1.9, Fe_2O_3 3.8, FeO 15.22, MgO 14.6, MnO 0.5, K_2O 9.5, Na_2O 0.3, CaO 0.2, H_2O^+ 1.5, H_2O^- 0.35, F 3.63, total 101.7, less O for F 1.5, total 100.2 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

31 E/1 Chemical analyses by W.H. Herdsman of biotites from cordierite-gedrite-garnet rocks along the north shore of Fishtail Lake, Harcourt Township.

	(1)	(2)	(3)	(4)
SiO_2	36.66	37.84	37.04	36.26
TiO_2	1.32	1.13	1.63	2.32
Al_2O_3	16.69	16.68	16.51	16.12
Fe_2O_3	5.37	5.33	3.41	5.74
FeO	11.31	10.54	12.36	10.88
MnO	0.13	0.04	0.18	0.06
MgO	16.34	16.83	15.60	15.92
CaO	0.56	0.12		0.44
Na_2O	0.94	0.74	1.06	
K_2O	7.80	7.51	9.44	8.96
H_2O	2.76	2.96	2.57	3.20
Total	99.88	99.72	99.80	99.90

(R.K. Lal and W.W. Moorhouse, 1969: Can. Jour. Earth Sci., 6, p. 145)

31 F/4 Chemical analyses by G. Bender and S. Courville:

(1) biotite from radioactive orebody at 45°01'N, 77°53'W, Faraday Township: SiO_2 41.96, Al_2O_3 9.81, TiO_2 1.04, Fe_2O_3 6.95, FeO 10.87, MgO 14.48, MnO 0.51, Li_2O 0.65, K_2O 9.36, Na_2O 0.11, Rb_2O 0.73, Cs_2O 0.1, H_2O^+ 1.66, H_2O^- 0.26, F 3.64, P_2O_5 0.03, total 102.06, less O for F 1.53, total 100.53.

(2) biotite, same locality as above: SiO_2 41.92, Al_2O_3 10.4, TiO_2 0.90, Fe_2O_3 6.31, FeO 10.50, MgO 14.3, MnO 0.50, Li_2O 0.71, K_2O 9.9, Na_2O 0.12, CaO 0.22, BaO 0.05, Rb_2O 0.74, Cs_2O 0.1, H_2O^+ 1.32, H_2O^- 0.19, F 3.67, P_2O_5 0.02, total 101.72, less O for F 1.54, total 100.18.

(3) biotite from radioactive pegmatite, Mentor property, at 45°10'N, 77°44'W: SiO_2 32.8, Al_2O_3 16.8, TiO_2 1.5, Fe_2O_3 7.2, FeO 22.36, MgO 5.8, MnO 0.9, K_2O 9.3, Na_2O 0.3, CaO 0.2, H_2O^+ 3.02, H_2O^- 0.63, F 0.55, total 101.4, less O for F 0.2, total 101.2 (J.H.Y Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

42 M/12 Chemical analysis by G. Bender and S. Courville of biotite from paragneiss north of Fort Hope on the west shore of Eabamet Lake (51°34'30"N, 87°59'00"W): SiO_2 36.11, Al_2O_3 18.5, TiO_2 2.63, Fe_2O_3 1.46, FeO 16.62, MgO 10.5, MnO 0.33, K_2O 9.54, Na_2O 0.1, BaO 0.11, H_2O^+ 3.05, H_2O^- 0.05, P_2O_5 0.08, total 99.63, less O for F 0.23, total 99.40 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

Quebec

12 O/2 Chemical analysis by G. Bender and S. Courville of biotite from gneiss at St-Augustin, east of the Protestant parish hall (51°14'N, 58°39'W):

SiO_2 39.12, Al_2O_3 12.49, TiO_2 3.57, Fe_2O 1.28, FeO 14.61, MgO 15.14, MnO 0.21, Cr_2O_3 0.02, K_2O 9.52, Na_2O 0.23, CaO 0.18, BaO 0.11, Rb_2O 0.1, H_2O^+ 1.32, H_2O^- 0.04, F 2.80, P_2O_5 0.03, total 100.69, less O for F 1.18, total 99.51 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

21 E/6 Chemical analyses of biotites by G. Bender and S. Courville: (1) from anorthositic gabbro rim of Mount Megantic intrusive at 45°28'N, 71°12'W: SiO_2 36.27, Al_2O_3 13.88, TiO_2 4.05, Fe_2O 2.95, FeO 18.98, MgO 10.29, MnO 0.14, Cr_2O_3 0.02, NiO 0.02, K_2O 8.39, Na_2O 0.27, CaO 0.48, BaO 0.38, Rb_2O 0.02, H_2O^+ 2.92, H_2O^- 0.20, F 0.18, P_2O_5 0.05, total 99.47, less O for F 0.08, total 99.39.

(2) from granitic core of Mount Megantic intrusive: SiO_2 36.43, Al_2O_3 12.55, TiO_2 3.5, Fe_2O_3 5.56, FeO 22.49, MgO 6.01, MnO 0.44, K_2O 8.25, Na_2O 0.11, CaO 0.06, BaO 0.32, Rb_2O 0.11, H_2O^+ 2.79, H_2O^- 0.26, F 1.22, P_2O_5 0.04, total 100.03, less O for F 0.51, total 99.52 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

21 M/9 Biotite from Mine de Pied des Monts in the Murray Bay district exhibits pleochroic haloes along major and minor cleavage planes in such a way as to suggest that the nuclei were formed after the crystallization and rupture of the mica. The biotite can be cleaved into exceptionally thin sheets (D.E. Kerr-Lawson, 1927, 1928: Univ. Toronto Stud., Geol. Ser., No. 24, p. 54; and No. 27, p. 15).

23 O/16 Chemical analysis by G. Bender and S. Courville of biotite from gneiss at 55°55'N, 66°03'W: SiO_2 36.50, Al_2O_3 15.80, TiO_2 2.05, Fe_2O 3.95, FeO 16.70, MgO 11.34, MnO 0.34, K_2O 9.39, Na_2O 0.05, CaO 0.04, BaO 0.11, H_2O^+ 3.23, H_2O^- 0.07, F 0.37, P_2O_5 0.07, total 100.01, less O for F 0.16, total 99.85 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

31 G/8
31 G/9 Chemical analyses of biotites, I, from alnoite rock and II, from pyroxene-calcite-rock, Oka Complex, 32 km west of Montreal on the north shore of the Lake of Two Mountains, by H. Ulk: I, SiO_2 37.65, Al_2O_3 18.25, TiO_2 3.73, Fe_2O_3 1.43, FeO 5.28, MnO 0.10, MgO 20.96, CaO 0.57, Na_2O 0.61, K_2O 9.30, P_2O_5 0.08, H_2O^+ 1.10, F 0.18, less O for F 0.07, total 99.17; II, SiO_2 36.60, Al_2O_3 18.25, TiO_2 1.41, Fe_2O_3 3.21, FeO 10.34, MnO 1.60, MgO 17.27, CaO 0.28, Na_2O 0.73, K_2O 9.32, P_2O_5 0.21, H_2O^+ 0.81, F 0.03, less O for F 0.01, total 100.05 (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 H/14 Brown, pleochroic biotite forming euhedral pseudohexagonal crystals is found in the bed of the Achigan River downstream from the dam at L'Epiphanie. It is concentrated in the lower 15 cm of the Utica Shale where it overlies the Trenton limestone and is the first known authigenic occurrence of the mineral in that formation. The crystals average 0.4 millimetre in diameter and 0.1 millimetres thick and contain black carbonaceous inclusions (Mrs. J.S. Stevenson: private communication).

35 A/8 Chemical analysis of biotite from granodiorite at 60°22'N, 72°27'W, by G. Bender and S. Courville: SiO_2 36.70, Al_2O_3 15.10, TiO_2 4.10, Fe_2O_3 2.83, FeO 15.90, MgO 11.82, MnO 0.21, K_2O 9.42, Na_2O 0.13, CaO 0.03, BaO 0.28, H_2O^+ 2.64, H_2O^- 0.06, F 0.59, P_2O_5 0.05, total 99.86, less O for F 0.25, total 99.61 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

35 J/4 Chemical analysis by G. Bender and S. Courville of biotite from veined gneiss at 62°07'N, 75°39'W: SiO_2 36.70, Al_2O_3 16.10, TiO_2 2.83, Fe_2O_3 3.37, FeO 18.68, MgO 9.16, MnO 0.23, K_2O 9.39, Na_2O 0.05, BaO 0.18, H_2O^+ 2.90, H_2O^- 0.10, F 0.31, P_2O_5 0.04, total 100.04, less O for F 0.13, total 99.91 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

BIRNESSITE

delta-MnO_2

Newfoundland

1 N/10 Birnessite is the main manganese mineral in red and green shale exposed along the steep banks of the Manuels River downstream from the bridge on Highway 60 at Manuels. It occurs as disc-shaped nodules and as thin bands and lenses (Ann P. Sabina, 1975: Geol. Surv. Can., paper 75-36, p. 70).

Quebec

11 N/4 Coatings of birnessite are found on rocks exposed along the shoreline cliffs on the north side of Demoiselle Hill on Amherst Island, the most southerly and largest of the Magdalen Islands (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 36).

11 N/5 Birnessite occurs coating rocks along the cliffs nearest the highway along the shore of Baie du Sud on Grindstone Island (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 16).

31 H/11 A mineral giving a characteristic X-ray powder pattern of delta-MnO_2 has been identified in vein material from the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

BISMITE

Bi_2O_3

A secondary mineral formed by oxidation of native bismuth and bismuth minerals. Four polymorphs of artificial Bi_2O_3 are known. The name bismite is given to the monoclinic polymorph, α - Bi_2O_3.

Ontario

31 F/6 Bismite has been found in Lyndoch Township, Renfrew County, conc. XV, lot 23, where its presence has been attributed to the alteration of bismuthinite (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, 14 R).

BISMOCLITE

BiOCl

Quebec

32 D/8 Bismoclite, a secondary mineral formed by alteration of bismuth minerals, was identified as a light green coating on feldspar and quartz on the dumps at the Preissac Mine. The mine is situated 14.4 km north of Highway 59 on Highway 395 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 70).

BISMUTH

Bi

British Columbia

92 H/8 At the Oregon property, about 4.8 km east of Hedley (Osoyoos mining division) bismuth is found with massive garnet, hedenbergite, wollastonite, calcite, minor quartz, and sparsely disseminated sulphides and tellurides. Bismuth, molybdenite and gold are closely associated with hedleyite and joseite while bornite, chalcopyrite, cobaltite and safflorite occur apart and are locally abundant (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

104 M/9 Bismuth occurs at the Engineer Mine in the Atlin mining division associated with calaverite, gold and pyrite (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., No. 40, p. 97).

104 P/4 Small amounts of bismuth have been found in the McDame area about 3.2 km northeast of the junction of Bass Creek and Cottonwood River. The bismuth occurs in a dense black skarn zone on the southwest slope of Needlepoint Mountain at the 1500 m level. Fluorite, magnetite, chlorite, quartz, carbonate and danalite are abundant (R.M. Thompson, 1957: Can. Mineralogist, 6, p. 69).

Manitoba

52 L/6 Native bismuth is associated with gustavite, cosalite, bismuthinite-aikinite intergrowths, chalcopyrite, stannite and arsenopyrite at the Tanco pegmatite, Bernic Lake (D.C. Harris and T.T. Chen, 1975: Can. Mineralogist, 13, p. 411).

New Brunswick

21 G/2 At Letite (Oliver Lode) native bismuth occurs with gold and with copper minerals in quartz veins (New Brunswick Mines Br., files).

21 G/7 Bismuth is associated with tin-zinc deposits in rhyolite at Mount Pleasant, Charlotte County (R.A.A. Ruitenberg, 1963: Univ. New Brunswick, M.Sc. Thesis).

21 G/8 At Square Lake, Queens County, native bismuth and bismutite occur with wolframite and molybdenite (W.J. Wright, 1940: New Brunswick, Mines Br., Paper 40-3).

21 J/10 Native bismuth is a minor constituent of the ore at the Burnt Hill tungsten deposit in York county, about 26 km from Maple Grove Station (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 127).

21 O/8 Native bismuth, bismutite and bismuthinite are minor constituents associated with the copper, lead and zinc deposits as at Heath Steele, Northumberland County (A.L. McAllister 1959: Can. Inst. Mining Met., New Brunswick Mines Br. reproduction).

Northwest Territories

75 L/5 Native bismuth has been identified in samples obtained from the Nix claim on the north shore of Sachowia Lake, north of the east arm of Great Slave Lake. Identification was made from X-ray powder patterns at the X-ray Laboratory, Geol. Surv. Can.

85 I/14 Bismuth occurs near Allan Lake, about 80 km northeast of Yellowknife, in veins composed predominantly of quartz and containing less than one per cent metallic minerals. Arsenopyrite, chalcopyrite, sphalerite, gold, and tellurbismuth are found in the vicinity of the native bismuth (H.V. Warren and R.M. Thompson, 1949: Am. Mineralogist, 34, p. 458).

86 E/9 Native bismuth occurs with native silver, matildite, safflorite, skutterudite, rammelsbergite, pararammelsbergite, gersdorffite, cobaltite and niccolite, at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay on Great Bear Lake, at latitude 65°36'14"N, longitude 118°06'45" W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 F/12 Specimens containing native bismuth have been found on the property of Camsell River Silver Mines (How Group) on the Camsell River, about 32 km to the south of Great Bear Lake. They consist of a dolomite-quartz gangue with disseminated galena, chalcopyrite, pyrite, bismuth, and silver-bearing bismuthinite. Associated with these minerals are sphalerite, chalcopyrite, tetrahedrite (in traces), silver, argentite, matildite, marcasite, and minute zoned crystals of an undetermined iron-cobalt-nickel-arsenic sulphide (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 547).

86 F/13 Native bismuth occurs as disseminated crystals in quartz and calcite stringers and in veins and cracks in cobaltite and pitchblende, in the silver deposits at the B.E.A.R. showings on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 761).

86 K/4 Native bismuth has been observed in two sections at the Eldorado Mine on Great Bear Lake. It occurs in vein-like forms associated with zoned crystals of skutterudite and with minor amounts of interbanded chloanthite and smaltite. The bismuth was formed after the skutterudite and quartz. Carbonate and minor amounts of chloritic mica are the gangue minerals (Ellis Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 47).

Nova Scotia

11 K/7 At Wagamatcook, Inverness County, native bismuth was found as water worn nuggets from the size of a wheat grain to that of a pigeon's egg (H. How, 1868: Mineralogy of Nova Scotia, p. 63).

Ontario

31 C/12 Small quantities of native bismuth have been noted in association with bismuthinite in a quartzose vein in Tudor Township, Hastings County, conc. III, lot 34 (H.G. Vennor, 1866-69: Geol. Surv. Can., Rept. Prog., p. 171).

31 M/4 Native bismuth is one of the minerals reported in the orebodies of the Frontier and Keeley mines in South Lorrain Township at the settlement of Silver Centre situated at the end of Highway 567 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 63).

31 M/5 The Drummond Mine in Ontario's Timiskaming district is known to contain native bismuth (National Mineral Collection).

Specimens containing native bismuth have been found in Coleman Township in the Timiskaming district near Cobalt. Analysis of native bismuth by Burrows: Bi 99.20, Co strong trace,

Ni trace, FeO 0.40, Ag trace, Sb none, total 99.60 (W.G. Miller, 1905: Ont. Bur. Mines, Ann. Rept., vol. 14, Pt. II, p. 22).

The Foster, Nipissing and O'Brien mines in the Cobalt area of the Timiskaming district all contain native bismuth (R.A.A. Johnston, 1907: Geol. Surv. Can., Summ. Rept., p. 97).

Native bismuth occurs at the Christopher, Victory, Ophir and Mayfair silver mines in the Cobalt area (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 50-52).

31 M/5 The Royal Ontario Museum mineral collection includes specimens of native bismuth from the following mines in Coleman Township.

University Mine, north half lot 4, conc. IV,
Foster Mine, north half lot 4, conc. IV,
Nipissing Mine, north half lot 5, conc. V,
McKinley-Darragh Mine, north half lot 6, conc. V,
Cobalt Lake Mine, lots 5 and 6, conc. V and VI,
Silver Queen Mine, north half lot 7, conc. V,
LaRose Mine, lot 4, conc. VI,
O'Brien Mine, south half lot 4, conc. VI,
Chambers-Ferland Mine, lot 5, conc. VI,
Hudson Bay Mine, lot 6, conc. VI,
Trethewey Mine, lot 6, conc. VI
(J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 65-6)

32 D/4 Bismuth occurs at the Peerless property, McElroy Township, with galena, copper, pyrite, sphalerite, pyrrhotite and cosalite in a rock composed predominantly of calcite but containing quartz and fragments of greenstone as well (A.G. Burrows and P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. VI, p. 17).

32 D/4 A calcite-quartz brecciated greenstone rock in the southwestern part of McElroy Township contains bismuth (E.M. Abraham, 1950: Ont. Dept. Mines, Ann. Rept., vol. 59, Pt. VI, p. 51).

41 I/6 In the Sudbury ores, native bismuth is confined almost entirely to ores rich in galena and pyrrhotite, or with parkerite and bornite, as at the Frood Mine (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7, p. 41).

41 J/11 Bismuth occurs in quartz veins in the southeast quarter of conc. IV, lot 1, Otter Township (R.A.A. Johnston, 1915: Geol. Surv. Can., 74, p. 42).

41 J/12 Native bismuth was discovered by Chapman in some rolled pieces of quartz near Echo Lake in the Algoma district (G.C. Hoffmann: Geol. Surv. Can., Ann. Rept., IV, p. 237).

41 P/9 Nickeline, cobaltite and native bismuth were collected from dumps near the main shaft of the Moose Horn Mine. The abandoned mine is located about 1.6 km north of Elk Lake village, along Highway 560 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 69).

41 P/9 Bismuth has been identified in dark grey carbonate rock from James Township, conc. I, lot 2 (northeast quarter, south half). It occurs as scattered masses and is associated with bismuthinite (D.A. Moddle, private communication).

41 P/10 Native silver and native bismuth have been found together in the Gowganda area in a vein on the Silver Bullion property at the northeast end of Leroy Lake (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 34).

41 P/10 Native bismuth is reported from the Walsh and Morrison mines located 3.5 and 5.1 km east of Gowganda via Highway 560. Crystals of native bismuth in calcite are reported from the Boyd-Gordon claim adjoining the Mann deposit. The Mann Mine is 5.6 km south of Highway 560 from a road junction 8.5 km west of Gowganda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 75,76,80).

42 A/7 Native bismuth has been found at the Night Hawk Peninsula Mine situated on the shore of a peninsula at the northern end of Night Hawk Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 123).

42 A/11 Bismuth and bisinuthinite have been identified in disseminated ore east of a bornite-rich zone on the 1200 level of the Kidd Creek Mine, north of Timmins. The mine may be reached via Highway 655, 25.7 km north of Highway 101 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

Quebec

22 A/13 Bismuth occurs in microscope amounts in chalcopyrite from the Needle Mountain orebody of Gaspe Copper Mines Limited in Murdochville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81).

23 B/14 Native bismuth is associated with bismuthinite, cobaltite, safflorite-lollingite and arsenopyrite at the Quebec Cobalt property, 52°50'N, 67°15'W, in the Mount Wright area. Identification was made by the X-ray powder diffraction method in the X-ray Laboratory, Geol. Surv. Can.

31 G/12 Native bismuth occurs sparingly as grey metallic small masses at the Evans-Lou Mine near St-Pierre-de-Wakefield (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 35).

31 G/12 A small vein of massive bismuth intergrown with bismuthinite was uncovered during feldspar mining at the Lachaine quarry west of St-Pierre-de-Wakefield. Specimens are in the National Mineral Collection.

32 C/5 Native bismuth, bismuthinite and molybdenite were the ore minerals that were mined at the Lacorne Mine. The mine is on the east side of Highway 60, 30.6 km from Val d'Or. Native bismuth has also been reported at the Quebec Lithium Corporation mine in Lacorne Township, on lot 54, range IX, about 0.8 km south of Lac Lortie (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 104-107).

32 D/8 At the Preissac Mine on Highway 395, about 14 km north of Highway 59, native bismuth is intergrown with molybdenite and muscovite (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 70).

32 D/12 Bismuth is present in the Height of Land Mine in the Abitibi district of western Quebec (M.E. Wilson, 1910: Geol. Surv. Can., Summ. Rept., p. 207).

Yukon

105 H/16 A small amount of native bismuth has been reported in quartz veins cutting the scheelite-bearing skarn zone at the Canada Tungsten Mine. The mine is at 61°57'N, 128°15'W, at an elevation of 1680 m in the Logan Mountains overlooking the Flat River valley (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 95).

106 D/4 Bismuth occurs at Dublin Gulch, 64°03'N, 135°50'W, in the Mayo mining district as a minor constituent in a gold placer deposit (X-ray Laboratory, Geol. Surv. Can.).

115 P/9 Small, rounded, yellow, oxide-coated nuggets of native bismuth exhibiting the characteristic pink tinge on a freshly broken surface were found among the heavy minerals recovered from a placer on Highet Creek in the Mayo district (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 451).

115 P/16 Yellow oxide-coated nuggets up to 10 millimetres in diameter occur in a placer on Haggart Creek in the Mayo district (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 451).

BISMUTHINITE

Bi_2S_3

Bismuthinite and native bismuth are the main ore minerals of bismuth. Although widely distributed in nature they rarely occur as large deposits.

British Columbia

82 E/2 Bismuthinite occurs in association with magnetite, chalcopyrite, pyrite and other minerals on the Bluebell, Summit Camp and Kettle River properties in the Greenwood mining division (R. Bell, 1902-3: Geol. Surv. Can., Ann. Rept., XV, p. 106 A).

82 E/3 Massive pyrite, pyrrhotite and arsenopyrite; accessory chalcopyrite, magnetite, tetrahedrite and gold; and minor bismuthinite comprise the ore at the Dividend Lakeview Mine, 3.2 km south of Osoyoos (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 451).

82 F/4 Bismuth sulphide occurs in impregnations near pulaskite dykes at the Giant and Jumbo mines in the Rossland area. It forms in particles or aggregates up to 5 cm in diameter. Visible gold is frequently found with it (C.W. Drysdale: Geol. Surv. Can., Mem 77, p. 77).

82 G/12 Specimens of bismuthinite in quartz have been obtained from the St. Mary's River near Cranbrook (National Mineral Collection).

82 L/14 Long prismatic crystals of bismuthinite were found in quartz on the north side of Little Shuswap Lake in the Kamloops mining division (G.M. Dawson 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 161 R).

93 L/11 Poorly formed, flattened prisms of bismuthinite are associated with bismuth tellurides and electrum (Au 85.72, Ag 14.28) in quartz at Hudson Bay Mountain near Smithers. They are from 12 to 25 mm long a 3 to 6 mm wide, have perfect cleavage, and a specific gravity of 6.77 ± 0.03 (H.V. Warren and P. Davis, 1940: Univ. Toronto Stud., Geol. Ser., 40, p. 107).

105 P/5 Quartz veins in porphyritic granite north of Cassiar contain bismuthinite, molybdenite and scheelite (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 109).

Manitoba

52 L/6 Bismuthinite was identified in a specimen from No. 1 subdrift, south, Chemalloy Minerals property at Bernic Lake (X-ray Laboratory, Geol. Surv. Can.).

New Brunswick

21 G/7 Bismuthinite is associated with tin-zinc deposits in rhyolite at Mount Pleasant, Charlotte County (A.A. Ruitenberg, 1963: Univ. New Brunswick, M.Sc. Thesis).

21 O/8 Native bismuth, bismutite and bismuthinite are minor constituents associated with the copper, lead and zinc deposits, as at Heath Steele, Northumberland County (A.L. McAllister, 1959: Can. Inst. Mining Met., New Brunswick Mines Br. reproduction).

Northwest Territories

86 F/12 Specimens from the property of Camsell River Silver Mines consist of a dolomite-quartz gangue with disseminated galena, chalcopyrite, pyrite, bismuth, and bismuthinite which carries silver. The bismuthinite is usually in contact with bismuth and occurs only in small amounts. Associated minerals are sphalerite, chalcopyrite and traces of tetrahedrite, silver, argentite, matildite, maracasite and minute zoned crystals of an undetermined iron-cobalt-nickel-arsenic sulphide. The specimens were taken from the How Group on Camsell River about twenty miles south of Great Bear Lake (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 547).

86 F/13 Bismuthinite is a minor constituent of the silver-uranium deposit at the B.E.A.R. property on the north shore of Contact Lake, 14 km southeast of the Eldorado Mine. It is closely associated with famatinite, arsenopyrite and native bismuth (G.M. Furnival, 1939: Econ. Geol., 34, p. 761).

Nova Scotia

11 F/16 At the Eagle Head Mine, located about 3.2 km east of Deep Cove on the north shore of Gabarouse Bay, Cape Breton Island, bismuthinite occurs as acicular crystals and as flaky, platy or fine grained masses in quartz, generally occupying vugs with quartz crystals (up to 12 mm long). It is associated with chalcopyrite, pyrite, brochantite, malachite, langite, devilline, quartz and calcite (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 35).

Ontario

31 C/12 Bismuthinite has been noted in Tudor Township, Hastings County, on conc. III, lot 34, and conc. IV, lot 34 (G.M. Dawson, 1895, 1897: Geol. Surv. Can., Ann. Rept., VIII, p. 119 A;X, p. 118 A).

31 C/14 Specimens containing bismuthininte have been collected in Frontenac County; Barrie Township, conc. X, lot 13 (National Mineral Collection).

31 C/14, 31 F/3 Bismuthinite has been found in Clarendon Township, lot 33, southwest range, and in Miller Township in a lot north of Buckshot Lake (R.W. Ells: Geol. Surv. Can., Ann. Rept., XIV, 75 J).

31 F/6 Bismuthinite and beryl form lamellar masses in a coarse granite vein on conc. XV, lot 23, Lyndoch Township (G.C. Hoffmann: Geol. Surv. Can., Ann. Rept., VIII, 14 R).

31 F/15 Bismuthinite has been found in an opening on a quartz vein 800 m north of Swamp Creek in the Dalhousie area of Clarendon Township (B.L. Smith, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VII, p. 39).

31 M/4 Bismuthinite is found in veins with quartz, calcite, cobaltite and arsenopyrite on a claim (H.R. 616) northeast of Lorrain Lake in the Matabitchuan area (E.W. Todd, 1925: Ont. Dept. Mines, Ann. Rept., vol. 34, Pt. III, p. 31).

31 M/4 The orebodies of the Frontier and Keeley silver mines contain bismuthinite. The mines are at the settlement of Silver Centre, at the end of Highway 567 in South Lorrain Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 63).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16
Small quantities of bismuthinite are present at many places in the ores of the Cobalt-Gowganda area. It occurs intergrown with bismuth, arsenopyrite, galena, pavonite and chalcopyrite (W. Petruk et. al., 1971: Can. Mineralogist 11, p. 218).

32 D/4 Needle-like crystals of bismuthinite have been observed in a quartz veinlet at Bennett-Pacaud Mines, in Pacaud Township, conc. VI, lot 1, north half (K.D. Lawton, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. V, p. 47) (A.G. Burrows and P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. VI, p. 15).

41 P/9 A shiny, grey, cleavable mineral associated with native bismuth in grey carbonate rock was found in James Township on conc. I, lot 2, northeast quarter, south half. It was identified as bismuthinite by the Provincial Assay Laboratory using X-ray diffraction methods (D.A. Moddle: private communication).

42 A/11 Bismuthinite and native bismuth have been identified in disseminated ore east of a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine north of Timmins. The mine may be reached by Highway 655, about 26 km north of Highway 101 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 74-1A, p. 311).

42 L/4 Quartz veins and adjoining schists in the Kowkash area are well mineralized with pyrite and pyrrhotite. On the Knapp-Hendricks claims, south of the Tashota gravel pit. molybdenite, graphite, and bismuthinite occur in small quantities (P.E. Hopkins, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 222).

52 C/10 Bismuthinite occurs in a vein at the Mikado Mine in the Rainy River district. It is associated with quartz, pyrite, chalcopyrite, molybdenite, malachite and free gold. The mine is on the shore of Bag Bay, Shoal Lake, about 56 km from Kenora (A.L. Parsons, 1911: Ont. Bur. Mines, Ann. Rept., vol. 20, Pt. I, p. 164).

52 C/13 A specimen of bismuthinite in the mineral collection at the Royal Ontario Museum is reported to be from the Mrs. J. Vinall occurrence at the north end of the northeast arm of Jackfish Lake, 42.5 km north-northwest of Fort Frances, Rainy River district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 68).

52 F/7 Bismuthinite from the E.D.S. Pidgeon occurrence, formerly AD8, 0.4 km east of Navimar Lake, near Upper Manitou Lake, Kenora district, is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 68).

52 F/10 A vein occurring on claims K. 665 and H.W. 443 in the Dryden area contains tellurides, bismuthinite, and small amounts of gold (Ellis Thomson, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 186).

52 F/16 Bismuthinite is a rare accessory in a muscovite-granite pegmatite in Echo Township in the district of Kenora. It occurs as prismatic crystals up to 2.5 cm long and 1.5 mm across and contains minor impurities of lead, copper, and antimony. Specimens were obtained for analysis from conc. V, lot 8, northeast quarter, south half. The identification was done by the Provincial Assay Laboratory using X-ray diffraction and spectrographic analysis (J. Satterly, 1960: Ont. Dept. Mines, Ann. Rept., vol. 69, Pt. VI).

Quebec

22 D/6 Tourmaline, spessartite, and bismuthinite occur in foliated masses in a perthite-quartz-muscovite rock on lot 21 of the north range of Jonquiere Township, Chicoutimi County. An analysis by Johnston of bismuthinite from this occurrence is as follows: S 18.46, Bi 79.28, Pb 1.68, Cu 0.48, Fe 0.74, total 100.64; specific gravity 6.781 (G.C. Hoffmann, 1892: Geol. Surv. Can., Ann. Rept., VI, pp. 19, 20 R).

23 B/14 Bismuthinite occurs with native bismuth, lollingite-safflorite, cobaltite, and arsenopyrite at the Quebec Cobalt property, 52°50'N, 67°15'W, in the Mount Wright area. Identification was by the X-ray powder diffraction method (X-ray Laboratory, Geol. Surv. Can.).

31 G/12 A small vein of massive bismuth intergrown with bismuthinite was uncovered during feldspar mining at the Lachaine quarry west of St-Pierre-de-Wakefield. Specimens are in the National Mineral Collection.

32 C/5
32 D/1
Molybdenite bearing quartz pegmatites in Malartic and Lacorne townships of Abitibi County contain considerable amounts of bismuthinite (H.S. Spence, 1930: Am. Mineralogist, 15, p. 438).

32 C/5 Pegmatites in the Fiedmont area of Abitibi County have quartz cores enclosed in spodumene-rich rock containing sugary albite, spessartite, columbite-tantalite, microlite, bismuthinite, molybdenite, betafite and powellite (E.W. Heinrich and A.A. Levinson, 1958: Am. Mineralogist, 38, p. 35).

32 D/8 A bismuthinite occurrence has been found in Preissac Township, Abitibi County, on the property of the St. Maurice mining syndicate (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 43).

32 D/8 Bismuthinite occurs with molybdenite in pegmatite in Lamotte Township, range II, lots 3-6, Abitibi County (National Mineral Collection, donated by H. Mayrand, 1929).

32 D/8 Bismuthinite is associated with molybdenite in Preissac Township on the property of the Height of Land Mining Co. and on Indian Peninsula, Kewagama Lake (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 43).

32 D/8 Bismuthinite and molybdenite occur in pegmatite at the Moly Hill Mine in LaMotte Township. The deposit is 3.2 km west of Highway 61 from a junction 6.6 km from Rivière Héva (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

Yukon

115 I/3 Samples of white quartz taken from a vein on the Divided Mineral claim at the head of the Klaza River near Carmacks contained sparse amounts of a massive grey metallic mineral which has been identified as bismuthinite (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 451).

BISMUTITE

$(BiO)_2CO_3$

Ontario

31 C/12 Bismutite and other bismuth minerals have been observed on conc. III, lot 34, and conc. IV, lot 34, of Tudor Township, Hastings County (H.G. Vennor, 1866-69: Geol. Surv. Can., Rept. Prog., p. 171).

31 F/6 Bismutite is reported to occur in Renfrew County on conc. XV, lot 23, of Lyndoch Township (H.S. Spence, 1930: Am. Mineralogist, 15, p. 438).

Quebec

31 G/13 Bismutite, an alteration product of bismuth, is common at the Evans-Lou Mine near St-Pierre-de-Wakefield; it occurs as cream white, yellow, grey and light green soft masses and as coatings on feldspar and quartz (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 35).

32 D/8 Yellow bismutite was noted as a coating on quartz and on molybdenite at the Moly Hill Mine in LaMotte Township, 3.2 km west of Highway 61 from a junction 6.6 km from Rivièré Héva (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

Yukon

106 D/4 Bismutite was found associated with a specimen of bismuth from a gold placer at Dublin Gulch, 64°03'N, 135°50'W, in the Mayo mining district. It was identified by X-ray diffraction in the X-ray Laboratory of the Geological Survey of Canada.

BISMUTOFERRITE

$BiFe_2(SiO_4)_2(OH)$

Quebec

31 G/13 Deep yellow coatings and aggregates of olive green rod-like crystals on a specimen from the Evans-Lou Mine near St-Pierre-de-Wakefield have been identified as bismutoferrite (X-ray Laboratory, Geol. Surv. Can.).

BITYITE

$CaLiAl_2(AlBeSi_2)O_{10}(OH)_2$

Manitoba

52 L/6 The secondary beryllium mineral bityite occurs abundantly as fine, white, silky flakes disseminated in fissures and vugs of albite at the Huron claim pegmatite located 0.8 km from the southeast shore of the Winnipeg River, 15 or 16 km above Point du Bois (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

blende

(see SPHALERITE)

BOEHMITE

AlO(OH)

Ontario

31 F/4 Boehmite has been found at the Princess sodalite mine near Bancroft. It occurs sparingly as cream-white pearly, platy and fluffy aggregates partly filling small vugs in massive natrolite; as pearly white powdery aggregates on platy to columnar natrolite; and as silky white wispy fibres on massive natrolite (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

BOHDANOWICZITE

$AgBiSe_2$

Ontario

42 A/11 Bohdanowiczite is one of the more common selenide minerals encountered in a bornite-rich zone on the 1200 level of the Kidd Creek Mine. Electron microprobe analysis gave: Bi 44.5, Ag 22.5, Se 32.5, S 1.2, total 100.7. The mine is 25.7 km north of Highway 101 via Highway 655 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 331).

BOLTWOODITE

$K_2(UO_2)_2(SiO_3)_2(OH)_2.5H_2O$

Ontario

52 F/13 Boltwoodite has been identified in a sample from a radioactive pegmatite dyke on the north shore of Kimber Lake near the east end of the lake, in Docker Township (A.P. Pryslak, 1976: Ont. Div. Mines, GR 130, p. 50).

Quebec

24 L/8 The uranium minerals boltwoodite and uranophane have been identified in pebbly arkose on mining concessions explored by Imperial Oil Limited in the Bérard Lake area, west of Fort Chimo (H.W. Little, 1974: Geol. Surv. Can., Paper 74-1A, p. 53).

BORNITE

Cu_5FeS_4

This common ore mineral of copper can often be distinguished by the characteristic iridescent purplish tarnish responsible for its popular name, peacock ore. It was named for the German mineralogist Von Born and has been found in dykes, basic intrusives, contact metamorphic deposits, quartz veins, and pegmatites.

Alberta

82 H/5 Bornite, covellite and digenite are the dominant copper-bearing minerals in quartzites of the Upper Grinnell formation at the Yarrow Creek-Spionkop Creek coppeer deposit. Electron microprobe analyses of the bornite are as follows:

	(1)	(2)	(3)	(4)	(5)
Cu	64.23	63.14	62.91	63.94	63.70
S	26.08	25.80	25.62	25.73	25.69
Fe	11.16	11.27	11.21	10.50	10.81
Total	101.47	100.21	99.74	100.17	100.20

(R.J. Goble and D.G.W. Smith, 1973: Can. Mineralogist, 12, p. 95)

82 O/4
82 O/11 Bornite has been found at two localities in Red Deer district; at Copper Mountain, near Bow River (G.M. Dawson, 1885: Geol. Surv. Can., Ann. Rept., I, p. 136 (B); and at the head of Panther Creek, Rocky Mountain park (G.M. Dawson, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 165 A).

British Columbia

82 E Specimens of massive bornite have been collected from the Main Kettle River area (National Mineral Collection).

82 E/2 Specimens showing chalcopyite surrounded by a zone of bornite have been collected from the Big Copper claim at the head of Copper Creek in the Boundary Creek district (R. Bell, 1902: Geol. Surv. Can., Ann. Rept., XV, p. 126 A).

82 F/6 In the Silver King Mine on Toad Mountain the ore consists mainly of argentiferous bornite with chalcopyrite, pyrite, tetrahedrite, argentite, sphalerite, galena and stromeyerite (G.M. Dawson, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 27 A).

82 N/4 High grade bornite ore specimens have been taken from the Silver Box Mine near Illecillewaet in Revelstoke mining division (E.D. Ingall, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 167 S).

92 E/8 Massive bornite occurs at the Indian Chief Mine (National Mineral Collection) and at the Dewdney claims, near Sidney Inlet on the west coast of Vancouver Island (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 46).

92 F/4 Bornite has been reported at Deer Creek, at the head of Tofino Inlet, Clayoquot mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 46).

92 F/9
92 F/15 Bornite is an important ore mineral at the Copper Queen (Vananda) Mine on Texada Island (E.D. Ingall, 1897: Geol. Surv. Can., Ann. Rept., X, p. 62 S) and at the Marble Bay Mine, where it occurs both in masses and disseminated. Chemical analysis of bornite from Marble Bay: Cu 63.24, Fe 11.75, S 24.34, insol. 0.35, total 99.68; S.G. 5.165 (T.L. Walker, 1930: Univ. Toronto Stud., Geol. Ser., 29, p. 6).

92 G/11 Veins cutting granitic rocks at the head of Salmon Arm of Jervis Inlet and between that inlet and Howe Sound, contain bornite (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 102 R).

92 G/11 Parallel quartz veins containing bornite, chalcopyrite, cuprite and molybdenite occur in granite at 49°42.5'N, 123°27.2'W, on Mount Donaldson, 20.9 km west of Squamish (B.C. Dept. of Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 277).

92 I/2 Quartz-calcite veins carrying malachite, azurite, chrysocolla, chalcocite, bornite and chalcopyrite occur at 1680 m elevation on Iron Mountain, 8 km south-southeast of Merritt Bornite, chalcopyrite, malachite and azurite are also reported at elevations of 880 to 1200 m on Clapperton Creek, 16.8 km northeast of Merritt. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1971, p. 142-4).

92 I/6 The main ore minerals at the Lornex Mine are chalcopyrite, bornite and molybdenite. The mine is at 50°27'N, 121°03'W, 42 km southeast of Ashcroft on the southern slope of Highland Valley. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 135).

92 I/6 The OK (Alwin) Mine at 50°29'N, 121°06'W, at elevations of 1550 to 1650 m, 4.8 km west of Quiltanton Lake, is a small, high-grade vein deposit of chalcopyrite, bornite and primary chalcocite (B.C. Dept. of Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 155).

92 I/9
92 I/10 Bornite-chalcopyrite mineralization is found in the lower part and native copper-chalcopyrite are present in the upper part of the Afton copper deposit located in a complex syenitic porphyry at an elevation of 640 m on the south side of the trans-Canada Highway, 12.8 km west of Kamloops. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 209).

92 K/15 Occurrences of bornite have been noted along the Homathco River at the head of Bute Inlet, Nanaimo mining division (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 152 R).

92 L/6 Bornite and chalcopyrite form veins, lenses and tabular bodies in skarn at the Old Sport mine at Benson Lake, 41.7 km southwest of Port McNeill. (J.E. Muller, K.E. Northcote and D. Carlisle, 1974: Geol. Surv. Can., Paper 74-8, p. 70)..

92 L/8 Veins and disseminations of bornite, chalcocite and chalcopyrite occur in volcanic rocks at the following localities: at elevations of 500 to 600 m on the west side of Adam River, 3.2 km southwest of Keta Lake; near Rooney Lake, 16.1 km west-southwest of Kelsey Bay; and at 100 m elevation, 1.6 km west of Port Neville, 12.8 km north-northwest of Kelsey Bay. (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1971, p. 292-3).

92 P/6 Bornite occurs as fracture fillings and minor disseminations in syenite, 24 km due east of 70-Mile House. (R.P. Campbell and H.W. Tipper, 1971: Geol. Surv. Can., Memoir 363, p. 88).

93 L/11
93 L/14 Bornite occurs on the property of the Whiteheader Group on Hudson Bay Mountain, and also near Telkwa, in the Omineca mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 47).

93 L/15 Quartz veins and silicified zones in volcanic rocks contain bornite, chalcopyrite and tetrahedrite at 54°52.1'N, 126°57'W, on Harvey Creek, a tributary of Driftwood Creek, 19.3 km northeast of Smithers (B.C. Dept. of Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 420).

93 L/16 Chalcopyrite and bornite with minor gold and silver are the economic minerals at the Granisle porphyry copper deposit. The mine is at 54°56.5'N, 126°09.5'W, on the McDonald Island, 14.4 km north of Topley Landing. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 265).

94 D/10 Disseminations and veinlets of chalcocite, bornite, chalcopyrite and some native copper form a large stratiform deposit at 56°36'N, 126°40'W, 6.4 km west-northwest of Sustut Peak on the west side of Sustut River at an elevation of about 1800 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 309).

103 B/12 Granular bornite occurs at the Last Chance Mine in the Queen Charlotte Islands (National Mineral Collection).

103 H/14 Bornite and chalcocite with some chalcopyrite and minor native gold and silver were discovered in 1907 about 1.6 km from the shore of Drumiummon Bay, a small cove on the northwest shore of Douglas Channel beside the outlet of Foch Lagoon (J.A. Roddick, 1970: Geol. Surv. Can., Paper 70-41, p. 53).

103 I/9 The mineral association at the M. and K. Copper property on Legate Creek consists of an intimate mixture of bornite, galena, and chalcopyrite. These minerals occur as solid masses in the basins of drag folds in a series of Jurassic lavas and tuffaceous sediments. Covellite occurs as narrow veinlets cutting all other minerals (W.L. Uglow, 1922: Am. Mineralogist, 7, p. 1).

103 I/9 Bornite specimens exhibiting almost perfect octahedral cleavage and with surfaces up to 2 centimetres in diameter, have been found at an auriferous copper prospect near Usk. Chalcocite occurs along the cleavage planes of the bornite. Chemical analysis by A.C. Wheatly: Cu 67.51, Fe 8.49, S 24.88, total 100.88; S.G. 5.28 (T.L. Walker, 1921: Am. Mineralogist, 6, p. 3)

103 I/9 Bornite is present in fractures and as disseminations in the rock matrix at the Alvija claims at 54°34'N, 128°09'W, on the north side of Kleanza Creek, 16 km east of Highway 16, between elevations of 490 and 760 m (B.C. Dept. Mines and Pet Res., Geol., Exp. and Mining in B.C., 1969, p. 82).

104 G/3 Disseminated bornite and chalcopyrite are the main ore minerals at the Galore Creek deposits of Stikine Copper Limited, located east of the Stikine River at about 57°08'N, 131°28'W (J.G. Souther, 1972: Geol. Surv. Can., Paper 71-44, p. 24).

104 G/14 Pockets of bornite occur in granitic dykes cutting diorite on Nine-Mile Creek, about 14.5 km above Telegraph Creek in the Stikine mining division (G.M. Dawson, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 55 A).

104 I/1 Chalcopyrite-sphalerite-bornite mineralization, both dispersed and massive, is present on claims centred at 58°12'N, 128°22'W, about 21 km southeast of the south end of Rainbow Lake at about 1500 m elevation (B.C. Dept. Mines and Pet Res., Geol., Exp. and Mining in B.C., 1974, p. 343).

114 P/10 Copper-silver and lead-zinc mineralization occurs on Mineral mountain and on Copper Butte located northwest and north, respectively, of the hairpin turn at Mile 52 (83.5 km) Haines Road. The ore minerals are bornite, chalcocite, chalcopyrite, sphalerite and galena (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

New Brunswick

21 G/2 Veins containing bornite occur in schist on Hardwood Island, Charlotte County (L.W. Bailey, 1864: Can. Naturalist, 1, pp. 81-97).

21 G/2 Pyrite and pyrrhotite are associated with bornite in a fault zone at Wheal Louisiana in Charlotte County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick 1st. Edition. Industrial and Educational Pub. Co., Gardenvale, Quebec).

21 G/7 The copper minerals, bornite, chalcopyrite, chalcocite and covellite are found in the tin deposits at Mount Pleasant in Charlotte County (A.A. Ruitenberg, 1963: M.Sc. Thesis, Univ. New Brunswick).

21 H/6 Bornite and chalcocite occur in a fault zone at Martin Head in Saint John County (L.W. Bailey, 1897: Trans. Roy. Soc. Can., Sec. 4, vol. 14, pp. 107-116).

21 H/10 Quartz-carbonate veins carrying bornite, chalcopyrite, and chalcocite have been found at Alma (West) in Albert County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, 1st Edition. Industrial and Educational Pub. Co., Gardenvale, Que.).

21 H/11 Bornite occurs in quartz veins with chalcopyrite, chalcocite, pyrrhotite and pyrite at Mile Brook and Roman Wolfe in Albert County. It has also been reported at Goose Creek in Saint John County (New Brunswick Mines Br., files).

Quartz veins carrying bornite, chalcocite and chalcopyrite occur at the Vernon Mine in Saint John County (G.S. MacKenzie, 1945: New Brunswick Mines Br., Paper 45-1).

21 J/16 Bornite is found with chalcopyrite and pyrite in quartzite and schist on the Little Southwest Miramichi River, Northumberland County (E.W. Shaw, 1936: Geol. Surv. Can., Mem. 197).

21 O/3 The volcanic rocks on Blue Mountain, Victoria County, contain showings of copper minerals, notably bornite and chalcopyrite (New Brunswick Mines Br., files).

21 P/13 Bornite is found near Patapat Brook in Restigouche County (H.R. Greiner, 1960: New Brunswick Mines Br., P.M. 60-2): also at Henry Brook in diorite, and at Green Point in andesite, Gloucester County (New Brunswick Mines Br., files).

Newfoundland

The following occurrences have been reported in Geol. Surv. Can., Paper 75-36, p. 52,73,74,106, (1975) by Ann P. Sabina.

1 N/6 Massive chalcopyrte, chalcocite and bornite occur as irregular patches in volcanic rocks at a deposit on the north side of a bend in the Colliers River, south of Highway 60.

1 N/7 The first attempt at mining in Newfoundland was made in 1778 at a deposit of chalcopyrite, chalcocite, bornite and tetrahedrite in quartz-calcite veins cutting sandstone on the shoreline near Shoal Bay about midway between Petty Harbour and Bay Bulls.

1 N/11 Bornite and chalcopyrite occur as fracture-fillings and in amygdules in basalt at a deposit on the west slope of a ridge overlooking Turks Gut, an inlet on the west side of Colliers Bay.

12 A/15 Fractures in the ore at the Buchans Mine contain native silver, bornite and argentite.

Northwest Territories

56 D/2 Uraninite-pyrite-bornite veinlets occur in fractures in sandstone on Christopher Island in Baker Lake at 64°06'21"N, 94°36'57"W. Fractures filled with pitchblende and bornite are also present at 64°06'42"N, 94°37'12"W, at the

northwestern tip of the island (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 76; Dept. Indian and Northern Affairs).

75 L/8 Mineralized showings consisting of bornite, and minor chalcopyrite, chalcocite and domeykite, have been reported on the HAR group claims located just north of Wilson Lake and just south of Stark Lake (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 24-25).

86 F/13 Bornite is abundant and is associated with chalcopyrite and chalcocite at the B.E.A.R. silver deposit on the north shore of contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol. 34, p. 752).

86 K/6 Copper minerals occur in a giant quartz vein at MacAlpine Channel, north shore of Hunter Bay, eastern end of Great Bear Lake. Minerals present include bornite, chalcopyrite, pyrite, hematite and carbonate (M. Feniak, 1949: Geol. Surv. Can., Paper 49-19, p. 13).

86 N/10 Spectacular showings of fairly massive bornite, over widths up to 3.6 m, have been exposed on the Copper Lamb claims just north of Bornite Lake (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 36).

Nova Scotia

11 F/6
11 F/11
11 F/12
11 F/13

The following occurrences of bornite were noted by R.A.A. Johnston, 1915, in Geol. Surv. Can., Mem. 74, p. 47.

(1) On the Canso road near its junction with the Whitehaven road, Guysborough Country.
(2) Campbell point, St. George channel, Richmond County.
(3) Upper South River, Antigonish County.
(4) Polson Lake, near Lochaber, Antigonish County.

Ontario

31 M/5 Many of the silver deposits of the Cobalt camp contain bornite: examples are the Silver Queen and Foster mines in Coleman Township (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 47).

31 M/5 The mineral collection of the Royal Ontario Museum includes specimens of bornite from the following mines in Coleman Township: Silver Queen, lot 7, conc. V; LaRose, lot 4, conc. VI; O'Brien, lot 4, conc. VI (J. Satterly, 1977: Ont. Geol. Surv. MP 70, p. 70).

41 H/1 A specimen in the mineral collection of the Royal Ontario Museum is from the Wilcox Mine, south half of lots 18-22, conc. IV, Cowper Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 69).

41 H/8 Bornite from the McGown Mine, lot 146, conc. B, Foley Township is present in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 69).

41 I/6 The Royal Ontario Museum mineral collection includes bornite from the Vermilion Mine, lot 6, conc. IV, Denison Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 70).

41 J/4
41 J/5 Copper deposits in the Bruce Mines district are of the fissure vein type and consist of chalcopyrite and bornite in a gangue of quartz intermixed with ankerite. The old Bruce Mine was first worked in 1846. Other notable deposits are: the Rock Lake Mine, 22.5 km north of Bruce Mines village, and the Cameron or Stobie Mine, 4 km northeast of Desbarats station on the Canadian Pacific line (R. Bell, 1902: Geol. Surv. Can., Ann. Rept., XV, pp. 246-52).

41 J/6 A specimen of bornite with associated tetrahedrite from the north half of lot 4, conc. V, Gladstone Township, is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 69).

41 J/10 Bornite from the Bi-Ore Mine on the south shore of Cobre Lake, Sagard Township, is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 69).

41 K/15 A specimen of bornite was obtained from the Sand Bay or Pancake Bay properties of the Copper Creek Mining Company on Lake Superior in the Thunder Bay district (G.M. Dawson, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 124 A).

41 P/9 Several showings of copper minerals have been reported in Tudhope Township. These include covellite and bornite in conc. IV, lot 12, and chalcopyrite, bornite and malchite in narrow veins in conc. V, lot 11, and conc. VI, lot 12 (W.W. Moorhouse, 1941: Ont. Dept. Mines, Ann Rept., vol. 50, Pt. IV, pp. 29-41).

41 P/10 Veins containing bornite, chalcopyrite and pyrite have been found on claims RSC 135 and 136 in Nicol Township, Gowganda district (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 34).

41 P/10 Specimens of bornite in the mineral collection of the Royal Ontario Museum are from the Castle Mine on the northwest shore of Miller Lake, and the Silver Bullion Mine, Nicol Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 70).

41 P/12 Two occurrences of bornite have been noted in Chester Township; with azurite on the east shore of Mesomikenda Lake; and with visible gold, tetradymite, covellite and malachite in a 35 cm quartz vein near Clam Lake (H.C. Laird, 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. III, pp. 27, 33).

41 P/15 A calcite vein containing bornite, native silver and smaltite is reported to occur in diabase on the Bishop claim (L. 0305) in Morel Township, Gowganda district (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 44).

41 P/15 Bornite is present on the rock dumps at the Ryan Lake copper-molybdenum mine on the west side of Highway 566, 51.5 km west of its junction with Highway 11 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 105).

42 A/6 Chalcopyrite and bornite are the principal ore minerals in the copper ore mined at the McIntyre Mine in the Porcupine gold camp. The mine is located on the shore of Pearl Lake at Schumacher (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 134).

42 A/11 Bornite is a constituent of the ore at the Kidd Creek Mine north of Timmins. The mine is reached via Highway 655, 25.7 km north of Highway 101 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 139). Electron microprobe analyses of selenian bornite from the 1200 level

of the Kidd Creek Mine: (1) Cu 63.3, Fe 11.2, S 25.2, Se 0.3, total 100.0; (2) Cu 61.1, Fe 11.4, S 25.4, Se 2.6, total 100.5 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

52 A/3 The mineral collection at the Royal Ontario Museum includes bornite from Prince's Mine, Spar Island, Lake Superior (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 70).

Quebec

Bornite occurs with chalcocite, chalcopyrite and pyrite at many localities in the eastern townships of Quebec. The following list of localities is taken from: R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 48.

	Range	Lot	Township	County
21 E/13	XIV	11	Chester	Arthabaska
			Craig Road Range	Arthabaska
	IV	28	Ham	Wolfe
21 L/4	III	10	Halifax	Megantic
21 L/6	IX	9,10,11	Leeds	Megantic
31 H/2	V	5	Brome	Brome
	VIII	18,19	Brome	Brome
	X	8,9	Sutton	Brome
31 H/8	XIII	3	Orford	Sherbrooke
	IV	9	Stukely	Shefford
	VI	21	Stukely	Shefford
	VII	21	Stukely	Shefford
	II	28,29	Brompton	Richmond
31 H/9	XII	25	Cleveland	Richmond
	I	8	Melbourne	Richmond
	II	2,6	Melbourne	Richmond
	IV	2	Melbourne	Richmond
	VII	21	Durham	Drummond
31 H/10	III	31,32	Acton	Bagot
	VI	29	Acton	Bagot
31 H/16	X	14	Wickham	Drummond

32 D/8 The nickel ore at the Marbridge Mine is reported to have contained some bornite. The mine site is about 8 km by road west of LaMotte (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

32 D/14 Ore consisting of massive bornite and chalcopyrite was worked for copper at the Duvan Mine, 8 km northeast of La Reine. Some bornite has also been found at the Normetal mine, at Normetal (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 57-8).

Yukon

105 C/14 Quartz veins containing considerable bornite and chalcopyrite are exposed on the Cone and Luck claims at 60°43'N., 133°22'W., on the south slope of a saddle cutting through Big Salmon Range about 4 km north northeast of Cone Mountain (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 63).

105 D Most of the copper deposits in the Whitehorse area are of the contact metamorphic type. The deposits of the Whitehorse copper belt, which extends along the valley of the Yukon River, lie near the contact between granitic rocks and limestones. Bornite and chalcopyrite are the chief ore minerals and these occur most commonly in garnet-diopside skarn; they also occur in magnetite-rich skarn at the Arctic Chief Mine. Specularite is abundant in the ore of the Peublo Mine. J.O. Wheeler, 1961, in Geol. Surv. Can., Mem. 312, pp. 137-142, describes the following properties.

105 D/1 Bornite, chalcopyrite, specularite and hematite are disseminated throughout a rock along a contact between serpentinized dunite and limestone, north of Jubilee Mountain.

105 D/3 Lenses of massive chalcopyrite, bornite and specularite have been exposed on the Fleming Group property located on the northeast spur of Carbon Hill.

105 D/11 The Arctic Chief property is at an elevation of 920 m above sea-level at the head of McIntyre Creek. It is accessible by a rough road 4.8 km long from mile 913⁴ on the Alaska Highway.

The Grafter property lies about 1.6 km north of the Arctic Chief and is accessible by the same rough road.

The Best Chance property is about 300 m east-northeast of the Grafter. It has large surface showings of magnetite.

The War Eagle showing is located in the valley of Porter Creek near the northern end of the copper belt, at an elevation of 811 m above sea-level. It is accessible from Whitehorse - about 9.6 km along a good road.

The Copper King showing, located on the east bank of McIntyre Creek about 6.4 km northwest of Whitehorse, was the first claim recorded in the copper belt. Magnetite, molybdenite and some free gold are associated in the ore.

105 D/14 The Anaconda claim is situated west of Porter Creek at the northern end of the copper belt.

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105 G/5 Nine small copper showings have been discovered on the Bell claims in the McNeil Lake area (61°28'N., 131°46'W.). Bornite, chalcopyrite, chalcocite and covellite are the main copper minerals (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 131).

115 A/5 Lenses, veinlets and disseminated grains of bornite and chalcopyrite are found in andesite at the Johobo Mine near Bornite Creek, 3.2 km southeast of Sockeye Lake, and 5.6 km southwest of Kathleen Lakes at 60°29'N, 137°34'W. Access to the mine site is by truck road from mile 142 (228 km) on the Haines road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-31, p. 57).

115 G/6 Several showings of disseminated bornite, chalcocite and minor native copper in malachite-stained basalt have been found near the head-waters of Quill Creek (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 53).

115 I/7 Quartz lenses containing bornite and chalcopyrite have been explored at the Bonanza King property on the east side of Nancy Lee Creek about 300 m from the mouth, at 62°23'N., 136°38'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 42).

115 I/11 Porphyry copper deposits in which chalcopyrite and bornite occur as small veinlets and disseminated grains have been explored on the DEF and MINTO claims at 62°37' to 62°38'N, 137°15'W, north of Dark Creek, about 72 km northwest of Carmacks (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 96-100).

BOULANGERITE

$Pb_5Sb_4S_{11}$

Boulangerite is a lead grey sulphosalt of lead and antimony. It tends to occur in veins formed at low or moderate temperatures. Boulangerite is difficult to distinguish from other sulphosalts of similar composition and reported occurrences must be viewed with suspicion unless the identification is confirmed by X-ray methods.

British Columbia

82 E/1 Specimens of fibrous boulangerite in quartz were collected from the Red Paddy property, near the headwaters of the Kettle River in the Greenwood mining division. A spectrographic analysis of the boulangerite indicated the presence of essential Pb and Sb, and also traces of Fe, As, Sn, Cu, Ag, Bi, and Au. The specific gravity of the mineral was found to be 6.12 (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 80).

82 E/1 The mineralization on the Kismet Group situated on the north side of Trap Creek, a tributary of the Kettle River, consists of galena, pyrite and boulangerite in quartz. The average specific gravity of the boulangerite was found to be 6.0, and spectrographic analysis indicated the presence of Pb, Sb and traces of Ag, Fe, Bi, Te, Sn, As, Mn, Cd, Zn, Ti and Cu (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 81).

82 E/2 Boulangerite of fibrous habit occurs associated with quartz, galena and sphalerite in a quartz vein on the Amandy property, on the south slope of Roderic Dhu Mountain, northwest of Jewel Lake in the Greenwood mining district. The identification of the mineral as boulangerite was confirmed by X-ray powder pattern. Spectrographic analysis showed essential Pb, Sb, and traces of Cu, Ag, As, Zn, Fe. The specific gravity was found to be 6.02 (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 80).

82 E/15 Galena, sphalerite, pyrite, chalcopyrite, silver minerals and boulangerite have been reported from a locality at the headwaters of the Granby River and Rendell Creek in the Vernon mining division. A sample containing quartz and boulangerite was obtained from the Lightning Peak Group in this area and submitted for analysis. The boulangerite was of fibrous habit, had a specific gravity of 6.08 and was shown, by spectrographic analysis, to contain traces of Cu, Ag, Sn, Bi, Te, Au, Mn, V and Ti in addition to the main constituents.

Chemical analysis by J.R. Williams and Son: Pb 55.40, Fe 0.25, Sb 25.50, As 0.24, S 18.50, Se was detected, total 99.89 (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 80).

82 F/4 Samples from the property of Rossland Mines Ltd., situated 2.4 km south of Rossland, consisted of massive sulphides and sulphosalts including pyrite, arsenopyrite, pyrrhotite, sphalerite, galena, and boulangerite. Minor amounts of tetrahedrite, chalcopyrite and gold were also present. Boulangerite formed radiating or interlocking fibrous crystals (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 547).

The mineralization on the Richmond-Lily May claims, located south of Rossland on the Dewdney trail, consists of galena, pyrite, pyrrhotite, sphalerite, and occasionally boulangerite, in a quartz gangue. The average specific gravity of the boulangerite is 6.02. Spectrographic analysis has indicted the presence of traces of Fe, Sn, Cu, As, Zn, Cd, Ti, and Mn as well as the essential Sb and Pb. An X-ray powder photograph was obtained from the mineral confirming its identity as boulangerite (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 81).

82 F/13 A specimen from the Great Britain property on Sable Creek in the Lardeau mining division, consists of a fine-grained compact mass of a feathery looking metallic mineral. Upon examination it was found to give the combined X-ray diffraction patterns of galena and boulangerite (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 451).

82 G/12 Boulangerite is erratically distributed throughout the Sullivan Mine, near Kimberley. It is associated with galena, sphalerite, pyrrhotite, pyrite, arsenopyrite, and quartz. It is occasionally found in vugs forming hair-like crystals up to 2 centimetres long. These are flexible and have one cleavage parallel to their elongation. The average specific gravity of 30 fragments is 6.18. Chemical analysis by J.R. Williams and Son gives the following composition: Pb 55.35, Fe 0.51, Sb 24.95, As 0.71, S 18.40, total 99.92. Spectrographic analysis indicated traces of Ag, Cu, Sn, As, Cd, Mn, V and Ti (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 79).

82 K/1 Sulphide wedges and lenses at the Silver Key Group, at the head of the east fork of Doctor Creek, 40 km west of Canal Flats, are composed of galena, pyrite, chalcopyrite, sphalerite and antimonial sulphide. Boulangerite may be intimately mixed with galena and it may occur as needles in quartzite or as the lining in vugs (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 504).

82 K/13 On the Big Five claim group at the extreme head of Ferguson Creek, Lardeau mining division, boulangerite of specific gravity 6.05 is associated with tetrahedrite, galena and sphalerite. A spectrographic analysis of the fibrous mineral shows essential Sb and Pb as well as traces of Cu, Ag, Sn, As and Fe. Boulangerite was conclusively identified by X-ray powder photograph (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 81).

82 L/16 A specimen from the Mastodon property near Revelstoke was found to consist of a narrow band of fibrous boulangerite with galena and sphalerite (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 605).

92 H/8 Fibrous boulangerite occurs with arsenopyrite, pyrite, sphalerite and quartz at a locality 4.8 km west of Hedley in the Osoyoos mining division (H.V. Warren, 1948: Univ. Toronto Stud., Geol. Ser., 52, p. 84).

93 L/15 Boulangerite, intimately intergrown with barite occurs in the Omineca mining division at the Lamarr Mine, near the head of Driftwood Creek, 30 km east of Smithers. The X-ray photograph

showed a weak boulangerite pattern with extra unidentified lines. Spectrographic analysis indicated Pb, Sb, Ba, and traces of Ag, Cu, As, Fe, Zn, V and Ti. The specific gravity was 5.83 (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 80).

Boulangerite is locally abundant and associated with sphalerite, galena, tetrahedrite, pyrite and chalcopyrite in a quartz gangue on the Babine Bonanza (or Cronin) property located near the head of Cronin Creek, 51 km from Telkwa. Chemical analysis, by J.R. Williams and Son: Pb 55.45, Ag 0.06, Fe 0.13, Sb 25.40, As 0.36, S 18.45, total 99.85; S.G. 6.08 (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 79).

93 M/3 A sample consisting of massive galena, sphalerite and very fine grained boulangerite was obtained from the Sunrise Group in the Omineca mining division. The group is situated on the north slope on Nine Mile Mountain, 12.8 km northeast of New Hazelton. The specific gravity of boulangerite was found to be 6.00-6.06 and a spectrographic analysis showed traces of Cu, As, Ag, and Zn (H.V. Warren, 1948: Univ. Toronto Stud., Geol. Ser., 52, p. 84).

104 K/12 About 4.8 km from Tulsequah, on the Erickson-Ashby property (Atlin mining division) there is an occurrence of massive sulphides consisting of galena, pyrite, sphalerite, pyrrhotite, arsenopyrite, tetrahedrite and fibrous masses of silvery grey boulangerite. The property is at the north end of Erickson Mountain (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 451).

A sample consisting of pyrite, sphalerite, boulangerite, chalcopyrite and quartz was obtained from the Hidding Creek Group located at about the 1,200 m level on the west slope of Mount Lester Jones in the Taku River area (H.V. Warren, 1948: Univ. Toronto Stud., Geol. Ser., 52, p. 85).

Manitoba

63 I/7 Polished sections of specimens from Eskamanish River, northeast of Lake Winnipeg contain massive aggregates of sphalerite enclosing short veins and blebs of galena and boulangerite. Larger areas of galena and boulangerite sometimes contain inclusions of tetrahedrite. Marcasite, pyrrhotite and chalcopyrite are also present in varying amounts, the latter occurring as small inclusions in a quartz gangue (Ellis Thomson, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 103).

New Brunswick

21 O/8 Inclusions of boulangerite have been found in the galena of the Heath Steele deposit in Northumberland County, in the Bathurst-Newcastle area.

21 P/5 A similar occurrence of boulangerite has been noted in galena from the Brunswick orebodies, Gloucester County (R.S. Boorman, 1968: New Brunswick Res. Prod. Council, Res. Note 11).

Northwest Territories

77 A/3 Boulangerite has been identified by X-ray powder pattern (X-ray Laboratory, Geol. Surv. Can., for R. Thorpe) in a specimen from the CAR group of claims owned by the Roberts Mining Company on the east side of Hope Bay, at lat. 68°05'58"N., long. 106°43'19"W. It occurs as needle or blade-like disseminations in white quartz veins cutting dacitic greenstone, just west of an auriferous - argentiferous shear zone of quartz veins carrying pyrite, chalcopyrite, arsenopyrite, galena, sphalerite and pyrrhotite.

85 J/8 Boulangerite has widespread distribution in the highly mineralized parts of the shear zones of the Con, Negus-Rycon, Giant-Campbell and Crestaurum systems in the Yellowknife camp (R.W. Boyle, 1951: Geol. Surv. Can., Memoir 310, p. 55).

Ontario

31 C/6 Boulangerite is the most abundant sulphosalt in a suite of 18 found in a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Ed. Taylor of Madoc. The boulangerite contains up to 2 per cent arsenic (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 7-24 and 191-213).

31 C/6 A specimen of boulangerite in the Royal Ontario Museum mineral collection is from: Roger Mine, lot 10, conc. XIV, Huntingdon Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 72).

31 C/14 Boulangerite from the International Mine, lots 8 and 9, conc. IX, Barrie Township is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 72).

31 C/15 Boulangerite is reported to occur in Clarendon Township, conc. I, lot 34 (E.W. Nuffield and D.H. Gorman, 1960: private communication).

52 G/15 Boulangerite and bournonite are rare constituents of the massive copper-zinc sulphide orebody at the Mattabi Mine. The mine is about 80 km north of Ignace, between Sturgeon Lake and Bell lake (J.M. Franklin, J. Kasarda and K.H. Paulsen, 1975: Econ. Geol., 70, p. 63).

52 N/4 A specimen of boulangerite from the Cochenour Willans Mine, Dome Township, is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 72).

Quebec

32 C/6 Boulangerite is disseminated in quartz and sphalerite and forms narrow massive veinlets up to 6 mm wide in a sericite schist on the property of the Alaska Development and Mineral Co., on lot 6, range VI, Montgay Township. In polished sections, it appears as aggregates averaging 6 mm in diameter with distinct polarization colours of light and dark grey. The specific gravity of a sample from this locality was 5.6. Chemical analysis by Gould: Pb 54.7, Sb 30.4, S 15.1, total 100.2. Later samples from the same occurrence were found to contain plagionite and jamesonite. Associated minerals are tetrahedrite, chalcopyrite, arsenopyrite, pyrite, silver and gold (J.E. Hawley, 1941: Univ. Toronto Stud., Geol. Ser., 46, p. 25).

Yukon

105 B/4 Boulangerite has been identified with galena, arsenopyrite, pyrite and sphalerite in quartz lenses in diorite at the Logjam Creek property at 60°01'N., 131°35'W., about 21 km by tote road from the Alaska Highway near Mile 753 (L.H. Green and C.I. Godwin, 1964: Geol. Surv. Can., Paper 64-36, p. 47).

105 K/16 Narrow fractures containing galena, boulangerite and sphalerite are found on the Solo claims located 12.8 km east of Mount Selous at 62°58'N., 132°10'W (D.B. Craig and P. Laporte, 1971: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 97).

105 M/14 Fibrous boulangerite occurs with sphalerite, galena, freibergite, siderite, quartz, pyrite, cerussite and oxides of iron and manganese on the Arctic Group property, Galena Hill, 43 km northwest of Mayo. The specific gravity of the mineral was found to be 5.80, a low value (H.V. Warren and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 81).

The X-ray laboratory of the Geological Survey of Canada has identified boulangerite as a constituent of several mineral specimens from the Keno Hill, Sourdough Hill, and Galena Hill areas of the Mayo mining district. The specimens were from the Arctic and Mastiff prospect; the Dragon Shaft; the Sadie Friendship Mine and a shaft north of Charity Gulch in number 6 vein (R.W. Boyle, 1955, 1957: Geol. Surv. Can., Papers 55-30, 57-1).

106 C/7 Boulangerite has been found with sphalerite, galena and pyrite in breccia zones at Goz Creek (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 D/4 Boulangerite has been identified by X-ray diffraction as a minor consituent in gold placer deposits at Dublin Gulch, 64°03'N, 135°50'W, in the Mayo mining district (X-ray Laboratory, Geol. Surv. Can.).

106 D/4 Boulangerite has been identified by X-ray diffraction as a minor constituent of veins on the Rex property of Peso Silver Mines Limited at 64°00'N., 135°54'W. It is associated with siderite, quartz, jamesonite, tetrahedrite, galena, pyrite and arsenopyrite (L.H. Green, 1965: Geol. Surv. Can., Paper 65-19, p. 20-21).

BOURNONITE

$CuPbSbS_3$

Bournonite occurs typically in moderate temperature hydrothermal veins where it may be associated with galena, tetrahedrite, sphalerite, chalcopyrite, siderite and quartz. It crystallizes in the orthorhombic system and may contain up to three per cent As. It alters to antimony oxides, cerussite, malachite or azurite.

British Columbia

82 F/10 An occurrence of bournonite with galena and quartz is reported on the Chicago property on La France Creek in the Nelson mining division (H.V. Warren, 1948: Univ. Toronto Stud., Geol. Ser., 52, p. 84).

82 F/14 Minute masses of bournonite occur in the galena ore of the Surprise and McAllister mines at the Slocan mining camp (C.E. Cairnes: Geol. Surv. Can., Mem. 173, p. 123).

82 K/8 Bournonite was identified in a polished section made from a specimen from the Mineral King Mine. It occurs as masses in sugary barite and is associated with sphalerite, galena, pyrite and tetrahedrite. the mine is located 43 km west of Athalmer between Toby and Jumbo Creeks at latitude 50°N, longitude 116°W (R.M. Thompson, 1960: private communication).

82 M/1 Specimens of white quartz from the property of Allco Silver Mines Ltd. have been found to contain bournonite as thin selvages on tetrahedrite and galena. The property is located at the head of Silver Creek, 32 km northwest of Revelstoke (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 452).

82 M/1 At the Mastodon claims in the Revelstoke mining division, bournonite occurs in a small quartz vein with sphalerite, calcite, tetrahedrite, meneghinite, galena, covellite, chalcocite, gold and probably arsenopyrite. The claims are located 32 km by road, north of Revelstoke, and 11 km by trail up La Forme Creek on the east side of the Columbia River (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 51, p. 73).

94 C/13 A sample collected from a vuggy quartz vein in the Ingenika Group quartzite on the northeast side of Pelly Creek, contains disseminated grains of a black metallic mineral which gave the X-ray pattern of bournonite. The occurrence is located about 8 km northwest of Pelly Lake in the Cassiar district (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 452).

Manitoba

63 K/13 Bournonite has been identified in a specimen from Flin Flon. The bournonite is massive and a major constituent in the specimen, and is associated with minor sphalerite and chalcopyrite (Private communication, R. Thorpe, 1969: identification by D. Harris).

63 K/16 Small amounts of bournonite are reported to occur in the Chisel Lake Mine located below the southern end of Chisel Lake at 54°49.5'N, 100°08'W (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 65).

New Brunswick

21 O/8 Inclusions of bournonite occur in galena at the Heath Steele and Texas Gulf Sulphur deposits in Northumberland County, Bathurst-Newcastle area.

21 P/5 Bournonite inclusions have also been found in galena from the Brunswick orebodies, Gloucester County (R.S. Boorman, 1968: New Brunswick Res. Prod. Council, Res. Note 11).

Northwest Territories

77 A/3 Bournonite has been identified by X-ray powder pattern (X-ray Laboratory, Geol. Surv. Can., for R. Thorpe) in a specimen from the CAR Group of claims owned by the Roberts Mining Company on the east side of Hope Bay, at lat. 68°05'58"N., long. 106°43'19"W. It occurs with pyrite as a massive fracture-filling in dacite greenstone, exposed on a low cliff face. The fracture trends nearly perpendicular to the shear zone mineralized with pyrite, chalcopyrite, galena, sphalerite and pyrrhotite.

85 J/8 Drill cores from the Akaitcho property near Yellowknife contain bournonite apparently replacing tetrahedrite. Pyrite, arsenopyrite, gold, calcite, and quartz are associated minerals (H.V. Warren, 1948: Univ. Toronto Stud., Geol. Ser., 52, p. 84).

Ontario

31 C/12 Bournonite occurs on lot 18 of conc. VIII, Marmora Township, Hastings County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 66 T).

Conc. V, lot 17, Madoc Township, Hastings County contains an occurrence of bournonite with quartz (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 34 R).

31 C/14 A specimen of bournonite from the International Mine, lot 9, conc. IX, Barrie Township, is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 73).

31 F/2 In Darling Township, Lanark County, bournonite has been found on lots 21 and 22, conc. IV, and on lot 22, conc. III (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 66 T).

31 F/7 Bournonite, pyrite and dolomite occur together in Bagot Township, conc. XII, lot 14, Renfrew County (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 13 R).

42 E/10 Irregular veinlets and blebs of bournonite have been found associated with chalcopyrite and quartz in the Little Long Lac Mine (A.S. Armstrong, 1944: Am. Mineralogist, 29, p. 314).

52 G/15 Bournonite and boulangerite are rare constituents of the massive copper-zinc orebody at the Mattabi Mine, about 80 km north of Ignace, between Sturgeon Lake and Bell Lake (J.M. Franklin, J. Kasarda and K.H. Poulsen, 1975: Econ. Geol., 70, p. 63).

52 H/9 A specimen of bournonite from the dump of the Leitch Mine is in the mineral collection of the Royal Ontario Museum. The mine is 6 km northwest of Beardmore, Eva Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 73).

Quebec

22 G/1 Small amounts of bournonite, gold and pyrrhotite are reported to occur with more abundant galena, sphalerite, pyrite, arsenopyrite, chalcopyrite and tetrahedrite at the Candego Mine on the west side of the Marsoui River, 19.5 km south of Marsoui (Ann. P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 75).

Yukon

105 G/3 Bournonite is a minor constituent of ore specimens from Tintina Silver Mines at 61°09'N., 131°09'W., 11 km northwest of the confluence of the Ings and Upper Liard Rivers. Other minerals present are: jamesonite, argentian tetrahedrite, galena, sphalerite, pyrite, arsenopyrite, marcasite, owyheeite, tintinaite, pyrrhotite and chalcopyrite (D.C. Harris, J.L. Jambor, G.R. Lachance and R.I. Thorpe, 1968: Can. Mineralogist, 9, p. 371-382).

105 K/6 Bournonite is reported to occur in the ore at the Anvil Mine. The mine is at 1200 m elevation near Faro Creek, a tributary of Rose Creek, at about 62°21'30"N., 133°22'W (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32. p. 87).

105 M/13
105 M/14 Bournonite is one of several sulphosalt minerals found in the silver-lead-zinc deposits of the Elsa-Galena Hill-Keno Hill area (Ann. P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 91).

115 I/3 A specimen from the Brown McDade property near Pony Creek, 56 km west of Carmacks, was found to contain pyrite, arsenopyrite, bournonite, stibnite, sphalerite and quartz (H.V. Warren, 1948: Univ. Toronto Stud., Geol. Ser., 52, p. 84).

BRANNERITE

UTi_2O_6

This rare radioactive mineral first became of economic value as an ore mineral of uranium with the development of the Blind River uranium camp. Prior to its discovery at Blind River, brannerite had been reported from only four localities in the world. At Blind River it occurs in association with an assemblage of heavy minerals in pyritized conglomerate; elsewhere it has been found in pegmatites, high-temperature quartz veins and gneiss. The mineral usually contains important amounts of thorium and rare earths in substitution for uranium.

Ontario

31 C/12 Brannerite has been found in association with native gold in specimens from the Richardson Mine near the village of Eldorado in Madoc Township. Uraninite and radioactive hydrocarbon have also been identified (H.R. Steacy, A.G. Plant and R.W. Boyle, 1974: Can. Mineralogist, 12, p. 360).

31 C/16 Small amounts of brannerite were found in a tremolite zone in metamorphic gneiss in South Sherbrooke Township, conc. C, lot 18, in Lanark County. The occurrence is north of Christie Lake and on the east side of a rock cut on the C.P.R. railway line. The mineral was identified by X-ray diffraction patterns of heated material. A chemical analysis by D.A. Moddle of the Ont. Dept. Mines indicated 42.7 per cent U_3O_8. A quantitative spectrographic analysis by Moddle gave the following results: U, Ti>10; Ca, Fe, Y, Si, 0.5-5.0; Th, Pb, 0.1-1.0; Yb, 0.05-0.5; Ce, Nb, trace (D.A. Moddle, 1957: Can. Mineralogist, 6, pp. 155-157).

41 J/2 Brannerite and uraninite are the main ore minerals of uranium in the radioactive conglomerate of the Blind River region. Identification of brannerite in these rocks was first made by E.W. Nuffield, who subsequently synthesized the material and reported its crystallography. The mineral is metamict and commonly gives an anatase X-ray pattern. Spectrographic analysis by W.H. Champ: U, Ti,10-100; Th, Si, Yb, Y, 1-10; Fe, Mn, Al 0.1-1; B, Mg, Pb, Ca, Ba, Sc trace (E.W. Nuffield, 1954: Am. Mineralogist, 39, p. 520. R.J. Traill, 1954: Can. Mining J., 75, p. 64. J.E. Patchett and E.W. Nuffield, 1960: Can. Mineralogist, 6, p. 483).

Saskatchewan

74 A/11 Brannerite has been identified as a constituent of a pegmatite dyke known as the Eldorado dyke on Middle Foster Lake. The mineral has a light brown colour and dull lustre and is closely associated with metallic black rutile and dull black anatase. Identification was by X-ray diffraction pattern after heating for five minutes in vacuo at about 900°C. The specimen was about the size of a walnut and contained about 40 per cent brannerite. This is the first known occurrence of brannerite in a Canadian pegmatite (X-ray Laboratory, Geol. Surv. Can., 1955).

74 N/9 Brannerite veinlets up to 2 mm wide occur in altered wall rock, and brannerite-hematite intergrowths occur as nests and bands in

carbonate at the Ace Mine, Beaverlodge area (V. Koeppel, 1968: Geol. Surv. Can., Paper 67-31, p. 93-4).

Yukon

106 D/16
106 E/1 The following occurrences of brannerite are reported in the Wernecke Mountains:

(1) coarsely disseminated in weathered breccia at 1500 m elevation, at 64°56'22"N, 134°16'20"W;

(2) in a vein cutting sediments in scree at 790 m elevation, at 65°04'20"N., 134°14'50"W:

(3) disseminated in intrusive breccia in outcrop at 1100 m elevation, at 65°06'20"N, 134°23'30"W;

(4) disseminated and in veins with pitchblende in breccia and in stratiform rocks at 1190 m elevation, at 65°08'25"N, 134°24'00"W (R.T. Bell and G.D. Delaney, 1977: Geol. Surv. Can., Paper 77-1A, p. 33).

BRAUNITE

$Mn^{++}Mn_6^{+++}SiO_{12}$

Commonly associated with other manganese oxides, braunite is a potential ore mineral of manganese. It frequently occurs as a weathering product of psilomelane, pyrolusite, and other manganese minerals.

British Columbia

82 E/5 A bedded deposit of manganiferous chert on the Iron King prospect near Olalla Creek is traversed by a network of minute veins containing rhodonite. These merge laterally into zones of hard black braunite containing small masses of chert and rhodonite. The braunite appears to be an alteration product of rhodonite and is cut by tiny stringers of rhodochrosite and quartz (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 504).

93 N/6 A vein of braunite and psilomelane cuts the Permian limestone about 1.6 km west of the south end of Indata Lake. It has been traced for 18 m and varies in width from 5 to 60 cm (J.E. Armstrong, 1942: Geol. Surv. Can., Paper 42-11, p. 11).

New Brunswick

21 H/11 The Markhamville Mine at latitude 45°37'N., longitude 65°27'W, King's County, operated from 1862 to 1893 and was the province's largest producer of manganese. The manganese minerals which include braunite, hausmannite, psilomelane, manganite and pyrolusite occur as lenses, nodules, veins and masses, generally conformable with the bedding of the Windsor limestone in which they occur (A.Y. Smith, 1963: Geol. Surv. Can., Paper 62-22, p. 18).

21 J/4 Braunite and hausmannite are the main constituents of the Plymouth ore body which lies mainly on the south side of the Meduxnekeag River, about 8 km west-northwest of Woodstock. This deposit is of interest for the occurrence there of the rare mineral sursassite (E.W. Heinrich, 1962: Can. Mineralogist, 7, p. 294).

Northwest Territories

86 K/12 At a deposit located about 20 km northeast of the head of Hornby Bay, a seam of manganese bearing material from a few cms to more than 1 m thick occurs in a silicified and brecciated zone lying along the unconformable contact between Hornby Bay sedimentary rocks of Proterozoic age. This zone has a known length of about 45 m and a maximum width of about 7.5 m. It is associated with a quartz stockwork that intersects the Fault River fault. A specimen of massive material from the seam was identified as braunite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 10).

Ontario

52 A/10 A vein 15 cm in average width, consisting of an intimate mixture of braunite and psilomelane, has been noted in a shatter zone in chert rock near Pearl in McTavish Township (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 65-37, p. 28).

Prince Edward Island

11 L/6 A specimen of braunite in the National Mineral Collection is reported to have been found on the west shore of the Wheatley River, Queens County.

BRAVOITE

$(Co,Ni,Fe)S_2$

The pyrite group forms an isostructural series with pyrite FeS_2, vaesite NiS_2 and cattierite CoS_2 as end members. The name bravoite is applied to intermediate members of the series; the boundary between bravoite and the end member in each case is placed at 80 per cent.

Ontario

31 M/5
31 M/12 Bravoite has been found as cores of pyrite grains in the intermediate layer of a cross vein at the Silverfields Mine in the Cobalt area. An electron microprobe analysis gave: Co 27.9, Ni 8.4, Fe 8.5, S 44.9, As 8.5, total 98.2. Bravoite has also been found at the Langis Mine as coatings on and veinlets in pyrite-marcasite and arsenide grains. Electron microprobe analyses: Co 37.3, Ni 10.7, Fe, 1.0, S 49.8, total 98.0; Co 37.3, Ni 6.4, Fe 5.4, S 48.6, total 97.7 (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 223).

52 B/9 The major sulphide minerals in the orebody at the Shebandowan Mine are pyrrhotite, pentlandite, chalcopyrite and pyrite. Polydymite, bravoite, violarite and millerite are present in minor amounts. The mine is located at the southwest end of Lower Shebandowan Lake (J.A. Morin, 1973: Ont. Div. Mines, GR110, p. 21).

BRAZILIANITE

$NaAl_3(PO_4)_2(OH)_4$

Yukon

117 A/9 Brazilianite is one of several phosphate minerals collected from a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Other minerals found at the locality are kulanite, lazulite, wardite, vivianite, childrenite, ludlamite, metavivianite, arrojadite and augelite (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

BREITHAUPTITE

NiSb

Northwest Territories

86 F/13 At the B.E.A.R. deposit located on the north shore of Contact Lake about 14 km southeast of the Eldorado Mine, breithauptite is of widespread occurrence as small grains in cobaltite, niccolite and rammelsbergite (G.M. Furnival, 1939: Econ. Geol., 34, p. 759).

Ontario

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16 In the Cobalt-Gowganda ores, breithauptite is intimately intergrown with nickeline in all occurrences, and the intergrowth is also associated with silver so consistently that local operators consider it an indicator of high-grade ore. Electron probe microanalysis of breithauptite: Ni 32.9, Co 0.1, As 2.0, Sb 65.0, total 100.0 (W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11. p. 182).

41 P/10 Purplish copper-coloured breithauptite occurs as rounded arborescent patches varying from about 3 mm to 2.5 cm in diameter on the Hudson Bay Mines property in the Cobalt area. The breithauptite-bearing areas are always enclosed by narrow bands of pale niccolite which is itself fringed by cobaltite. An analysis is as follows: Ni 32.09, Co 0.59, Fe 0.04, Sb 66.62, As 0.58, S nil; total 99.92 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 209).

52 L/16 A minor amount of breithauptite is reported in a massive basemetal sulphide deposit located in Mulcahy Township, Red Lake area, about 32 km west of Red Lake and 1,200 m south-southwest of the south end of Trout Bay (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 234).

breunnerite

(See MAGNESITE)

BREWSTERITE

$(Sr,Ba,Ca)Al_2Si_6O_{16}.5H_2O$

British Columbia

82 E/5 Brewsterite has been identified in a specimen from the north side of Yellow Lake, about 14 km west of Okanagan Falls. It occurs as colourless, transparent stout prisms associated with analcime, thomsonite and laumontite (X-ray Laboratory, Geol. Surv. Can.).

BRITHOLITE-ABUKUMALITE

$(Na,Ca,Ce,Y)_5(P,Si)_3O_{12}(OH,F)$

Quebec

31 G/8 Chemical analysis of britholite from Oka, by J.G. Sen Gupta and F.R. Lachance: SiO_2 12.28, Al_2O_3 0.47, Fe_2O_3 0.14, R.E. Oxides 33.43 (CeO_2 15.0, Nd_2O_3 8.0, La_2O_3 5.6), CaO 28.84, MgO 0.20, Na_2O 0.21, ThO_2 5.62, TiO_2 0.09, P_2O_5 16.96, H_2O 0.54, F 2.10, total 100.80, less O=F = 99.98 (Unpublished analysis, Geol. Surv. Can.).

31 G/9 Finely granular, massive and reddish brown britholite with resinous lustre occurs in a mixture of calcite, magnetite, biotite, apatite, feldspar and quartz at the Defresne Property of Quebec Columbium Limited near Oka (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 64).

31 H/11 At the Mont St-Hilaire Quarry, also known as the Desourdy Quarry, on the north side of Mont St-Hilaire, britholite is present as light tan-coloured platy aggregates (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 57).

31 L/16 A mineral found in Villedieu Township about 500 m east of the widening of the Kipawa River known as Sheffield Lake (latitude 46°46'N, longitude 78°27'W) was examined by the Ont. Dept. Mines and found to have an apatite type X-ray diffraction pattern and cell dimensions corresponding to those of a britholite specimen from the Royal Ontario Museum. A qualitative spectographic analysis showed the following to be major constituents: Ca, Ce, La, Y, Si, P, Th (D.A. Moddle: private communication).

31 L/16 Britholite is reported to occur with rinkite, mosandrite, eudialyte, vlasovite, miserite and agrellite in pyroxenite-amphibolite rocks in an alkalic complex on the Kipawa River in Villedieu Township at 46°47'49"N, 78°29'31"W (H.M. Aarden and J. Gittins, 1974: Can. Mineralogist, 12, p. 241).

BROCHANTITE

$Cu_4SO_4(OH)_6$

British Columbia

92 I/11 A bright green crust of brochantite is present on a specimen from a locality 0.8 km west of Highway 1, 27 km south of Cache Creek (X-ray Laboratory, Geol. Surv. Can.).

92 K/3 Brochantite is associated with abundant malachite and volborthite as weathering products of a chalcocite-bearing interlava sedimentary rock which outcrops west of Menzies Bay on Vancouver Island and north of Gowland Harbour on Quadra Island (J.L. Jambor, 1960: Am. Mineralogist, 44, p. 1308).

93 M/4 The secondary minerals brochantite, chrysocolla and posnjakite have been identified on specimens from the Rocher Deboule Mine, about 10 km south of Hazelton (X-ray Laboratory: Geol. Surv. Can.).

104 B/1 Brochantite and linarite occur as crusts on rocks collected at the Silbach Premier Mine at 56°03.5'N, 130°01'W, on the west slope of Bear River Ridge, about 0.8 km north of the Alaska and British Columbia boundary (X-ray Laboratory: Geol. Surv. Can.).

Manitoba

63 K/12 Ore specimens coated with gypsum, brochantite, and posnjakite were collected at the site of the Mandy Mine, a former copper producer on a peninsula in the northwest arm of Schist Lake. Brochantite and devilline were identified on schist specimens from the Cuprus Mine, 16 km east of Flin Flon along Highway 10 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 38, 42).

63 K/13 Brochantite and posnjakite occur as bright green and light blue crusts on ore-bearing rocks at the North Star and Don Jon deposits located on

small islands on the west side of Thompson Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 47).

Newfoundland

1 N/6 The secondary minerals, green brochantite and blue posnjakite form powdery and finely crystalline coatings on ore-bearing rock at a deposit on the north side of a bend in the Colliers River, south of Highway 60 (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 73).

Nova Scotia

11 E/8 At the College copper mine, about 5 km west of South Lochaber, Antigonish County, bright green, crystalline brochantite coats quartz, hematite and chalcopyrite (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 17).

11 K/1 Bright green aggregates of acicular crystals of brochantite, accompanied by blue masses of posnjakite, coat quartz and host rocks at the Coxheath copper mine, located about 3 km east of Frenchvale, Cape Breton County (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 29).

Ontario

31 M/4 Bright green brochantite forms a finely granular crust on ore-bearing rock at a deposit on a knoll on the west side of a pond about 1.6 km south of Kanichee Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 7).

31 M/5 Brochantite has been identified at the Hudson Bay and Nova Scotia silver mines in the Cobalt area (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 34, 42).

42 A/3 Specimens coated with brochantite were found on the rock dump at the Texmont Mine located about 50 km south of Timmins in Bartlett-Geikie Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 151).

42 A/9 Crusts of green brochantite are present on rock specimens on the dumps at the Centre Hill Mine, a former copper mine in Munro Township. The deposit is 8.3 km by road north of Highway 101 from a road junction 25.2 km east of Matheson (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 116).

Quebec

The following occurrences of brochantite in copper deposits of the Eastern Townships are reported by Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 5, 8, 9, 19, 21, 25, 29, 57.

21 E/5 With posnjakite and devilline at the Capelton and Albert mines, and with posnjakite at the Eustis Mine. The mines may be reached by travelling 4.8 km west from Lennoxville along Belvedere Street and then 4.2 km south.

21 E/5 At the Aldermac Moulton Hill Mine, with devilline, on quartz and sulphides. The mine is 4.8 km south of Highway 1, by gravel road, from a point 8.4 km east of Sherbrooke (junction of Highway 1 and 10th Street).

21 L/6 Specimens of chalcopyrite and bornite coated with brochantite may be found at the site of the Harvey Hill copper mine 4 km from West Broughton (St-Pierre).

31 H/2 With malachite and posnjakite at Sweet's Mine, 4.8 km north of Sutton along the road to West Brome.

31 H/8 With langite and posnjakite at the Ives Mine, located on the west side of the road between Eastman and Bolton Centre.

With malachite and langite at the Huntingdon Mine on the east side of the road between Eastman and Bolton Centre.

31 H/10 With azurite, malachite and posnjakite at the Acton Mine, near Acton Vale.

31 I/16 Emerald green brochantite was noted on the surfaces of tremolite rock at the Tetreault Mine near Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 88).

31 M/7 The secondary copper minerals brochantite and posnjakite occur as coatings on specimens on rock dumps at the Lorraine Mine, located 5 km by road south of Highway 62 from a point 20 km west of Belleterre (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 94).

32 C/4 Brochantite and malachite have been identified coating ore specimens on the dumps of the Rainville Mine. The mine is at Colombiere, 1.9 km south of Highway 59 and 16.7 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 115).

32 D/3 Secondary minerals including bright green brochantite occur as coatings on specimens at an old mine dump at the railway line on the north side of Highway 59 at Aldermac (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 41).

32 D/10 Specimens coated with green brochantite were collected on mine dumps at the Lyndhurst Mine, a former copper-gold-silver producer. The mine is 5.8 km east of Highway 46 along the road to Laferté (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 57).

Saskatchewan

63 K/12 Specimens coated with brochantite, posnjakite, devilline and antlerite are present on the dumps of the Coronation Mine, located near the shore of Phil (McNally) Lake about 26 km from Creighton (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

63 L/9 Brochantite, atacamite and devilline occur as powdery coatings on sulphides and volcanic rocks at the Birch Lake copper mine. The deposit is at the north end of a small island in Birch Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 26).

73 P/7 The secondary copper minerals malachite, brochantite and carbonate-cyanotrichite have been identified as coatings on rocks from the Eureka deposit on a peninsula at the southern end of Heyer Bay, MacKay Lake. The lake is 62.5 km north of LaRonge via Highway 2 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 7).

Yukon

105 D/11 Brochantite has been identified as a bright green crust on specimens collected at the War Eagle Mine, about 6.4 km west of Whitehorse (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 46).

115 F/15 Malachite, brochantite and chrysocolla are present at the Canalask Mine on the east side of the White River. Access to the mine is by a 4.5 km road leading south from the Alaska Highway at Mile 1167.9 (1874.5 km) (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 73).

bronzite

(see ENSTATITE)

BROOKITE

TiO_2

Quebec

31 H/11 Brookite, the orthorhombic polymorph of rutile and anatase, has been identified in specimens from the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

BRUCITE

$Mg(OH)_2$

Brucite is an ore mineral of magnesium. It is most commonly found in crystalline limestone and is associated with dolomite, magnesite, chromite, and serpentine minerals. The name nemalite has been used for ferroan brucite.

Nova Scotia

11 N/2 The Meat Cove zinc deposit is located on the headwaters of French Creek, 3.2 km southwest of the settlement of Meat Cove, on the northern tip of Cape Breton Island. Brucite occurs in marble as round blebs or spheroids 0.1 to 3 mm in diameter which are semi-transparent to opaque. The colour varies from grey to almost grey-black (W.M. Tupper, 1963: Can. Mineralogist, 7, p. 796).

Ontario

31 C/10 Brucite in crystalline limestone is exposed in a few pits and trenches at an occurrence that can be reached by road westward for 16 km from Piccadilly on the Oak Flats road. The pits are on the Dwyer farm (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 12).

31 C/10 Granular brucite is present in the crystalline limestones underlying much of Hinchinbrooke Township. It is exposed on conc. X, lot 5; conc. XI, lot 4, conc. XII, lots 3,4,5 and 6 (W.D. Harding, 1947: Ont. Dept. Mines, Ann. Rept., vol. 56, Pt. VI, pp. 44-5).

31 C/12 A specimen of brucite in the mineral collection of the Royal Ontario Museum is from W.F. Bonter and Co. Ltd., lots 16 and 17, conc. XI, Marmora Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p, 77).

31 F/4 Brucite is associated with nodules of brugnatellite in marble at two localities near Bancroft. (1) At the York River tactite zone, a cliff-like exposure on the East side of the York River bridge at a point 11 km east of the junction of Highways 500 and 62 in Bancroft (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

31 L/6
31 L/7 The Aluminum Company of Canada Ltd., holds what has been estimated as up to a million tonnes of ore grading from 11 to 23 per cent brucite on conc. A, Olrig Township (W.D. Harding, 1944: Ont. Dept. Mines, vol. 53, Pt. VI, p. 43).

An equigranular rock made up of calcite, dolomite, and brucite forms a series of low weathered outcrops on conc. IX, lot 28, Calvin Township. These cover an area about 150 m wide and 270 m long just north of the highway (H.C. Cooke, 1938: Geol. Surv. Can., unpublished File 21-C-10, p. 1).

31 L/6 White nodules of brucite up to 4 mm in diameter are abundant at the Legendre quarry, located 2.7 km north of Highway 17 from a point 1.9 km east of Rutherglen. (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 71)

41 B/1 Brucite is present as white to light green compact fibrous and flaky masses associated with chrysotile asbestos at the Reeves Mine in Reeves Township at 48°12.5'N, 82°05'W (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 155).

Quebec

21 E/13 Brucite is present in the Martin-Bennett chrome pit in Ireland Township, Megantic County. Specimens collected from this locality by E. Poitevin are in the National Mineral Collection. Two unusual modes of occurrence of brucite have been found in the Johns-Manville Mine at Asbestos: long parallel fibres with peridotite in a crushed zone; and a central zone of brucite dividing a vein of cross fibre asbestos. A chemical analysis of brucite from Asbestos by Gonyer is as follows: Fe_2O_3 1.95, FeO 9.57, MgO 60.33, H_2O 28.60, total 100.45 (H. Berman and C.D. West, 1932: Am. Mineralogist, 17, p. 313).

21 E/13 The fibrous iron-bearing variety of brucite (nemalite) occurs in the Asbestos district of Quebec. It has a lower birefringence than iron-free brucite. Chemical analysis by Gonyer: Fe_2O_3 1.95, FeO 9.57, MgO 60.33, H_2O 28.60, total 100.45 (J.D.H. Donnay, 1945: Univ. Toronto Stud., Geol. Ser., 49, p. 5).

21 E/13 Fibrous brucite from Asbestos has been studied in detail. Its X-ray powder pattern is identical to platy brucite but chemical analyses show that the fibres are significantly higher in manganese, iron and silicon. Chemical analysis: SiO_2 1.13, MgO 61.72, FeO 8.70, MnO 0.24, H_2O 28.27, total 100.06 (R.S. Liebling and A.M. Langer, 1972: Am. Mineralogist, 57, p. 857).

31 F/10 The white crystalline limestones of the Calumet Island area contain brucite both as small aggregates amounting to 25 or 30 per cent of the rock and as concentrations along joints. On range II, lots 3 to 9 in Calumet Township, brucite occurs as lenticles following the structural trend, and coarse aggregates of the hydroxide mineral appear in a rock cut on the road leading from the island to the town of Campbells Bay (F.F. Osborne, 1939: Que. Dept. Mines, Prelim. Rept. 139, pp. 13, 14).

31 G/12 Occurrences of brucite in limestones have been noted in Wakefield Township, range I, lots 5, 6 and 7; and range III, lots 6 and 7; Masham Township, range I, lot 6, and range III, lot 7; and Hull Township, range XV, lots 22 and 23, and range XIV, lots 23 and 24 (F.F. Osborne, 1939: Que. Dept. Mines, Prelim. Rept., 139, pp. 7-11).

31 G/12 Brucite occurs at the Cross Quarry near Meach Lake as colourless, white to grey, pearly to waxy nodules (1 to 5 mm in diameter) and as

colourless to pale green foliated, platy or flaky aggregates and as fibrous veinlets in limestone (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 41).

31 G/15 Silky brucite occurs in veins up to 12 mm wide at the Rockway Valley marble quarry west of Arundel; in narrow veins in magnesite and serpentine at Kilmar; and in dolomite at the Dobbie Mine (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 68, 72, 73).

Yukon

116 C/7 Fibrous brucite with fibres several cm long occurs at the Clinton Creek asbestos mine (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 111).

BRUGNATELLITE

$Mg_6FeCO_3(OH)_{13}.4H_2O$

Ontario

31 F/4 The rare carbonate mineral brugnatellite has been found at two localities near Bancroft: (1) As creamy white nodules in marble at the York River tactite zone, a cliff-side exposure on the east side of the York River, 320 m north of Highway 500 at a point 11 km east of Bancroft. (2) Road-cuts on Highway 500 on the east side of the York River bridge at a point 11 km east of the junction of Highways 500 and 62 in Bancroft (Ann P. Sabins, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

Quebec

31 J/4 Brugnatellite has been identified as white flaky coatings on clinohumite in rock exposures along the Lièvre River at des Cèdres dam near Notre-Dame-du-Laus (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

BUETSCHLIITE

$3K_2CO_3.2CaCO_3.6H_2O$

Ontario

31 C/6 The rare mineral buetschliite (also spelled bütschliite) has been identified from the trunk of a partially burned hickory tree near Deseronto. It is associated with fairchildite (K.R. Dawson and Ann P. Sabina, 1958: Can. Mineralogist, 6, p. 290).

31 F/11 Bütschliite and fairchildite have been identified from the trunk of a burned birch tree near Eganville, Gratton Township, by the Royal Ontario Museum (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 380).

BURBANKITE

$(Na,Ca,Sr,Ba,RE)_6(CO_3)_5$

Quebec

31 H/11 Burbankite has been identified as a constituent of vugs in nepheline syenite at the Desourdy Quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

Electron microprobe analysis of burbankite from the Desourdy quarry: Na_2O 8.30, CaO 12.03, SrO_2 32.35, BaO 11.02, Ce_2O_3 2.12, Nd_2O_3 0.13, Dy_2O_3 0.08, Yb_2O_3 0.10, CO_2 (33.17), total (99.30). (T.T. Chen and G.Y. Chao, 1974: Can. Mineralogist, 12, p. 342).

31 H/12 Burbankite occurs as colourless and reddish pink fine, hair-like aggregates on calcite at the Miron Quarry, Montreal Island. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 68).

BYTOWNITE

$NaAlSi_3O_8$-$CaAl_2Si_2O_8$

Bytownite is a member of the plagioclase feldspar series. Its range in composition is limited by definition to between 10 and 30 per cent of the albite molecule ($NaAlSi_3O_8$) and 70 to 90 per cent of the anorthite molecule ($CaAl_2Si_2O_8$). Although the feldspar group of minerals are the most abundant minerals in the earth's crust, bytownite is relative rare. It has been found in basic igneous rocks.

The name was given to a greenish white mineral found in a boulder near Bytown, now Ottawa. The name was later appled by Tschermak to include all feldspars with the range of composition $Ab_{10-30}An_{70-90}$. The original bytownite specimen was later shown to be a mixture of anorthite and other minerals.

Ontario

42 B/7 Bytownite megacrysts, approximate composition An_{75}, are abundant in the Shawmere anorthosite body at 48°15.5'N, 82°35.6'W, near the Goose Range fire tower in Foleyet Township. (P.C. Thurston, G.M. Siragusa and R.P. Sage, 1977: Ont. Div. Mines, GR157, p. 69).

42 C/8 Colourless bytownite of composition Ab:An = 1:3 (approx.) has been found at the northwest end of Dog Lake, 2.4 km southeast of Lochalsh. The feldspar occurs as a primary constituent of a gabbro-wehrlite with olivine, augite, biotite, pigeonite, chromite, magnetite and apatite (M.H. Frohberg, 1944: Am. Mineralogist, 29, p. 302).

Quebec

31 H/7 Anorthite is reported to occur at Yamaska Mountain near Abbotsford in Rouville County as a constituent of yamaskite, a rock composed of pyroxene, hornblende, ilmenite, and feldspar, and lesser amounts of biotite, titanite, and spinel. The amount of feldspar varies from small amounts of irregular grains to abundant idiomorphic crystals (G.A. Young, 1904: Geol. Surv. Can., Ann. Rept., XVI, 31-32 H).

Chemical analysis of feldspar from Yamaska Mountain, by T. Sterry Hunt: SiO_2 46.90, Al_2O_3 31.10, Fe_2O_3 1.35, CaO 16.07, MgO 0.65, K_2O 0.58, Na_2O 1.77, H_2O 1.00, total 99.42: S.G. 2.756-2.763 (T. Sterry Hunt, 1863: Geol. Surv. Can., Geology of Canada, p. 479). The above analysis converted to atomic proportions does not agree with the feldspar formula. If Fe and Mg are assumed to be due to admixed pyroxene and corresponding atomic proportions of Fe, Mg, Ca, Si, and O are deducted, the remaining atomic proportions yield the formula $(Ca_{.78}\ Na_{.18}\ K_{.04})(Al_{.46}\ Si_{.54})_4O_8$ which falls within the bytownite range of composition.

The composition of the feldspar in a specimen of yamaskite believed to be similar to that studied by Hunt has been determined by X-ray diffraction and fusion techniques. Values of An_{82-88} were obtained by the X-ray method and

An_{80} by the fusion method. The Yamaska 'anorthite' is thus shown to be bytownite (X-ray Laboratory, Geol. Surv. Can.).

31 I/16 Bytownite, wilsonite, cordierite, and scapolite occur in Montauban Township on range I, lots 33 to 41 and 312 to 322 and, range Ii, lots 38 to 41, in association with a sulphide body (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 30).

cacholong

(see OPAL)

CACOXENITE

$Fe_9(PO_4)_4(OH)_{15} \cdot 18H_2O$

Ontario

31 B/12 Cacoxenite crystals have been described by B.J. Harrington as beautiful little yellow tufts on the walls of cavities in calcite. The calcite is associated with a pyrite deposit near Brockville in Elizabethtown Township, conc. II, lot 19 (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 25 T).

CADMOSELITE

CdSe

Ontario

42 A/11 Cadmoselite has been identified as a rare constituent of a bornite-rich zone on the 1200 level of the Kidd Creek Mine in the Timmins area. The mine may be reached via Highway 655, 25.7 km north of Highway 101 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

CALAVERITE

$AuTe_2$

Calaverite is essentially a ditelluride of gold, but may contain subordinate amounts of silver. It is found in gold-bearing hydrothermal vein deposits associated with other telluride minerals and native gold that normally crystallize late in the paragenetic sequence.

British Columbia

93 L/14 At Glacier Gulch, 9.6 km west of Smithers, calaverite occurs as a subordinate mineral with tetradymite in a white rock which also contains sericite, carbonates, and kaolin. It is also associated with matildite, sphalerite and chalcopyrite (G.M. Pratt, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 55).

104 M/8 Calaverite occurs with gold, bismuth, and pyrite at the Engineer Mine in the Atlin mining division (Ellis Thomson, 1936-37: Unit. Toronto Stud., Geol. Ser., 40, p. 97).

Ontario

31 M/13 Calaverite has been identified, by X-ray diffraction, with chalcopyrite, pyrite, and spalerite in a polished section of a specimen from Miller Independence Mines at Boston Creek, Pacaud Township. It occurs as bladed lath-like crystals, stout or slender prisms, or in a massive to indistinctly crystalline form (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 348).

The mineral has also been identified from the Boston-McRae Mine where it is the chief telluride present (Ellis Thomson, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 97).

32 D/4 In the Kirkland Lake area, calaverite occurs as small compact masses, and disseminations in quartz, calcite, or altered porphyry, in association with other tellurides, sulphides, and free gold. It has been noted at the following mines: Wright-Hargreaves, Macassa, Toburn, Bidgood, Kirkland Golden Gate, Upper Canada, and Lake Shore. Chemical analysis by Rickaby of calaverite from Lake Shore gave the following results: Au 39.36, Ag 0.30, Pb 5.20, Cu 0.24, Fe 0.33, Te 54.32, S 0.12, insol. 0.24, total 100.11. An analysis of calaverite with minor altaite, pyrite, and chalcopyrite, from the Wright-Hargreaves Mine is as follows: Au 38.55, Ag 0.22, Pb 6.49, Cu trace, Fe 0.70, Te 52.70, S 0.55, insol. 0.60, total 99.81 (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 348).

42 A/1 Calaverite has been reported in the Teck-Hughes and Sylvanite mines at Kirkland Lake (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 349).

42 A/1 Coarse, readily recognized grains of calaverite were found in No. 3 vein of the Tough-Oakes Mine near Kirkland Lake. An assay of the telluride from this occurrence yielded 40.6 per cent gold (A.G. Burrows, 1923: Ont. Dept. Mines, Ann. Rept., vol. 32, Pt. IV, p. 24, revised edition).

42 A/6 The telluride minerals calaverite, sylvanite and altaite have been identified at the Dome Mine in the Porcupine gold camp. The mine is located on the north side of the Back Road, 11.1 km east of Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 147).

42 A/9 Calaverite associated with tetradymite, gold, and pyrite occurs at Painkiller Lake, Beatty Township (Ellis Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 98).

52 E/9 Small blebs and short veins of calaverite occur in quartz and carbonate gangue at Bigstone Bay,, Lake of the Woods. Tetradymite, petzite, pyrite, gold, chalcopyrite, and hessite are associated minerals (Ellis Thomson, 1935: Univ. Toronto Stud., Geol. Ser., 38, p.. 48).

Quebec

32 C/4 Specimens taken from the Louvicourt Goldfields Mine in Louvicourt Township were composed of tourmalinized quartz, with free gold and small areas of calaverite and tarnished tellurbismuth in close association with calcite (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 348).

32 C/4 A specimen of white quartz from the Lamaque mine in Bourlamaque Township contained small plates of tellurbismuth and massive calaverite (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 348).

32 D/1 Grains of calaverite about one millimetre in diameter occur in massive milky quartz at Canadian Malartic Gold Mines in Fournier Township, Quebec (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 348).

32 D/6 Several pieces of greenstone taken from the Horne Mine at Noranda contained calaverite, altaite, and petzite in coarsely crystalline masses or intergrown with tellurbismuth (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 349).

32 D/6 Calaverite has been found in intimate association with montbrayite in specimens from

the Robb Montbray deposit. The two minerals are almost identical optically. Electron probe microanalysis: Au 43.2, Ag 1.5, Sb, 0.1, Pb 0.0, Bi 0.0, Te 56.0, total 100.8 (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 709-716).

CALCIOSAMARSKITE

Columbate of rare earth elements

Ontario

31 F/4 Calciosamarskite is the name given to what was believed to be a lime-rich variety of samarskite from the Woodcox Mine, in lot 17, conc. VII, of Monteagle Township. It occurs in a pegmatite dyke with hatchettolite (pyrochlore) and cyrtolite. A chemical analysis by H.V. Ellsworth is as follows: SiO_2 2.39, TiO_2 2.50, Al_2O_3 0.16, Fe_2O_3 7.67, BeO 0.26, FeO 0.21, CaO 7.56, MgO 0.02, MnO 0.04, ZrO_2 0.02, SnO_2 1.49, Ta_2O_5 2.54, Cb_2O_5 43.32, PbO 0.44, UO_2 9.00, UO_3 1.67, ThO_2 3.34, $(Ce,La,Di)_2O_3$ 1.68, $(Yt,Er)_2O_3$ 11.38, H_2O (-110°) 0.40, H_2O (+110°) 3.24, total 99.33. S.G. 4.738 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 258).

X-ray powder patterns of ignited calciosamarskite do not resemble those of samarskite but are similar to yttrotantalite (Dana, 7th edition, vol. I, p. 772).

41 H/1 A black radioactive mineral occurs with uraninite in a dyke on lots 9 and 10, conc. IX, Conger Township, Parry Sound district. It resembles the calciosamarskite from Monteagle Township in Hastings County and has, therefore, been given that name. Analysis by H.V. Ellsworth: SiO_2 1.92, TiO_2 1.43, Al_2O_3 0.65, BeO 0.49, FeO + Fe_2O_3 (as Fe_2O_3) 3.01, CaO 4.76, MgO 0.14, MnO 0.23, ZrO_2 0.24, SnO_2 0.48, Ta_2O_5 4.86, Cb_2O_5 43.50, PbO 0.38, U_3O_8 13.38, ThO_2 2.16, $(Ce, La, Di)_2O_3$ 4.04, $(Y,Er)_2O_3$ 10.71, H_2O^- 0.68, H_2O^+ 5.76, total 98.82, S.G. 4.485 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 258).

CALCITE

$CaCO_3$

Calcite, the most stable form of calcium carbonate is one of the commonest of minerals. It is an important rock-forming mineral in rocks of sedimentary origin and their metamorphic equivalents, where it may be the dominant and almost pure constituent as in limestone, chalk and marble, or occur in lesser amounts as a cementing material in other rocks. Calcite is a widespread alteration product of igneous rocks, particularly basic varieties, and is a common constituent of hydrothermal mineral deposits. It also occurs as a product of magmatic crystallization. Calcite is deposited from meteoric lime-bearing carbonated waters in a variety of forms including: stalactites and stalagmites in limestone caves; travertine and calc-sinter from springs and streams; and petrifying material preserving animal and plant remains.

Varietal names for calcite, based mainly on variations of crystal habit include: dog-tooth spar, nail head spar, Iceland spar, satin spar, lublinite, argentine and aphrite. Massive and cryptocrystalline calcite is known variously as limestone, marble, chalk, lithographic stone, pisolite, Egyptian and Oriental alabaster, Mexican onyx, calc-sinter, travertine, calc-tufa, rock-milk and rock-meal. Compositional varieties found by substitution of other divalent cations for calcium include: manganoan, ferroan, magnesian, zincian, cobaltian, plumbian, barian, and strontian calcite.

A few of the many Canadian localities that have yielded interesting specimens of calcite in its various forms are noted below.

British Columbia

82 F/15
82 K/2 Marble suitable for ornamental purposes is quarried at two places near Kootenay Lake: at the Canadian Marble and Granite Works property near Marblehead (12.8 km north of Lardeau), and at a quarry on the south fork of Kaslo Creek, 8 km from Kaslo. The marble is of the mottled blue variety (W.A. Parks, 1917: Can. Dept. Mines, Mines Br. Publ., No. 452, vol. 5, pp. 128-29, 138-39).

92 F/9
92 F/10
92 F/15 Delicate pink, red to chocolate brown and greenish coloured crinoidal marble occurs at the Malaspina Quarries Company property located at lot 339, group 1, on a ridge west of Anderson Bay near the southern tip of Texada Island. Nootka Quarries Limited, on lot 26, 30 m above sea level and about 270 m from the head of Anderson Bay, produces a pink and white marble.

Outcrops of a pure white to greyish and bluish marble are found in the northern part of Texada Island, in an area extending from the northern tip southward for a distance of 9.6 km in the Davis Bay and Crescent Bay areas. At one time, a quarry was operating in the southwestern corner of Blubber Bay (W.A. Parks, 1917: Can. Dept. Mines, Mines Br. Publ., No. 452, vol. 5, pp. 150-162).

94 A/4 A large deposit of travertine formed from springs is reported to occur near Hudson Hope in the Peace River mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 50).

Manitoba

Bright pink fluorescent calcite has been reported at the following deposits between Flin Flon and Thompson.

63 J/10 Manibridge Mine

63 K/9 South end of Tramping Lake

63 K/16 Anderson Lake Mine

63 N/3 Sherritt-Gordon Mine

(Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, pp. 48, 51, 64, 70)

New Brunswick

21 G/8 A band of serpentine marble, about 15 m wide, occurs in a crystalline limestone exposure along Burpee Avenue in the city of Saint John. The marble is the verde-antique variety consisting of coarse-grained white, bluish, and greyish calcite irregularly mingled with greenish and yellowish serpentine (W.A. Parks, 1914: Can. Dept. Mines, Mines Br. Publ., No. 203, p. 164).

21 H/11 Large rhombohedrons of calcite fill crevices in the conglomerates at Goose Creek near Martin Head (L.W. Bailey, 1870-71: Geol. Surv. Can., Rept. Prog., p. 237).

21 P/13 Good crystals of calcite have been collected at Chapel Point in Gloucester County (National Mineral Collection).

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Some specimens of calcite fluoresce with a bright pink colour when placed under ultraviolet radiation. The following occurrences are noted by Ann P. Sabina, 1967, in Geol. Surv. Can., Paper 66-51.

21 J/3 In a limestone quarry at Waterville.

21 O/16 In veins cutting sedimentary rocks exposed at Razor and Dickie Coves on the west side of Black Point.

21 P/11 Fracture fillings in sandstone cliffs along the shoreline between Clifton and Stonehaven.

21 P/12 Associated with the silver-lead-zinc orebody at the Sturgeon River Mine in the Bathurst area.

21 P/13 In veins cutting limestone exposed along Chaleur Bay on both sides of the mouth of Hendry Brook, and from Limestone Point to the mouth of the Elmtree River.

22 B/1 In cavities and fractures in volcanic rocks exposed along the Inch Arran - Cape Bon Ami shoreline, at Dalhousie.

Newfoundland

12 A/13
12 H/15
12 I/9 Marbles suitable for cutting, polishing and ornamental use occur at the following localities: quarries overlooking the Humber River and Humber Arm in the Corner Brook area; Canada Harbour and Bide Arm; Doucers Brook near Sop Arm, White Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 126, 146, 147, 150).

12 B/10 Colourless transparent crystals and white cleavable masses of calcite that fluoresce yellow in ultraviolet light occur with celestine, barite and marcasite at the Aguathuna limestone quarry which extends for about 1.6 km parallel to the south shore of East Bay, Port au Port Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36. p. 155).

Northwest Territories

27 C A beautiful marble composed of white and light rose or orange coloured crystalline limestone is reported to occur "in an inland zone west of a line connecting the heads of Sam, Clyde and McBeth fiords to the edge of the Barnes ice cap". The limestone is interbedded with diopside, chrondrodite, and phlogopite in the 60 m wide formation. The limestone is exposed along the valleys of the Clyde River and the Sam Fiord River (E.H. Kranck, 1951: Can. Inst. Mining Met., Bull., vol. 44, No. 474, pp. 682-3).

Nova Scotia

11 E/5 Dog-tooth spar is found associated with pyrolusite and manganite in the Faulkner manganese mine southwest of Minasville (L.J. Weeks, 1948: Geol. Surv. Can., Mem. 245, pp. 68-69).

11 E/6 Dolomitic shell limestone (coquina-type) occurs in a deposit about 4.8 km west of Hilden. The limestone is composed almost entirely of shells replaced by black crystalline limestone and cemented with the same material. Crystals of red calcite and of dolomite coat the cavities between and inside the shells (M.F. Goudge, 1934: Can. Dept. Mines, Mines Br. Publ., No. 742, pp. 44-45) (I.M. Stevenson, 1958: Geol. Surv. Can., Mem. 297, p. 100).

11 E/13 Reddish brown calcium limestone concretions occur in a red shaly matrix at a limestone quarry on Dewar's Hill, 4.8 km southwest of Pugwash. Crystals of calcite and dolomite line vugs in the limestone of the quarry (M.F. Goudge, 1934: Can. Dept. Mines, Br. Publ., No. 742, pp. 51-55).

11 F/15 Beautiful marbles occur at a locality near Eskasoni, on the west side of East Bay on Bras d'Or Lake (W.A. Parks, 1914: Can. Dept. Mines, Mines Br. Publ., No. 203, pp. 183-185).

11 K/1 Two types of marble are found at the quarry at Scotch Lake, west of the Scotch lake village. One is a fine-grained white matrix with pink and green clouds and veins; the other a medium-grained white marble with dots of yellow serpentine (W.A. Parks, 1914: Can. Dept. Mines, Mines Br. Publ., No. 203, pp. 181-182).

11 K/8 Pure white, blue and white clouded, and salmon variegated marbles are among those found at the Marble Mountain limestone quarry, located at Marble Mountain village, near the shore of the West Bay of Bras d'Or Lake (T.D. Guernsey, 1927: Geol. Surv. Can., Summ. Rept., Pt. C, pp. 77-79).

11 L/2 Calcareous tufa deposited on moss has been found at a spring near Upper Stewiacke, in Colchester County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 228).

21 A/16 Black calcite, the result of its content of manganese, occurs at the manganese mines south of Dean Chapter Lake, about 11 km north of New Ross (G. Hanson, 1932: Geol. Surv. Can., Econ. Geol., Ser., 12, pp. 53-62).

21 H/1 Fluorescent calcite is found in the rock exposed along the shores of Minas Basin from Chenerie to Walton. The calcite occurs as crystals in carboniferous conglomerate and as fine-grained matrix cementing pebbles in the conglomerate. It fluoresces a brilliant hot pink (R.W. Boyle, private communication).

21 H/8 Calcite crystals associated with analcime occur in geodes at Wassons's Bluff, Cumberland County (A.T. McKinnon, 1916: National Mineral Collection).

Ontario

30 M/3 Fine specimens of dog-tooth spar have been collected at Niagara Falls in Welland County (National Mineral Collection).

31 C/6 Clear to smoky grey, pink, and red aggregates of calcite scalenohedrons (individual crystals up to 2.5 cm long) occupy vugs and fissures in the Henderson and Conley talc mines (Canada Talc Industries Limited). These mines are near the north shore of Moira Lake in Huntingdon Township, Hastings County (P. Sandomirsky, 1954: M.A. Thesis, Univ. Western Ont.) (M.E. Wilson, 1926: Geol. Surv. Can., Econ. Geol. Ser., No. 2, pp. 78-87).

31 C/7 Calcite crystals, vugs lined with small amethyst crystals, and banded calcite with hematite are exposed at a road cut on the east side of Highway No. 38, 1.6 km south of Verona, Portland

Township, Frontenac County. The banded calcite-hematite specimens are reported to fluoresce (B.B. Woods and L.B. Woods: Min. Coll. Eastern Ont., pp. 5-6).

31 C/10 A.L. Parsons has described an unusual occurrence in Godfrey Township in which a small crystal of calcite has been nearly enclosed by the lower part of a large pyramidal crystal giving the impression of twinning (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 23).

31 C/11 A beautiful black marble composed of alternating dark and lighter bands occurs in a quarry in the southeast end of the village of Madoc, in Madoc Township, Hastings County. The quarry is on the north side of the road leading to the talc mines, 640 m from the turnoff on Highway No. 7 (F.F. Osborne, 1930: Ont. Dept. Mines, Ann. Rept., vol. 39, Pt. VI, pp. 53-54).

31 C/15 Cream-coloured crystals of calcite having diameters of up to 20 cm occur at the Marhill calcite quarry located about 3.2 km west of Robertsville, Palmerston Township, Frontenac County. Some of the crystals have a violet tinge. The calcite vein cuts pink granite gneiss (B.L. Smith, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VII, p. 42).

31 C/16 The Silver Queen Mine located on lot 13, conc. V, North Burgess Township, contains crystalline limestone in which are found phlogopite, diopside, wollastonite, pyrite, garnet, tremolite, marcasite, pyrrhotite and graphite. The limestone is unusual on account of its blue colour and its property of releasing hydrogen sulphide when crushed. The limestone pit is 75 m from the mica pits (H.S. de Schmidt, 1912: Can. Dept. Mines, Mines Br. Pub., No. 118, pp. 167-68, 253-54).

31 D/16 Orange calcite is found in crystalline limestone at a roadcut on Highway No. 121 about 1.2 km north of Tory Hill (D.D. Hogarth: private communication).

31 F/4 In the Stewart marble quarry, located in lots 29 and 30, conc. X, Dungannon Township, Hastings County, several varieties of dolomite marble are found. Among them are light blue, medium-grained, siliceous dolomite veined with white; brownish pink fine-grained, banded marble; pale, clouded green, fine-grained marble with siliceous streaks, containing feathery rosettes of green tremolite; serpentinous, green, fine-grained dolomite ('Imperial Green' Marble); and pink calcium marble. The marbles occur as bands which adjoin each other in the quarry.

Four varieties of marble are found at the Barker marble quarry on lots 41 and 42, Hastings Road. They are: 'Laurentian No. 19' marble consisting of greyish white and greenish white dolomite fragments cemented by chocolate brown micaceous material; calcium marble in pink to red shales with irregular black and pale green veins; 'Laurentian No. 14' marble composed of green and brown brecciated dolomite traversed by narrow white calcite veins; siliceous, fine-grained, banded brownish dolomite.

'Laurentian Buff' marble, a fine-grained buff dolomite veined and clouded with dark brown micaceous bands is exposed in a small quarry on the top of a cliff, 180 m northwest of the Barker (main) quarry on lots 41 and 42, Hastings Road (D.F. Hewitt and W. James, 1955: Ont. Dept. Mines, Ann. Rept., vol. 64, Pt. VIII, p. 55-56).

31 F/4 Coarsely crystalline, salmon pink calcite with ellsworthite is found on lot 18, conc. VII of Monteagle Township. The colour is believed due to the presence of manganese and possibly ferrous iron. An analysis by E.W. Todd gave the following composition: CaO 55.43, CO_2 43.86, FeO 0.28, MnO 0.21, SiO_2 0.03, H_2O 0.10, total 99.91 (T.L. Taylor and A.L. Parsons: Univ. Toronto Stud., Geol. Ser., 16, p. 18).

31 F/4 Calcite in the form of clear honey yellow crystals measuring up to 12 cm across has been found at the Faraday Uranium Mines Ltd., property on lots 16-18, conc. XI, in Faraday Township, Hastings County. Some of the crystals contain inclusions of chalcopyrite and tiny crystals of pyrite, and hematite. Hematite in botryoidal form often coats these crystals (D.F. Hewitt, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. III, pp. 70-75).

31 F/4 Good terminated crystals of calcite occur in a road cut on Highway No. 62, 5.3 km north of Bancroft in Dungannon Township, Hastings County (D.F. Hewitt, P.A. Peach, and L. Moyd, 1953: Geol. Soc. Am. and Geol. Assoc. Can., Ann. Meeting, Guide to Field Trip No. 1, p. 16).

31 F/4 Massive blue calcite is found in a skarn zone exposed by a pit on a hillside above the road, 180 m north of Highway No. 500, on the east side of Egan Chute on the York River, in lot 12, conc. XII, Dungannon Township, Hastings County.

Pink calcite in crystalline limestone occurs at a deposit 3.2 km from Birds Creek on the side of a cliff overlooking McFall Lake, Herschel Township, Hastings County, on its north side (V.B. Meen and D.H. Gorman, 1953: Geol. Soc. Am. and Geol. Assoc. Can., Ann. Meeting, Guide to Field Trip No. 2, p. 20).

31 F/6 A vein of coarse salmon orange calcite is located in a deposit near the northern shore of Turner's Island in Lake Clear, Sebastopol Township, Renfrew County. Scapolite, hornblende, and pyroxene are found in this vein (G.F. Kunz, 1890: Gems and Precious Stones of North America, pp. 259-260).

31 F/15 Iceland spar has been found at Dalhousie Lake in Lanark County (National Mineral Collection).

31 L/7 Pale blue coarse-grained calcite, siliceous, pale green dolomite, and a rock composed of mainly quartz crystals is associated with the dolomite in an outcrop on the south side of Highway 17, at a point 500 m east of the bridge over Pimisi Bay, near Rutherglen (M.F. Goudge, 1938: Can. Dept. Mines, Mines Br. Publ., No. 781, pp. 130-132).

31 M/4
31 M/5 Pink fluorescent calcite has been found on many of the rock dumps of mines in the Cobalt area. Colourless to white calcite rhombohedra studded with tiny pyrite cubes were found on the dumps of the Cobalt Contact Mine. Crystals of dogtooth spar were found at the Agaunico Mine (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, pp. 7,8,40,42,54,57,59,60,63).

40 J/3 Dog-tooth spar has been found with celestine in the rocks in the bed of the Detroit River at Amherstburg in Essex County (G.C. Hoffmann, 1904: Geol. Surv. Can., Ann. Rept., XVI, pp. 347-348 A).

52 A/4 Pink and white calcite are found at the Hidden Treasure Mine, on the south half of lot 16, conc. IV, Pearson Township, along with pale

brown barite crystals (T.L. Tanton, 1931: Geol. Surv. Can., Mem. 167, p. 140).

52 A/6 Iceland spar is found in the Neepatyre Mine, located on lots 24 and 25, conc. V, north of the Kaministikwia River in Neebing Township (T.L. Tanton, 1931: Geol. Surv. Can., Mem. 167, p. 144).

52 A/7 Calcite crystals of two generations occur near Thunder Cape, Lake Superior. The earlier crystals tend to be tabular and badly etched while the later ones are well formed though usually with a frosted surfce. The interiors are unusually transparent and colourless and their suitablility for optical use has been considered (A.L. Parsons, 1920: Univ. Toronto Stud., Geol. Ser., 12, p. 51).

52 A/7 Pink laumontite and calcite, some of which is of the Iceland spar variety, are found in a composite vein cutting basic lava on Porphyry Island, in Lake Superior. This vein, which strikes parallel to a diabase dyke to the north of it, is exposed on the eastern shore of the north part of the island (T.L. Tanton, 1931: Geol. Surv. Can., Mem. 167, p. 187).

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The following occurrences of calcite, with directions as to how to reach them, are noted by Ann P. Sabina, in Geol. Surv. Can., Paper 67-51, 1968, and Paper 68-51, 1969.

31 B/12 White to brownish pink coarsely crystalline calcite occupies cavities about 2 cm across in dolomite in a quarry about 10 km north of Brockville on Highway 2. The calcite fluoresces pink under short ultra violet rays (Paper 67-51, p. 48).

31 B/14 White to pink crystalline calcite, which fluoresces pink under short ultra violet rays, is associated with pyrite in cavities and veins at Fetterly's Quarry which is situated north of Highway 2 at approximately 120 m from Kingston (Paper 67-51, p. 49).

31 C/7 Aggregates of calcite crystals are common at the Kingston Township Quarry. The calcite crystals vary from colourless to greyish white transparent. The quarry is located nearby and to the southeast of the junction of Highway 401 and 38 (Paper 67-51, p. 6).

31 C/7 Pinkish to white calcite lined cavities are found on the road-cut along Highway 38 about 800 m north of the junction of Highway 401 and 38. The clcite crystals are very coarse grained and are closely associated with anhydrite and gypsum. (Paper 67-51, p. 7)

31 C/7 Pink calcite occurs with light-amber mica, dark green pyroxene crystals, and green and red apatite. These minerals are found in four large mica pits at the Freebern Mine about 26 km north of Kingston and 4.8 km east of Hartington (Paper 67-51, p. 9).

31 C/8 Colourless calcite crystals (dogtooth spar) commonly fill cavities in the limestone at the McGinnis and O'Connor Quarry on Highway 15 north of Kingston (Paper 67-51, p. 41).

31 C/10 Salmon pink calcite together with massive pyrite and pyrrhotite is found in crystalline limestone at the Enterprise Mine about 42 km north of Kingston and 16 km west of Godfrey. Other minerals present are molybdenite, apatite, hornblende, scapolite, hexahydrite, jarosite, copiapite, rozenite and fibroferrite (Paper 67-51, p. 10).

31 C/10 Pink and white crystalline calcite is common at the Kingston (Bedford) mica mine located about 3.2 km east of Highway 38 and 800 m southeast of the Godfrey - Westport road (Paper 67-51, p. 14).

31 C/10 Coarsely crystalline white to sky blue, greenish blue and salmon pink calcite is exposed along a cliff opposite Long Lake. The outcrop is about 5 km northwest of Parham on the Long Lake road (Paper 67-51, p. 18).

31 C/16 A blue calcite has been reported from the Hanlon Mine. Other calcites present in the mica mine are predominantly white and salmon pink. The mine is located about 800 m east of the Kingston-Westport-Perth Road and about 76.6 km (road log) north of Kingston (Paper 67-51, p. 32).

31 C/16 Coarse, salmon to reddish pink calcite occurs at the Byrnes Mine. Also present in the mine is finely granular white calcite that fluoresces bright pink under 'short' ultraviolet rays. The mine was originally opened for phosphate. It is located at a contact of gneiss and pyroxenite on the east side of the Kingston-Westport-Perth Road about 75.6 km (road log) north of Kingston (Paper 67-51, p. 32).

31 G/5 Coquina limestone occurs at the Dibblee Construction Bowesville Quarry south of Ottawa (Paper 68-51, p. 83).

31 G/5 At the Frazer Duntile Quarry near Ottawa, calcite occurs as colourless, transparent crystals (dogtooth spar) and as white to pink granular and cleavable masses; some of the massive variety fluoresces pink when exposed to ultraviolet rays (Paper 68-51, p. 85).

31 G/5 Colourless to white crystal aggregates of calcite are common in fractures and cavities in limestone at the Francon Quarry east of Ottawa. The calcite fluoresces pale yellow when exposed to ultraviolet rays (Paper 68-51, p. 82).

31 G/10 White crystals of calcite occupy cavities about 2.5 cm across in the limestone at the Bertrand and Frere Quarry near Hawkesbury (Paper 68-51, p. 79).

Quebec

11 N/5 Crystals of colourless to white dog-tooth spar occupy cavities and veins in sandstone along the sea-cliffs south of Cap-aux-Meules pier on Grindstone Island. Crystals of dog-tooth spar are also present in volcanic rock in a quarry on the west side of Buttes road, 0.5 kn south of its junction with Highway 199 on Alright Island, Magdalen Islands. The calcite fluoresces pink in ultraviolet light (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, pp. 9, 19).

21 L/3 Dog-tooth calcite crystals occur in vugs in altered leucocratic rocks in association with thomsonite crystals at the King, Beaver, and Bennett-Martin mines (property of Asbestos Corp., Ltd.) and at the Johnson Mine (property of Johnson's Co. Ltd.). These mines are all located at Thetford Mines, Thetford Township, Megantic County (A. Sabina, private communication).

31 F/10 Sky blue calcite crystals have been reported from Calumet Falls in Litchfield Township, Pontiac County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 51).

31 F/15 Salmon pink calcite is found to occur with apatite and diopside crystals and purple fluorite in a skarn zone at the property of Yates Uranium Mines Ltd. This property is located north of Otter Lake, in lots 19 and 20, range IV, and lots 16 and 17, range V, Huddersfield Township, Pontiac County. Pink calcite containing stilbite and heulandite has been found in a pit about 1.2 km by road west of the camp (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, pp. 39-41).

31 G/9 Fetid calcite occurs with tourmaline in lot 10 range XI, Chatham Township, Argenteuil County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 51).

31 G/11 Fibrous calcite occurs at an apatite-mica deposit on lot 8, range IX, in Templeton Township, Papineau County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 51).

31 G/11 Pink calcite, mica, and green apatite occur in the Wallingford mica mine, on the north slope of a ridge in lot 16, range VIII, Templeton Township, Papineau County, southwest of Perkins Mills; at the Goldring Mine, lot 17, range IX, Templeton Township; and at the Victoria Mine, 4 km northwest of Perkins Mills (H.S. de Schmidt, 1912: Can. Dept. Mines, Mines Br. Publ., No. 118, pp. 70-78, 276-295).

31 G/12 The Nellie and Blanche Mine, located in Hull Township, lot 10, range II, 3.2 km southwest of Cantley village, contains salmon-coloured calcite with apatite, scapolite, diopside, and actinolite, in a pyroxenite dyke (D.D. Hogarth, 1962: Can. Field Nat., vol. 76, No. 1, p. 31).

Pink calcite occurs in the Lake Girard Mine on the south shore of Lac Girard, lot 24, range II, Wakefield Township, Gatineau County (D.D. Hogarth, private communication).

31 H/3 Grey, pink and green marbles occur at the quarry of Missisquoi-Lautz Co. Ltd., 1.2 km north of the village of Phillipsburg, on Missisquoi Bay of Lake Champlain, Missisquoi County. The grey marble is mottled, traversed by dark green irregular lines, and blotched with yellow-green. The 'Emeraldo' variety is a grey marble with a high proportion of yellowish green to deep sea green patches. The 'vert Rose' variety consists of a white and green matrix with mottled white and rose-coloured clouds up to 5 cm in diameter (W.A. Parks, 1914: Can. Dept. Mines, Mines Br. Publ., 279, pp. 212-225).

31 H/8 Several varieties of marble are mined at the quarry of Dominion Marble Co., among them dark and light 'Jaune royal', dark and light 'Rose royal', 'vert royal', 'Royal veined white' and 'Royal Dominion blue'. The quarry is located 2 km north of the village of South Stukely, Stukely Township, Shefford County.

Fine-grained red and green marble are found at the quarry of the Orford Marble Co., on the east side of Bowker Lake, Orford Township, Sherbrooke County. The red variety is traversed by white calcite veinlets. Crystals of green calcite occur in the crystalline limestone (W.A. Parks, 1914: Can. Dept. Mines, Mines Br. Publ., 279, pp. 203-211).

Iceland spar occurs on lot 6, range XII of Orford Township, Sherbrooke County (National Mineral Collection).

31 K/1 Pale salmon pink calcite is found in the Father Guay Mine, 6 miles northeast of Gracefield, lot 6, range A, Wright Township, Gatineau County. Pink calcite is found with apatite and mica at the Chaibee Mine, lot 6, range A, Wright Township, Gatineau County (H.S. de Schmidt, 1912: Can. Dept. Mines, Mines Br. Publ., 118, pp. 123-124, 296).

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The following occurrences of fluorescent calcite in the Eastern Townships and along the south shore of the St. Lawrence River are noted by Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51.

21 E/14 In veins cutting chloritic schist at road-cuts on the north side of Highway 34 at points 10.9 and 11.7 km east of its junction with Highway 1; and at the Cupra Mine, 2.6 km south of Highway 34 at Km 12.4 (p. 40,41).

22 A/2 As veins cutting limestone and shale at several rock-cuts along Highway 6 at Port Daniel (p. 92).

22 A/4 As veins in limestone along the Black Cape shoreline, near New Richmond (p. 97).

22 A/7 In quartz-calcite lenses cutting quartzite and slate along the shoreline at Chandler (p. 89).

22 A/9 In marble pebbles along the beach from Corner of the Beach to Nouville (p. 84).

22 A/16 As veins cutting limestone at the Little Gaspé lead mine and at road cuts along Highway 6 between Little Gaspé and Cape Gaspé lighthouse, and along the shoreline at Cap-des-Rosiers lighthouse (p. 78, 79).

22 B/2 In fractures and cavities in volcanic rocks at a quarry adjacent to Highway 6 at a point 1.1 km west of the junction road to Cross Point (p. 100).

22 B/16 With epidote in blocks of amphibolite along the side of the Trans-Gaspésien highway about 4 km from Ste-Anne-des-Monts (p. 72).

22 C/3 On the south side of Highway 10 at a point 2.4 km west of Trois-Pistoles, as veins in limestone (p. 68).

22 G/2 As veins in grey limestone blocks along the shoreline adjacent to Highway 6 at Capucins (p. 71).

31 H/10 In limestone at the Acton Mine, at Acton Vale, 38.6 km from Richmond (p. 25).

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The following occurrences of calcite are reported by Ann P. Sabina, 1968, in Geol. Surv. Can., Paper 67-51.

21 M/7 White, coarsely crystalline calcite that fluoresces yellow when exposed to "long" ultraviolet rays occurs at the Baie St-Paul lead occurrence (p. 94).

21 M/10 Vugs in the ore at the St. Urbain Titanium Mines are partly filled with pyrite, limonite, hematite and with pale green chlorite, pinkish

white zeolites and calcite crystals. White crystalline calcite fluoresces bright pink when exposed to ultraviolet rays (p. 96).

22 D/5 Colourless, crystalline calcite, which fluoresces pale yellow under "long" ultraviolet rays, occurs in cavities and veins at the Desbiens Quarry, south of Lake St. John (p. 116).

22 D/6 Calcite, forming unusual spherulitic growths with radial concentric interiors and measuring about 5 cm in diameter, occurs at the Plourde et Plourde Ste-Anne Quarry near Chicoutimi Nord. The spherulites are composed of a light brown calcite (massive) interior rimmed by blackish brown calcite crystals forming the exterior. Some spherulites have a nucleus of colourless quartz as well as crystals of quartz on the exterior. The spherulites form aggregates several inches across. The brown calcite fluoresces pale yellow under ultraviolet rays (p. 106).

Calcite occurs as colourless to white crystalline masses and as smoky brown crystal aggregates at the Pic Quarry near Chicoutimi Nord (p. 107).

31 G/5 At the Canada Cement Quarry located north of Hull, calcite occurs as colourless to white crystal aggregates (tabular, scalenohedral, and rhombohedral) lining fractures in the limestone. It fluoresces deep yellow when exposed to ultraviolet rays (p. 11).

31 G/9 Greenish white crystalline calcite found at the St. Lawrence Columbium and Metals Corporation Mine, near Oka, fluoresces very bright pink under the "short" ultraviolet rays and reddish pink under the "long" rays (p. 62).

31 G/12 Colourless platy calcite occurs at the Sweeney Mine near Meach Lake (p. 40).

31 H/11 Cavities in grey limestones are commonly lined with white calcite rhombs (about 2 cm across) and colourless dogtooth spar. The occurrence is in the Goyer Quarry, north of St-Bruno, west of St-Bruno Mountain (p. 54).

31 H/11 White massive calcite containing cavities lined with dogtooth spar occurs with crystalline pyrite in veins up to 5 cm wide at the Dulude Quarry north of St-Bruno (p. 55).

31 H/12 Calcite occurs as colourless to transparent yellow crystals in cavities at the Miron Quarry, Montreal Island (p. 68).

31 I/9 At the St-Marc-des-Carrières Quarries colourless to white or grey coarsely crystalline calcite that fluoresces pale yellow when exposed to ultraviolet rays is associated with massive and bladed barite (p. 87).

31 I/10 White calcite veins measuring about 2 km wide cut the gneiss at the Grand'Mère Quarry. The calcite fluoresces bright pink when exposed to ultraviolet rays (p. 83).

31 I/15 An attractive marble composed of bright salmon-pink calcite with blotches, bands and/or streaks of yellow-green to dark green serpentine is found in the Ste-Thècle Marble Quarry. Another variety is composed of white calcite with patches of pink calcite (p. 85).

31 J/4 Cavities in calcite at the Parker Mine near Notre-Dame-du-Laus are lined with clear quartz crystals (about 6 mm across) and with tiny calcite crystals (dogtooth spar). The cavities are 2 to 5 cm in diameter (p. 48).

32 A/8 Colourless to white crystals and crystalline aggregates of calcite occur in veins and cavities in limestone in road-cuts on Highway 55 on the southern shore of Lake St. John (p. 115).

32 A/9 Colourless to white calcite crystals (dogtooth spar) occur in veins and small cavities in limestone at the Roberval Quarries. They fluoresce pale yellow when exposed to ultraviolet rays (p. 113).

32 A/16 The deposit at the Les Calcites du Nord Quarry north of Dolbeau consists of coarsely crystalline calcite, predominantly white but banded locally in shades of pink, yellow, green or grey. An attractive pink to rose-coloured variety is also present in small amounts (p. 111).

Saskatchewan

63 K/12 An occurrence of massive calcite which fluoresces and phosphoresces yellow when exposed to ultraviolet rays is reported at the Henning Maloney Mine, 6.9 km south of Creighton (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 24).

CALEDONITE

$$Cu_2Pb_5(SO_4)_3CO_3(OH)_6$$

British Columbia

82 F/3 Caledonite occurs sparingly with linarite in greenish druses on the Beaver claim group at Beaver Mountain in the Slocan district (Unknown, 1921: Univ. Toronto Stud. Geol. Ser., 12, p. 69).

82 N/1 Caledonite has been reported from the Ice and Beaverfoot rivers in the Golden mining division (J.A. Allan, 1910: Geol. Surv. Can., Summ. Rept., p. 139).

camsellite

(see SZAJBELYITE)

CANCRINITE

$$(Na,K,Ca,Al)_{6-8}Al_6Si_6O_{24}(SO_4,CO_3)_{1-2}.1\text{-}5H_2O$$

Ontario

31 C/12 Fine amber yellow cancrinite occurs in Methuen Township in the quarries of the American Nepheline Corporation. X-ray study of a fragment gave unit cell constants a = 12.60, c = 5.12. Chemical analysis by R. Phoenix: SiO_2 33.98, Al_2O_3 29.11, Na_2O 18.69, K_2O 0.64, CaO 4.80, CO_2 7.00, SO_3 1.37, Cl 0.42, H_2O^+ 4.34, H_2O^- 0.23, total 100.58 less O for Cl_2 0.10 = 100.48; S.C. 2.420, 2.423 (R. Phoenix and E.W. Nuffield, 1949: Am. Mineralogist, 34, p. 452).

31 C/12 The mineral collection of the Royal Ontario Museum includes specimens of cancrinite from the Craig quarry of Indusmin Limited on lot 19, conc. VI; and the International Minerals quarry on lot 20, conc. VI, Methuen Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 91).

31 D/16 A specimen in the mineral collection of the Royal Ontario Museum was collected near

Gooderham, Glamorgan Township (J. Satterly, 1977: Ont. Geol. Surv., MP p. 91).

31 F/4 Cancrinite occurs as an alteration product of nepheline in the nepheline-bearing rocks of Dungannon Township near Egan Chute. It is found as an opaque white zone surrounding crystals of nepheline and is in turn surrounded by zones of fine-grained pink and green material, respectively (L. Moyd, 1949: Am. Mineralogist, 34, p. 747).

Irregular veins of cancrinite from 2.5 to 10 cm wide cut nepheline in a quarry near Bancroft. Chemical analysis by V.B. Meen: SiO_2 35.38, Al_2O_3 28..42, CaO 11.66, Na_2O 9.82, K_2O 1.23, CO_2 6.18, H_2O^+ 6.39, H_2O^- 0.60, Cl 0.08, SO_3 0.19, total 99.95; S.G. 2.476 (V.B. Meen, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 35).

31 F/4 Cancrinite occurs in a skarn zone at a contact between marble and nepheline syenite on the east side of the York River, 180 m north of the Bancroft to Hermon road. Chemical analysis by J.C. DeVine and J.B. Bodkin: SiO_2 34.16, TiO_2 0.011, Al_2O_3 28.75, FeO <0.01, Fe_2O_3 <0.01, MgO <0.01, CaO 10.10, Na_2O 16.02, K_2O 0.14, H_2O^+ 3.43, H_2O^- 0.12, SO_3 <0.01, Cl 0.12, CO_2 6.70, F_2 0.02, less O for Cl 0.03, total 99.54. Cancrinite also occurs in nepheline syenite pegmatite at the Davis quarry. Chemical analysis by J.C. DeVine and J.B. Bodkin: SiO_2 35.38, Al_2O_3 28.42, CaO 11.66, Na_2O 9.82, K_2O 1.23, H_2O^+ 6.39, H_2O^- 0.60, SO_3 0.19, Cl 0.08, CO_2 6.18, total 99.95 (F.F. Foit Jr., D.R. Peacor and E.W. Heinrich, 1973: Can. Mineralogist, 11, p. 940).

31 F/6 Small patches of cancrinite and sodalite are reported in nepheline pegmatite on the Gutz farm near Rosenthal in Brudenell Township (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 40).

41 I/2 Cancrinite forms yellow masses in the central portions of pegmatite dykes in Bigwood Township. The dykes occur in a north-south belt about 8 km long and 400 m wide with its south end exposed along the French River. Associated minerals are: sodalite, plagioclase, microcline, apatite, magnetite, lepidomelane, molybdenite, and pyrrhotite. Chemical analysis by H.C. Rickaby: SiO_2 36.24, CO_2 5.61, Al_2O_3 28.78, Fe_2O_3 0.36, CaO 4.83, MgO 0.26, MnO 0.04, Na_2O 18.63, K_2O 0.73, H_2O 4.64, Cl trace, total 100.12; S.G. = 2.425. It is said to have possibilities as a gemstone (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 8) (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 19).

Quebec

31 H/6 Cancrinite occurs in Beloeil Township, Rouville County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 26 T) B.J. Harrington, 1882-83: Trans. Royal Soc. Canada, vol. I, sec. III, p. 81).

31 H/11 Cancrinite is a constituent of the nepheline syenite at the Desourdy Quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 I/14 Thin sections made from specimens obtained from the Metawishish River in the Albanel area contain up to 5 per cent cancrinite. It occurs as poikilitic intergrowths with nepheline and as grains interstitial to the feldspars. Associated minerals are orthoclase, albite, and biotite (James Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 14).

CANFIELDITE

Ag_8SnS_6

British Columbia

82 N/4 Tellurium-bearing canfieldite occurs as small inclusions in galena in a specimen of lead-zinc-silver ore from a prospect located 30.5 km northeast of Revelstoke. Electron microprobe analysis (average of four): Ag 65.12, Sn 10.57, Te 8.69, S 13.95, total 98.33 (D.C. Harris and D.R. Owens, 1971: Can. Mineralogist, 10, p. 895).

New Brunswick

21 P/12 Canfieldite is reported to occur as inclusions in galena specimens from the Nigadoo property in Gloucester County. Neither X-ray powder data nor chemical analysis are cited to confirm the identification (R.S. Boorman, 1968: New Brunswick Res. Prod. Council, Res. Note 11).

CARBOCERNAITE

$(Ca,Sr,RE)_4(CO_3)_4F$

Ontario

52 G/15 Carbocernaite occurs as distinct layers and clusters in an albite-biotite-calcite carbonatite on the east side of Sturgeon Narrows in the Thunder Bay district about 110 km southeast of Sioux Lookout. Chemical analysis of a concentrate containing an estimated 3 to 5 per cent impurities (fluorite, pyrite and calcite): CaO 19.59, SrO 21.05, Fe_2O_3 2.47, RE_2O_3 20.00, CO_3 28.82, F 3.60, Cl 0.08, insol. 2.87, total 98.48. The RE content is as follows:

La_2O_3 27.87, CeO_2 52.60, Pr_2O_3 4.81, Nd_2O_3 13.66, Sm_2O_3 0.46, Eu_2O_3 0.30, Gd_2O_3 0.10, Tb_2O_3 0.10, Dy_2O_3 0.10, total 100.00 (D.C. Harris, 1972: Can. Mineralogist, 11, p. 812).

CARBONATE-CYANOTRICHITE

$Cu_4Al_2(CO_3,SO_4)(OH)_{12}.2H_2O$

Saskatchewan

73 P/7 Bright blue carbonate-cyanotrichite occurs with malachite and brochantite coating host rocks at the Eureka deposit, located on a peninsula at the southern end of Heyer Bay, MacKay Lake, about 63 km northeast of LaRonge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 7).

CARLETONITE

$KNa_4Ca_4Si_8O_{18}(CO_3)_4(F,OH).H_2O$

Quebec

31 H/11 The new mineral carletonite, named after Carleton University, Ottawa, occurs mainly with pectolite, albite, arfvedsonite, calcite, fluorite and apophyllite in nepheline syenite at Mont St. Hilaire. Chemical analyses of pink and blue varieties, respectively, gave: SiO_2

44.9, 44.7; TiO_2 tr, tr; Al_2O_3 0.5, 0.6; MgO 0.09, 0.13; CaO 19.92, 19.97; Na_2O 10.23, 10.64; K_2O 3.28, 3.31; CO_2^-, 15.2; < 0.70, 0.73; H_2O^- 0.70, 0.63; H_2O^+ -, 3.51; LOI 19.92, -; sum 100.24, 99,42; less O for F_2 0.29, 0.30; total 99.95, 99.12 (G.Y. Chao, 1971: Am. Mineralogist, 56, p. 1855).

Carnelian

(see QUARTZ)

CARNOTITE

$K_2(UO_2)_2(VO_4)_2.3H_2O$

British Columbia

92 K/3
92 K/6 While examining copper deposits in the vicinity of Gowland Harbour, Quadra Island, Mr. Crowe-Swords of Vancouver noticed a soft greenish yellow material occurring in small fissures in the rocks. The material was subsequently identified as carnotite at the University of British Columbia. Chemical analyses: I, by Archibald, Univ. British Columbia: SiO_2 17.54, U_3O_8 27.70, V_2O_3 19.00, Fe_2O_3 22.00, CaO 4.5, Na_2O 2.2, K_2O 3.2, H_2O 5.0, total 101.14; II, by Mines Br., Ottawa: SiO_2 10.6, U_3O_8 28.9, V_2O_3 21.1, Fe_2O_3 2.9, H_2O 4.9, total 68.4. Carnotite has also been reported on the surface and in fractures of amygdaloidal flows of the Valdes formation northwest of the north end of Gowland Harbour (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 139).

Identification of the material as carnotite appears to have been based on colour and apparent high content of uranium and vanadium. The chemical analyses, however, do not correspond with carnotite and, lacking confirmation by X-ray diffraction, the identification must be viewed with suspicion. Subsequent study of the area by J.L. Jambor (M.Sc. Thesis; Univ. British Columbia, 1960) has shown that vanadium-bearing minerals are abundant, but no radioactive materials were found and no significant amounts of uranium are present in the rocks of the area. The above evidence suggests that the reported occurrences of carnotite on Quadra Island are not valid.

CARROLLITE

$CuCo_2S$

Ontario

42 A/11 The cobalt minerals carrollite, cobaltite and cattierite are present in a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine. An electron microprobe analysis of the carrollite gave: Cu 12.0, Fe 0.6, Ni 2.1, Co 40.0, As 0.15, Se 3.8, S 41.2, total 99.85. The mine is 25.7 km north of Highway 101, via Highway 655. (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

Quebec

32 C/4 Carrollite was identified by X-ray powder pattern in a sample from Siscoe Gold Mines (E.W. Nuffield and D.H. Gorman, 1960: private communication).

CASSITERITE

SnO_2

British Columbia

82 F/16 Cassiterite and scheelite have been found in small quartz veins and in float and soil samples on the crest and slopes of Rusty Ridge at the head of a north tributary of Skookumchuck Creek at about 49°57'N, 116°15'W (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 87).

82 K/13 Cassiterite and scheelite were found in the Incomappleux River, at the mouth of McDougall Creek and at the junction of the third creek flowing into McDougall Creek from the west. (J.S. Stevenson, 1943: British Columbia Dept. Mines, Bull. 10, p. 131).

82 G/12
82 N/4 Cassiterite is a minor constituent of the lead-zinc sulphide ores at the Sullivan Mine, Kimberley (G/12), and the Snowflake-Regal Silver Mine, near the headwaters of Clabon Creek, Revelstoke (N/4). (R. Mulligan, 1966: Geol. Surv. Can., Paper 64-54, p. 16).

104 N/11 Ruby Creek, 27 km east of Atlin has cut a deep narrow canyon through a basalt flow exposing buried stream gravels in which cassiterite is found as a placer mineral. Other minerals identified in the black sand are: wolframite, magnetite, zircon, brookite, gold, copper, bismuth, ilmenite, rutile, chalcopyrite, pyrite, pyrope, quartz, feldspar, biotite, muscovite, chrysotile, amalgam, and mercury. The cassiterite is believed to have originated in the ultrabasic rocks in the upper reaches of the creek (T.L. Gledhill, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 40).

104 P/5 Cassiterite has been won from a placer deposit on the Wing property, Quartz Creek, at 59°16'N, 129°41'W. (R. Mulligan, 1966: Geol. Surv. Can., Paper 64-54, p. 15).

Manitoba

52 L/6 A few grains and lumps of cassiterite have been found on the Bear mineral claim, 4.8 km southeast of Lamprey Falls on the Winnipeg River (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 157).

52 L/6 Cassiterite occurs in a pegmatite dyke with quartz, albite, tourmaline, biotite and mica in the Shatford-Ryerson Lake area of Manitoba. The dyke follows the contact of a basalt and a garnetiferous band lying between the basalt and a silicified rock. It is located on a small reef near the east end of Shatford Lake (J.F. Davies, 1957: Manitoba Mines Br., 56-1, p. 16).

52 L/6 The Annie claim, 375 m north northwest of the Huron deposit and 600 m northeast of the Silverleaf deposit, about 1.6 km south of the Winnipeg River at a point 7.6 km east of Lamprey Falls, was formerly worked for cassiterite (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 53).

52 L/6 Albitite dykes carrying cassiterite have been investigated north of Rush Lake, about 3 km northeast of Bernic Lake. (J.D. Bateman, 1943: Can. Mining Jour., 64, p. 273-278).

52 L/6 The beryl-bearing pegmatites near Greer Lake contain some cassiterite (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

52 L/6 Cassiterite is present in the Tanco pegmatite at Bernic Lake. It is usually associated with

tantalite (J.D. Grice, P. Černý and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 634).

53 K/4 Cassiterite occurs with minor topaz in albitite dykes on the Tin Bar group of claims on the north shore of Red Sucker Lake in the Island Lake Mining District (J.D. Bateman, 1943: Can. Mining Jour., 64, p. 273-278).

New Brunswick

21 G/7 The largest concentration of tin in the province is at Mount Pleasant, Charlotte County, where cassiterite and stannite occur with sulphides of Cu, Zn, Pb, Mo, Bi and W in acidic volcanic rocks (A.A. Ruitenberg, 1963: M.Sc. Thesis, Univ. New Brunswick). Cassiterite has also been found at Kedron Brook in quartz veins, with associated sphalerite, pyrite, galena and chalcopyrite (W.M. Tupper, 1959: New Brunswick Mines Br., P.M. 59-2).

21 G/8 A quartz-greisen deposit containing minor cassiterite with wolframite, molybdenite and fluorite occurs at Square Lake in Queens County (R. Mulligan, 1966: Geol. Surv. Can., Paper 65-54, p. 18).

21 J/10 Quartz veins carrying cassiterite, topaz, molybdenite, wolframite, chalcopyrite, pyrrhotite, pyrite, arsenopyrite and fluorite have been found at Burnt Hill Brook, York County (W.J. Wright, 1940: New Brunswick Mines Br., Paper 40-2).

21 P/5 Cassiterite and stannite are minor constituents of the massive sulphide ore bodies in the Bathurst mining camp, notably at Brunswick No. 6 and No. 12 and Portage River (A.L. McAllister, 1959: New Brunswick Mines Br., reproduction of Can. Inst. Mining Met., Bull.).

21 P/5 Inclusions of cassiterite within silicate gangue minerals have been found in specimens from the Captain deposit on the headwaters of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland Counties, about 14 km east of Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can., Paper 66-18, p. 12).

Northwest Territories

85 I/1 The Tan claims are located on four zoned pegmatite dykes grouped around a small lake about 800 m east of the southeast corner of Blatchford Lake. The dykes carry spodumene, amblygonite, cassiterite and tantalite-columbite (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 15).

85 I/1 Grains of cassiterite and columbite-tantalite up to 2.5 cm across occur in muscovite segregations and quartz at the boundaries of large spodumene crystals in the Best Bet pegmatite on the west side of Drever Lake. Similar pegmatites occur 8 km to the south and southeast near the shore of Hearne Channel at the Big Hill and Moose properties (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 96).

85 I/2 Minor cassiterite occurs with local concentrations of fluorite and abundant tourmaline in a pegmatite dyke at the Stannum Group, at 62°10'N, 112°41'W, north of Blatchford Lake (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 97).

85 I/11 Noteworthy amounts of cassiterite have been reported in pegmatities that extend for a distance of some 500 m southeast of Sproule Lake. Other minerals present include beryl, spodumene, amblygonite, lithiophilite and tantalite-columbite (R. Mulligan, 1960: Geol. Surv. Can., Paper 60-21, p. 14).

85 I/11 A pegmatite containing fine grains and aggregates of cassiterite up to 4 cm long is exposed on the Freda claim at Thompson Lake. Amblygonite, beryl and columbite-tantalite are also present (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 96).

Nova Scotia

11 D/15 Cassiterite has been reported to occur in sand at Tangier in Halifax County.

11 F/4 It has also been noted at Country Harbour in Guysborough County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 53).

21 A/9 Small quantities of cassiterite have been found in pegmatite veins in Lunenburg County near lake Ramsay, and elsewhere in the parish of New Ross (E.R. Faribault, 1907: Geol. Surv. Can., Summ. Rept., pp. 80, 81).

Ontario

41 I/6 Minute crystals of cassiterite have been noted with sperrylite in the Vermilion Mine in Denison Township, conc. IV, lots 5 and 6, in the Sudbury district (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 26 T).

42 A/11 Disseminated fine-grained cassiterite is a constituent of the Kidd Creek deposit of Ecstall Mining Limited in the northeast part of Kidd Township about 24 km north of Timmins. This deposit is expected to be the most important tin producer in North America (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 106).

42 F/4 The massive sulphide orebodies of the Geco and Willroy Mines in the Manitouwadge area contain minor cassiterite (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 103).

52 I/10 The first discovery of major amounts of tin in Ontario was the finding of cassiterite in felsite dykes near the east end of Linklater Lake in 1948. Beryl occurs in the same area (E.O. Chisholm, 1948: Ont. Dept. Mines, PR 1948-11).

52 L/16 Cassiterite has been identified as a minor constituent of a massive base-metal sulphide ore from a deposit in Mulcahy Township about 32 km west of Red Lake and 1,200 m south-southwest of the south end of Trout Bay (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 234).

52 N/2 The South Bay Mines property in the southeast corner of Dent Township about 80 km east of Red Lake is a stratiform massive pyrite-sphalerite-chalcopyrite deposit. Disseminated cassiterite is present in the ore (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 101).

Quebec

31 G/11
31 G/14 Microscopic grains of cassiterite have been observed with rutile in samples taken from the more micaceous portions of the gneiss in the graphite area of Buckingham Township, ranges VII and VIII, lots 18 to 28 (A. Osann, 1899: Geol. Surv. Can., Ann. Rept., XII, 72-0).

Yukon

105 B/1 Cassiterite is a constituent of vuggy quartz veins containing wolframite, scheelite, galena and fluorite at the Fiddler (Yukon Tungsten) property at 60°08'N, 130°26'W, located on a ridge north of Boulder Creek, at an elevation of 1,550 m, that may be reached by a secondary road about 9 km long that leaves the Alaska Highway just west of the Boulder Creek bridge at km 1129 (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 80).

105 M/10
105 M/14 Cassiterite has been found in placers on Ledge Creek at the southeast arm of Mayo Lake, and Thunder Gulch, Keno Hill (R. Mulligan, 1966: Geol. Surv. Can., Paper 65-54, p. 14).

105 M/14 Cassiterite has been found in gold placer operations on Davidson and Duncan Creeks (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, Table 1).

106 D/4 Cassiterite has been found west of Haggart Creek, a tributary of the McQuesten River, in the Mayo mining district (R.M. Thompson, 1945: Econ. Geol., 40. p. 142-147).

The mineral also occurs in abundance in the gold placers of the Dublin Gulch area in the Mayo mining district.

115 G/6 Cassiterite occurs in placers on Burwash Creek (R. Mulligan, 1966: Geol. Surv. Can., Paper 64-54, p. 14).

115 J/15 Pebbles of cassiterite have been noted in Canadian Creek (National Mineral Collection).

115 O/10 Fragments of wood tin make up 25 per cent of some non-magnetic heavy mineral fractions of concentrates from the tin-rich parts of Dominion and Sulphur Creeks (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 68).

115 P/13
115 P/14 Placer operations on Clear Creek have encountered tin-rich sections which have yielded up to 45 kg of cassiterite concentrates per day.

115 P/15 Sluice boxes on Arizona Creek and also down Drapeau and Kobe Creeks are reported to have yielded much cassiterite. Cassiterite concentrates have also been obtained on May, Boulder and Sunshine Creeks.

115 P/16 Abundant cassiterite has been found in placers on Highet and Secret Creeks (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, Table 1).

116 B/3 Irregularly shaped pebbles of cassiterite have been found in the auriferous gravels of Bonanza and Hunker Creeks and from claim 26 on Last Chance Creek (G.C. Hofffmann, 1889: Geol. Surv. Can., Ann. Rept., XII, p. 16 R).

CATAPLEIITE

$(Na_2,Ca)ZrSi_3O_9.2H_2O$

Quebec

31 H/11 This rare hydrous sodium-zirconium silicate has been found in pegmatitic veins and vugs in the nepheline syenite of the Desourdy Quarry on the north-northeast slope of Mont St-Hilaire (G.B. Pendlebury, 1964: Can. Mineral., 8, p. 120).

31 H/12 At the Miron quarry, Jarry Street at Papineau Avenue, Montreal, dykes and sills which intrude limestone contain brown and orange lamellar catapleiite in white potash feldspar (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 253).

CATTIERITE

CoS_2

Ontario

42 A/11 Cattierite is a rare constituent of the ore in a bornite-rich zone on the 1200 level of the Kidd Creek Mine. An electron microprobe analysis shows the mineral to be a ferroan variety: Cu 0.6, Fe 15.7, Ni 0.4, Co 29.0, As 6.1, S 47.3, total 99.1. The mine is located north of Timmins, 25.7 km north of Highway 101, via Highway 655 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

CAYSICHITE

$(Y,Ca)_4Si_4O_{10}(CO_3)_3.4H_2O$

Quebec

31 G/12 The new mineral caysichite occurs as coatings and crusts on granite pegmatite at the abandoned Evans-Lou feldspar mine near St-Pierre-de-Wakefield about 35 km north of Ottawa. Chemical analysis: CaO 10.04, Y_2O_3 28.18, La_2O_3 0.08, CeO_2 0.24, Pr_2O_3 0.09, Nd_2O 0.30, Sm_2O_3 0.20, Eu_2O_3 0.09, Gd_2O_3 0.51, Tb_2O_3 0.16, Dy_2O_3 1.16, Ho_2O_3 0.66, Er_2O_3 1.84, Tm_2O_3 0.21, Yb_2O_3 2.12, Lu_2O_3 0.42, SiO_2 28.84, Al_2O_3 0.58, CO_2 15.7, H_2O 8.6, total 100.02 (D.H. Hogarth, G.Y. Chao, A.G. Plant and H.R. Steacy, 1974: Can. Mineralogist, 12, p. 293).

CELADONITE

near $KMg_3Fe_3Si_9O_{25}(OH)_2.9H_2O$

Northwest Territories

87 H/2 Celadonite occurs as bluish green earthy coatings in amygdules and on the surface of specimens of amygdaloidal basalt from the Minto River Canyon, 71°15'N, 113°30'W, on Victoria Island (Collector: R.L. Christie). Identification was made by X-ray powder pattern. A similar specimen from Axel Heiberg Island was also proved to contain celadonite (X-ray Laboratory, Geol. Surv. Can.).

Nova Scotia

21 H/8 Zeolite specimens, some measuring several cm across and usually coated with green celadonite can be found in cavities in the rock or as loose fragments along the beaches from Cape Blomidon to Cape Split, Kings County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 38).

CELESTINE

$SrSO_4$

In 1966, the Commission on New Minerals and Mineral Names, of the International Mineralogical Association recommended use of the name celestine in preference to the synonym, celestite.

British Columbia

82 M/12 The Rexspar property is 4.8 km south of Birch Island station, on the main line of Canadian

National Railways about 129 km north of Kamloops. In 1942, more than one million tonnes of material reported to contain 20 per cent fluorite and 15 per cent celestine were outlined by diamond-drilling and bulk sampling (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd Ed., p. 205-6).

Newfoundland

12 B/10 Crystalline aggregates of celestine occur with barite, calcite, and aragonite at Gillanis Cove, about 800 m west of Aguathuna. At the settlement of Boswarlos, 800 m southwest of the mouth of Hoopers Brook, celestine occurs as:

(a) intergrowths of blue granular celestine in an aragonite groundmass,
(b) large lenticles of friable, coarsely crystalline, blue celestine in a buff muddy limestone,
(c) large rounded crystal masses of celestine with sugary white or pink massive barite,
(d) intergrowths of finely crystallized celestine and barite,
(e) filling vugs in thinly bedded limestone.

(Helgi Johnson, 1954: Geol. Surv. Can., Bull. 27, p. 13)

Nova Scotia

11 E/13 Coarsely-crystalline, translucent, pale blue celestine occurs with minor fine-grained patches of galena in red sandstone and shale on the north side of Dickson Brook, on the C. Tower Farm (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 56).

11 K/1 A bluish grey, granular massive variety of celestine has been observed in a bed, 30 cm thick, in the carboniferous limestone on the right bank of the Sydney River, about 2.4 km above Sydney Bridge, Cape Breton County (G.C. Hoffmann, 1892: Geol. Surv. Can., Ann. Rept., VI, p. 25 R).

21 H/1 Blue-grey, transparent, fibrous bundles of celestine protrude through the weathered surfaces of fibrous gypsum. It is associated with gypsum, anhydrite, calcite, fluorite and danburite along limestone cliffs northeast of the wharf at Cheverie (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 54).

Ontario

30 M/5 Celestine specimens in the mineral collection of the Royal Ontario Museum are from the Dundas South quarry, lots 10 and 11, conc. II, and the Dundas North quarry, lots 10 and 11, conc. III, West Flamborough Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 95-6).

30 M/12 Celestine occurs at the Fleming quarry on lot 26, conc. X, Esquesing Township, Halton County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 53).

30 M/13 A red variety of celestine occurs in cavities in dolomite at Credit Forks, Caledon Township, Peel County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 26 T).

30 M/13 The Royal Ontario Museum mineral collection contains a specimen of celestine from the Walker Bros. quarry, lot 2, conc. IIIW, Caledon Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 95).

31 C/1 The Trenton limestone near Kingston contains white, translucent, foliated masses of celestine (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 26 T).

31 C/6 North of the town of Belleville, in the Madoc area, tabular crystals and fibrous aggregates of celestine up to 1 m or more in diameter occur in veins. Fluorite is asociated with the celestine (W.M. Fairbairn, 1929: Am. Mineralogist, 14, p. 296).

31 C/6 Celestine specimens in the mineral collection of the Royal Ontario Museum are from: the Bailey Mine, lot 1, conc. IV, Madoc Township; and the Noyes Mines, lot 13, conc. XII, Huntingdon Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 94).

31 C/7 Well formed crystals of celestine are found as segregations or nodular masses in the Paleozoic limestones in the vicinity of Verona, and at the Frontenac lead mine north of Kingston (W.M. Fairbairn, 1929: Am. Mineralogist, 14, p. 286).

31 C/9 Celestine, associated with calcite and galena occurs in abundance on lot 2, conc. VIII, Lansdowne Township, Leeds County. Chemical analysis by Johnston: SO_3 43.51, SrO 56.31, BaO trace, CaO 0.11, total 99.93; S.G. 3.958 (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 9-10 R).

An occurrence of celestine has been reported at Lyndhurst on the Brockville-Westport branch of the Canadian National railway (W.M. Fairbairn, 1929: Am. Mineralogist, 14, p. 286).

31 C/10 Celestine has been found in lot 5, conc. XII, of Loughborough Township in Frontenac County (R.L. Broadbent, 1907: National Mineral Collection).

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The following occurrences of celestine, with directions as to how to reach them, are noted by Ann P. Sabina, 1968: in Geol. Surv. Can., Paper 67-51.

31 B/14 McFarland's Williamsburg Quarry, located about 2 km east of Williamsburg on Highway 31, contains celestine as bluish white radiating fibrous aggregates (up to 5 cm across), associated with calcite (p. 51).

31 C/7 Celestine occurs as colourless to white radiating fibres on calcite crystals in cavities at the Kingston Township Quarry located nearby and to the southeast of the junction of Highway 401 and 38 (p. 6).

31 C/7 Radiating tabular or acicular aggregates of celestine are found in a limestone quarry about 21 km north of Kingston on the west side of Highway 38 near Murvale. The celestine is colourless, snow-white or transparent, and occurs commonly as patches on calcite veins about 2.5 cm wide or as masses in limestone about 15 cm across (p. 8).

31 C/7 Sky-blue celestine crystals (up to 5 cm long) together with marcasite have been reported to line cavities in calcite at the Frontenac (Frontenac Draper Lake) lead mine. The mine is located about 27 km north of Kingston along the kingston-Westport-Perth Road (p. 24).

31 C/8 Colourless to white, elongated tabular aggregates of celestine occur on calcite crystals (dogtooth spar) filling cavities in

limestone at the McGinnis and O'Connor Quarry north of Kingston on Highway 15 (p. 41).

31 C/16 Celestine is reported in an apatite-mica deposit at the Rogers Mine. It occurs as platy aggregates at the contact of gneiss and pyroxenite. The deposit is located near Noble Bay of Rideau Lake about 18 km south of Perth (p. 31).

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31 F/4 The X-ray Laboratory of the Geological Survey of Canada has identified celestine from the property of Faraday Uranium Mines Ltd., in Hastings County, Faraday Township, conc. XI, lots 16 and 17.

31 F/7 Slab-like masses of celestine enclosed in brown dolomite occur on the Kingston-Pembroke branch of the Canadian Pacific railway near Calabogie. The strontium sulphate is believed to have been deposited from ascending solutions related to intrusions of diabase (W.M. Fairbairn, 1929: Am. Mineralogist, 14, p. 286).

31 F/7 A milk white, columnar variety of celestine occurs in lot 7, conc. X, Bagot Township, Renfrew County. Chemical analysis by Johnston: SO_3 42.09, SrO 48.30, BaO 9.44, CaO trace, total 99.83; S.G. 3.944 (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 9 R).

Chemical analysis by E.A. Thomson, $SrSO_4$ 78.50, $BaSO_4$ 18.61, $CaSO_4$ 0.73, total 97.84 (J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. III, p. 111).

31 F/8 Specimens of celestine from a vein in Fitzroy Township, lot 21, conc. VI, have been analyzed in the chemical laboratory of the Mines Branch, Ottawa. The results are as follows: $SrSO_4$ 93.00, $CaCO_3$ 1.30, Fe and Al oxides 0.85, total 95.15 (M.E. Wilson, 1924: Geol. Surv. Can., Mem. 136, p. 115).

31 G/5 At the Frazer Duntile Quarry near Ottawa, celestine forms silky white to buff coloured radiating fibrous aggregates that become friable on weathered surfaces (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 85).

31 G/10 An occurrence of celestine has been reported at Hawkesbury, West Hawkesbury Township, Prescott County (G.M. Dawson, 1900: Geol. Surv. Can., Ann. Rept., XIII, 174 A).

40 J/3 Crystals and crystal aggregates of celestine were recovered from an excavation in the bed of the Detroit River at Amherstburg in Essex County (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 347 A, 348 A).

40 J/3 The mineral collection of the Royal Ontario Museum includes celestine from Amherst Quarries Limited, lot 22, conc. II, Malden Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 94).

41 G/15
41 H/12 White to bluish translucent, radiating, columnar masses of celestine are known to occur in the Manitoulin district on the east side of Manitowaning Bay and in the neighbourhood of Cape Robert, Bayard Island and Drummond Island (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 19 R).

42 A/1 Celestine occurs as clusters of fine radiating needles in vugs in quartz veins at the Lake Shore Mine near Kirkland Lake (J.E. Hawley, 1948: Ont. Dept. Mines, Ann. Rept., vol. 57, Pt. V, p. 122).

CELSIAN

$BaAl_2Si_2O_8$

Yukon

106 B/1 Celsian has been identified in a sample of diabase dyke that cuts the lower Road River Formation at about 64°10'N, 130°21'W (X-ray Laboratory, Geol. Surv. Can., sample submitted by W.D. Goodfellow, 197)

cenosite

(see KAINOSITE)

centrallassite

(see GYROLITE)

cerargyrite

(see CHLORARGYRITE)

CERIANITE

CeO_2

A rare mineral, isostructural with uraninite and thorianite, described for the first time and named by A.R. Graham in 1955.

Ontario

41 O/14 The mineral was observed as tiny, translucent, dark greenish amber octahedrons in a suite of minerals concentrated from a sample of carbonate rock taken from a nephelinized hybrid gneiss on the claims of the Dominion Gulf Company in Lackner Township, Sudbury mining division. Spectrochemical analysis on a 2 mg sample of handpicked crystals by W.O. Taylor: CeO_2 80 ± 20, ThO_2 5.1 ± .05, Nb_2O_5 1.8 ± 0.2, La_2O_3 1.5 ± 0.2, Y_2O_3 1.2 ± .2, Yb_2O_3 1.1 ± 0.1, Ta_2O_5 0.6 ± 0.05, ZrO_2 0.6 ± 0.05, U_3O_8 N.D. Cell edge 5.42 + 0.01 Å (A.R. Graham, 1955: Am. Mineralogist, 40, p. 560).

CERINITE

aluminosilicate of calcium

Nova Scotia

21 H/2 The name cerinite was given by How to a mineral forming the outer layer of a nodule found near Black Rock. The other minerals comprising the nodule were gyrolite and 'cyanolite'. Chemical analysis of cerinite (How): SiO_2 58.13, Al_2O_3 12.21, Fe_2O_3 1.01, CaO 9.49, MgO 1.83, K_2O 0.37, H_2O 15.96, total 99.00 (H. How, 1859: Edin. New Phil. J., N.S., X, pp. 84-94; Phil. Mag., 1, 1876, p. 128).

According to Hey (1955) cerinite is probably impure gyrolite (M.H. Hey, 1955: Chemical Index of Minerals, 2nd edition).

CERITE

$(Ca,Mg,RE)_3Si_2(O,OH,F)_9$

Ontario

41 P/10 Cerite has been identified with abundant native silver in a single specimen from the Siscoe Mine, Miller Lake, Gowganda (J.L. Jambor, 1971: Can. Mineralogist, 11, p. 247).

Quebec

31 F/15 Microscopic grains of deep pink cerite occur in stilbite and calcite at the Yates uranium deposit in Huddersfield Township, about 4.8 km west of Sandy Creek and 16.5 km northwest of Otter Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 95).

CERUSSITE

$PbCO_3$

Cerussite is a secondary mineral found typically in the oxidized portions of lead ore deposits. It is isostructural with aragonite, witherite and strontianite but shows very little isomorphous substitution for Pb by other elements.

British Columbia

82 F/6 Cerussite occurs on the property of the Ymir Gold Mine in the Nelson mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 55).

82 F/9 Some cerussite is associated with the lead ores of the Donaldson and North Star mines in the Fort Steele mining division of British Columbia (G.M. Dawson, 1898: Geol. Surv. Can., Ann. Rept., XI, 166 T).

82 F/14
82 K/3 Cerussite is fairly common in the zones of oxidation of the lead ores of the Slocan mining camp (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 123).

82 G/5 The upper workings of the Society Girl Mine in the Rossland district expose an oxidized ore body consisting of cerussite, and pyromorphite (C.W. Drysdale, 1915: Geol. Surv. Can., Mem. 77, p. 127).

82 N/5 Oxidized lead-zinc ores, containing silver and gold, on the Waverley group located just north of Tangier Pass and accessible from Albert Canyon, consist of cerussite, anglesite, malachite and azurite with minor smithsonite and rare residual nodules of galena and argentian tetrahedrite (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

Newfoundland

2 E/12 Specimens on the dump of the abandoned Silverdale Mine are commonly coated with cerussite and anglesite. The mine is 1 km from Silverdale (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 114).

Ontario

31 C/7 Cerussite and hydrocerussite form greyish white coatings on sulphide ore at the Frontenac (Frontenac Draper Lake) lead mine. The sulphide ore consists essentially of galena and sphalerite. Chalcopyrite occurs in small amounts. The mine is located about 27 km north of Kingston along the Kingston-Westport-Perth Road. (Ann P. Sabina, 1968: Geol. Surv. Can., 67-51, p. 24.)

Quebec

22 A/16 Cerussite and hydrocerussite form a soft cream-white encrustation on galena at the Little Gaspé lead mine located 6.9 km east of Highway 6 on the road to Cape Gaspé. The crust fluoresces yellow under ultraviolet rays (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 78).

Yukon

105 P/14 Abundant smithsonite occurs with barite, cerussite and hydrozincite in a fault zone at the ART-KEW1 property at 63°51'N, 129°12'W (K.M. Dawson, 1975: Geol. Surv. Can., Geol. Surv. Can., Paper 75-1A, p. 240).

106 C/7 Cerussite and hydrozincite occur with massive smithsonite in the oxidized zones of zinc-lead deposits at Goz Creek (64°26'N, 132°31'W). Similar deposits occur at 64°26'N, 132°55'W, about 24 km west of Goz Creek on the Bonnet Plume River (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 D/4 Cerussite, both massive and well-crystallized, is a common alteration product of galena at several ore deposits in the Keno Hill-Galena Hill area (R.W. Boyle, 1956: Geol. Surv. Can., Paper 55-30; 1957: Geol. Surv. Can., Paper 57-1).

115 I/3 Silver and gold bearing veins and pods of anglesite, cerussite and limonite, containing remnants of galena, arsenopyrite and pyrite occur on the May Group claims (62°07'N, 137°15'W.) on the northeast shoulder of Mount Nansen, northwest of the headwater of Nansen Creek and south of the Klaza River (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. Indian Affairs and Northern Development, p. 90).

115 J/10 Cerussite is a common alteration product of galena in oxidized surface trenches at the Bomber showing of Casino Silver Mines Limited at 62°43'N, 138°49'W, on a tributary of Casino Creek (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 39).

CHABAZITE

$CaAl_2Si_4O_{12}.6H_2O$

Chabazite is a mineral of the zeolite group. The zeolites are aluminosilicates, chiefly of Na and Ca, which have two characteristic features: the ease with which they may exchange cations: and the capability of losing their water content without change of crystal structure, and absorbing other compounds in place of the water removed. Like the other zeolites, chabazite typically occurs in cavities in basalts and andesites. It is distinguished from other zeolites by its crystal form - usually simple rhombohedrons closely resembling cubes.

British Columbia

82 L/5 Basalts cut by logging roads south of Monte Lake contain the zeolite minerals chabazite, stilbite, levyne, analcime, thomsonite, cowlesite, ferrierite and heulandite (W.S. Wise and R.W. Tschernich, 1975: Am. Mineralogist, 60, p. 951).

92 B/5 Veins and amygdules in the Metchosin basalt east of the Sooke River contain epidote, pumpellyite, prehnite, laumontite, chabazite, stilbite, analcime, quartz and calcite (W.G. Libby and Jerry Kopel, 1971: Can. Mineralogist, 10, p. 915).

92 P/3 Chabazite occurs in cavities in basalt at Chasm on the Bonaparte River, Clinton mining division (G.M. Dawson, 1895: Geol. Surv. Can., Ann. Rept., VIII, 118 A).

Manitoba

63 N/3 A porous crust of distinct crystals of chabazite and analcime has been noted on vein quartz at the Sherritt Gordon Mine. The chabazite crystals are well defined, grey-green rhombohedrons and a few of them exhibit interpenetration twinning (G.M. Brownell, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 19).

Nova Scotia

21 A/12 Chabazite occurs in Digby County at Digby Neck, Mink Cove, Sandy Cove and Williams Brook (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 27 T).

21 H/7 Occurrences of chabazite have been reported at Cape d'Or in Cumberland County and at a number of other localities in the Fundy Bay-Minas Basin area. The chabazite is flesh red or lighter in colour and is associated with quartz, heulandite, stilbite, and other zeolites. A specimen from Wassons Bluff gave the following chemical analysis: SiO_2 49.58, Al_2O_3 18.07, Fe_2O_3 0.13, CaO 8.30, SrO 0.48, Na_2O 1.08, K_2O 1.16, H_2O 21.80, total 10.60 (A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 42).

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Chabazite is found in trap rocks with other zeolites at several localities in the Minas Basin - Bay of Fundy region. The following localities and associated minerals were noted by Ann P. Sabina in Geol. Surv. Can., Paper 64-10 - Rocks and Minerals for the Collector, Bay of Fundy Area.

	Locality	Associated Minerals
21 H/7	Horseshoe Cove, Cape d'Or, Cumberland County	stilbite, laumontite, apophyllite, analcime, thomsonite, mesolite, natrolite, heulandite, jasper, copper, calcite
21 H/8	Cape Blomidon-Cape Split, Kings County	apophyllite, heulandite, natrolite, stilbite, analcime, gmelinite, laumontite, mesolite, thomsonite, amethyst, jasper, agate, calcite, celadonite
	Partridge Island, Cumberland County	stilbite, laumontite, natrolite, heulandite, analcime, apophyllite, quartz crystal, calcite, chalcedony, jasper
	Pinnacle Island, Cumberland County	analcime, natrolite, stilbite, heulandite, thomsonite, gmelinite, calcite
	Swan's Creek (Swan Brook), Cumberland County	gmelinite, analcime, apophyllite, natrolite, heulandite, calcite, stilbite
	Two Islands, Guysborough County	gmelinite, analcime, heulandite, natrolite, calcite
	Wasson Bluff, Cumberland County	heulandite, stilbite, gmelinite, natrolite, analcime, calcite, copper

21 H/7 Chemical analyses of chabazites from Wasson's Bluff (I) and Cape d'Or (II) by E.W. Todd: I, salmon colour, SiO_2 49.46, Al_2O_3 17.91, Fe_2O_3 0.11, CaO 8.24, MgO 0.10, SrO 0.46, Na_2O 1.14, K_2O 1.12, H_2O 21.89, total 100.43; II, nearly colourless, SiO_2 50.20, Al_2O_3 17.79, Fe_2O_3 0.03, CaO 8.08, Na_2O 1.54, K_2O 0.78, H_2O 21.55, total 99.97 (T.L. Walker and A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 44).

21 H/8 The reddish variety of chabazite, which has been named acadialite, is found at Partridge Island, Swan Creek and Two Islands in Cumberland County and on Pinnacle Island in Colchester County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 15 T and 27 T).

Ontario

31 D/16 Chabazite has been identified in specimens from the Centre Lake property of Bicroft Uranium Mines Ltd. The property is in Haliburton County, Cardiff Township, conc. XI, lots 26 and 27. (X-ray Laboratory, Geol. Surv. Can.)

31 F/4 Pale wine, yellow and white crystals of chabazite occur in cavities in a vein composed of pyroxene, biotite, scapolite, quartz, and calcite on conc. VI, lots 24 and 25, Monteagle Township (G.C. Hoffmann, 1893: Geol. Surv. Can., Ann. Rept., VI, p. 27 R).

31 F/4 Specimens of chabazite in the mineral collection of the Royal Ontario Museum were collected from lot 26, conc. VI, Monteagle Township, and from Highway 62, lot 14, Hastings Road, Monteagle Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 98).

31 M/5 Crystals of chabazite of maximum diameter 3 millimetres, are found in veins with stilbite and heulandite on the west side of Cross Lake near Cobalt. They are of the common rhombohedral habit and in a few instances, form penetration twins (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 68).

31 M/5 An occurrence of chabazite has been reported on the King Cobalt claim in Coleman Township, Timiskaming County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 56).

42 F/4 Chabazite from the Willecho Mine in the east central part of Mapledoram Township is included in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 98).

Quebec

31 G/11 Chabazite has been found at the Pedneaud Quarry near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 21).

31 G/12 The Haldane Mine on lot 12, range I, of Wakefield Township, Gatineau County has been reported to contain chabazite (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog., 18 L).

31 G/12 Crystals of chabazite, commonly forming penetration twins, occur with scapolite and pyroxene in the following townships of Papineau County: Templeton Township, range XII, lot 21; the Gore of Templeton, lot 3, at the Rheaume Lake Mine; East Portland Township, range III, lot 1, and range XII, lot 21 (H.S. de Schmidt, 1912: Can. Dept. Mines, Mines Br. Publ., 118, p. 284, and B.J. Harrington, 1877-78: Geol. Surv. Can., Rept. Prog., 35 G).

31 G/13 Pyroxene, apatite, and chabazite are found at Crown Hill in lot 27, range IX, Portland East

Township, in Papineau County (J.F. Terrance, 1883; National Mineral Collection).

31 H/11 Chabazite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

CHALCANTHITE

$CuSO_4.5H_2O$

British Columbia

82 L/3 Chalcanthite, or blue vitreol as it is sometimes called, has been observed on a number of claims a short distance to the west of the city of Vernon (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 56).

92 H/8 Chalcanthite is found at Copper Mountain in the Similkameen mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 56).

92 I/14 Chalcanthite occurs in the Lillooet district at the Avoca claim on the Bonaparte River about 4 km above Hat Creek, and also at a locality between the Chilcoten River and Big Creek (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 12 R).

Manitoba

63 K/12 Chalcanthite has been reported at the Mandy copper mine, located on a peninsula in the northwest arm of Schist Lake. (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 38).

New Brunswick

21 P/5 At the Key Anacon mine, located 5.9 km east of Highway 331 from a point 18.8 km south of Bathurst, the primary sulphides are commonly coated with chalcanthite and rozenite. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 117).

Ontario

41 I/6 A specimen in the mineral collection of the Royal Ontario Museum is from the Vermilion Mine, lot 6, conc. IV, Denison Township. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 99).

Quebec

32 C/4 Chalcanthite has been identified as light blue translucent crusts on ore specimens collected from a stockpile or ore at the Louvem Mine. The mine is 3.2 km by road from a junction on Highway 59, 20 km east of Val d'Or. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 120).

chalcedony

(see QUARTZ)

CHALCOALUMITE

$CuAl_4SO_4(OH)_{12}.3H_2O$

British Columbia

92 I/11 Chalcoalumite has been identified as a pale blue botryoidal crust on a specimen from a locality 0.8 km west of Highway 1, 27 km south of Cache Creek. (X-ray Laboratory, Geol. Surv. Can.).

CHALCOCITE

Cu_2S

Chalcocite is an important ore mineral of copper. In copper deposits in arid and semi-arid climates it occurs as a secondary mineral at the water table level and may form a zone of secondary enrichment that contains a much higher copper content than the primary ore deposit. Chalcocite also occurs as a primary mineral in hydrothermal veins.

British Columbia

92 H/15 Volcanic rocks of the Nicola Group are mineralized with chalcocite and native copper at about 1200 m elevation between Bluey Lake and Highway 5, from 5 to 13 km south of Aspen Grove. Chalcocite and malachite are reported at 1200 m elevation immediately north and west of Miner Lake, 3.2 km southeast of Aspen Grove; and at 1150 m elevation 3.2 km northeast of Aspen Grove (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 135-138).

92 I/2 Quartz-calcite veins carrying malachite, azurite, chrysocolla, chalcocite, bornite and chalcopyrite occur at 1680 m elevation on Iron Mountain, 8 km south-southeast of Merritt (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 142).

92 I/6 The OK (Alwin) Mine in a small high-grade vein deposit of chalcopyrite, bornite and primary chalcocite. It is located at 50°29'N, 121°06'W, at 1550 to 1650 m elevation, 4.8 km west of Quiltanton Lake (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 155).

92 I/7 Massive chalcocite has been found at the Aberdeen Mine, near Merritt in the Nicola mining division (X-ray Laboratory, Geol. Surv. Can.).

92 I/9
92 I/10 The Afton copper deposit at 50°39.5'N, 120°30.5'W, is 12.8 km west of Kamloops on the south side of the Trans-Canada Highway at an elevation of about 640 m. It is a complex syenitic porphyry in which the upper part is mineralized with native copper and chalcocite, and the lower part with bornite and chalcopyrite (B.C. Dept. mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 209).

92 K/3 Chalcocite is a major constituent of a thin interlava sedimentary rock which outcrops west of Menzies Bay on Vancouver Island and north of Gowland Harbour on Quadra Island. Associated minerals are volborthite, malachite, brochantite, cuprite, tenorite, azurite, cyanotrichite and connellite (J.L. Jambor, 1960: Am. Mineralogist, 45, pp. 1307-9).

92 L/8 Chalcocite occurs with bornite and chalcopyrite in veins and disseminated in volcanic rocks at the following showings: between 500 m and 600 m elevation on the west side of Adam River, 3.2 km southwest of Keta Lake; and at about 100 m elevation, 1.6 km west of Port Neville, 12.8 km north-northwest of Kelsey Bay (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972: p. 292-3).

94 D/10 The Wesfrob copper prospect is a stratiform chalcocite-rich deposit at 56°36'N, 126°40'W, 6.4 km west-northwest of Sustut Peak on the west

side of Sustut River at about 1800 m elevation. Bornite, chalcopyrite and some native copper are also present (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 309).

103 H/14 Bornite and chalcocite with some chalcopyrite and minor native gold and silver were found in 1907 about 1.6 km from the shore of Drumlummon Bay, a small cove on the northwest shore of Douglas Channel beside the outlet of Foch Lagoon (J.A. Roddick, 1970: Geol. Surv. Can., Paper 70-41, p. 53).

114 P/10 Copper-silver and lead-zinc mineral deposits occur on mineral Mountain and on Copper Butte, located northwest and north, respectively, of the hairpin turn at Mile 52 (83.5 km) Haines Road. The minerals present are: bornite, chalcocite, chalcopyrite, galena and sphalerite (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

New Brunswick

21 B/10
21 B/15 Specimens of granular chalcocite have been obtained from Grand Manan Island, Charlotte County (National Mineral Colection).

21 H/10 The Copp copper deposit is located on the Copp farm near Germantown. The copper minerals occur as veins and as intergrowths with fibres of fossil plants. the most abundant mineral is chalcocite. Associate minerals are malachite, chalcopyrite, covellite and azurite in grey sandstone (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 24).

21 H/10 At the New Horton copper mine, chalcocite is associated with malachite, chalcopyrite, pyrite, covellite and azurite. The mine, also known as the Vernon mine, is on the west side of the New Horton road, 8.7 km south of its junction with Highway 14 south of Albert (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 25).

21 H/16 At the Dorchester copper mine, near Dorchester in Westmorland County, chalcocite with pyrite, quartz and covellite forms nodules 5 cm across. It commonly replaces pyrite and fossil plants which retain the original structure. Some of the chalcocite is disseminated in the sandstone. Fine-grained malachite coats the nodules and copper-bearing plant remains. The deposit was first investigated as a copper prospect in 1881 and was worked at intervals until 1917 (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 28).

21 I/2 Chalcocite is associated with barite, fluorite, galena, malachite, azurite and quartz in veins cutting red shale at the East Memramcook barite deposit, about 3 km east of Memramcook (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 27).

21 O/8
21 P/5 Chalcocite is reported to be a minor constituent of the orebodies at the Heath Steele, Brunswick and Key Anacon mines in the Bathurst-Newcastle area. The main sulphides are pyrite, galena, sphalerite and chalcopyrite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51).

Newfoundland

1 N/6 Massive chalcopyrite, chalcocite and bornite occur as patches in volcanic rocks at a deposit on the north side of a bend in the Colliers River, south of Highway 60 (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 73).

1 N/7 The first attempt at mining in Newfoundland was made in 1778 at a deposit of chalcopyrite, chalcocite, bornite and tetrahedrite in quartz-calcite veins that cut sandstone, on the shoreline near Shoal Bay, about midway between Petty Harbour and Bay Bulls (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 52).

Northwest Territories

48 A/11 Chalcopyrite, chalcocite, malachite and azurite, with major galena and minor sphalerite occur along a major fault on the Borden Peninsula at 72°31'28"N, 82°07'42"W, 19.3 km north-northeast of the icefield east of Magda Plateau (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 148; Dept. Indian and Northern Affairs).

55 K/6 A granodiorite body north of Whiterock Lake is cut by narrow quartz veins containing chalcopyrite, chalcocite, galena and molybdenite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 30; Dept. Indian and Northern Affairs).

75 L/8 A vein containing bornite and minor chalcopyrite and chalcocite has been investigated on the HAR claims located just north of Wilson Lake and just south of Stark Lake (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 24-25).

86 F/13 Chalcocite is abundant and is associated with bornite and chalcopyrite at the B.E.A.R. silver deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol. 34, p. 752).

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The following occurrences of chalcocite were reported in the Coppermine River area following a staking rush from 1966 to 1968:

	Property	Claims	Latitude	Longitude
86 N/7	Canadian Goldale Corporation	MAR	67°22'30" N	116°48'30" W
	Coppermine River Limited	DOT	67°28'	116°32'
	Coppermine River Limited	DON	67°29'45"	116°42'45"
	Coppermine River Limited	LLOYD	67°28'07"	116°44'08"
	Coppermine River Limited	LLOYD	67°28'06"	116°43'53"
	Coppermine River Limited	LLOYD	67°27'55"	116°43'27"
	Coppermine River Limited	LARS	67°28'	116°38'
	Coppermine River Limited	LARRY	67°25'	116°46'55"

	Property	Claims	Latitude	Longitude
	Coppermine River Limited	JACK	67°24'45"	116°44'15"
	Shawinigan Mountain Copper Mines	ILROCK	67°20'30"	116°35'30"
	Northlake Mines Limited	STAN	67°28'	116°53'
	Northville Exploration Limited	MAR	67°27'	116°50'
86 N/8	Coppermine River Limited	METALS	67°23'15"	116°28'40"
	Coppermine River Limited	PUMA	67°21'05"	116°14'20"
	Coppermine River Limited	PUMA	67°20'20"	116°15'30"
	Lake Beaverhouse Mines	MAR	67°16'	116°05'30"
	Rose Pass Mines Limited	MGB	67°19'	116°25'
	September Mountain Copper Mine	JIM, VIC	67°19'30"	116°02'
86 N/9	Cambridge Mines Limited	CAM	67°33'	116°18'
	Colonial Oil and Gas Limited	NOR, HOLE	67°32'15"	116°05'
86 N/10	Consolidated Proprietary Mines	COPPER LAMB	67°37'40"	116°52'
	Consolidated Proprietary Mines	HARRY	67°38'30"	116°53'15"
86 N/11	Earlcrest Resources Limited	MID	67°41'30"	117°10'
86 O/4	James Bay Mining Corporation	ALF	67°15'30"	115°55'30"
86 O/5	Bermack Coppermine Company	HOK, KIL	67°20'	115°39'30"
	Bracemac Mines Limited	KAT	67°15'30"	115°51'30"
	Chance Mining and Exploration	GDF	67°23'10"	115°26'25"
	Consolidated Proprietary Mines	VERA	67°18'07"	115°47'45"

	Property	Claims	Latitude	Longitude
	Coronation Gulf Mines	5B,IS, JB,JS	67°18'30"	115°58'
	Coronation Gulf Mines	GM,DM FD,SA	67°24'	115°35'
	D'Aragon-Willow Lake Mine	JIM	67°21'10"	115°55'30"
	Donalda and Bernack Coppermine	KIL	67°19'	115°35'30"
	Eskimo Copper Mines	JOK, EXT	67°20'	115°32'30"
	James Exploration Limited	CU	67°22'	115°48'
	Quadrate Exploration Limited	HOK, TUFF ST, TAR, CU	67°20'	115°46'30"
	Spectroair Exploration Limited	SIL, BO, EB	67°17'30"	115°48'30"
	Teshierpi Mines Limited	PAN, DIB, MAS	67°21'	115°36'
	Teshierpi Mines Limited	SAM	67°21'30"	115°51'30"
	United Buffadison Mines	NAN, GRA, PRO	67°21'30"	115°42'30"
86 O/6	East Coppermine Exploration	MIKE 11	67°29'25"	115°11'05"
	East Coppermine Exploration	MIKE 14	67°29'35"	115°11'45"
	East Coppermine Exploration	NOR 94	67°26'55"	115°12'55"
	East Coppermine Exploration	NOR 94	67°26'45"	115°12'45"
	East Coppermine Exploration	NOR 48	67°26'25"	115°13'45"
	East Coppermine Exploration	PAT 2	67°26'35"	115°21'40"
	East Coppermine Exploration	PAT 6	67°26'30"	115°22'15"
	East Coppermine Exploration	LR 6	67°26'15"	115°20'50"
	East Coppermine Exploration	LR 27	67°25'55"	115°21'00"

	Property	Claims	Latitude	Longitude
	East Coppermine Exploration	JH 22	67°25'20"	115°18'55"
	East Coppermine Exploration	JH 22	67°25'17"	115°18'35"
	East Coppermine Exploration	JH 32	67°25'13"	115°18'55"
	East Coppermine Exploration	GS 21	67°23'40"	115°13'00"
	East Coppermine Exploration	HW 4	67°22'45"	115°12'15"
	East Coppermine Exploration	AC 42	67°20'50"	115°22'35"
	East Coppermine Exploration	AC 25	67°20'30"	115°22'40"
	East Coppermine Exploration	AC 20	67°20'15"	115°22'45"
	Teshierpi Mines Limited	HED, RON, TER, MAS	67°27'	115°28'30"
	Univex Mining Corporation	RT, EH	67°21'30"	115°27'30"
86 O/7	Bernack Coppermine Company	JUNE, BET, LIZ	67°27"	114°55'
86 O/10	Amalta Oils and Minerals	SD, MCK, NWA	67°35'30"	114°56'
	Artex Mines Limited	HA	67°35'30"	114°50'
	Provident Resources Management	WIN	67°38'30"	114°50'
	Provident Resources Management	AL	67°35'30"	114°44'
86 O/11	Cornonation Gulf Mines	GO	67°32'	115°22'
	East Coppermine Exploration	SHARON 1	67°33'10"	115°10'00"
	East Coppermine Exploration	SHARON 1	67°33'05"	115°10'05"
	East Coppermine Exploration	JIM 26	67°31'10"	115°12'55"
	East Coppermine Exploration	JIM 26	67°31'00"	115°13'15"
86 O/12	Casino Silver Mines	BUD	67°33'30"	115°48'30"

(R.I. Thorpe, 1970: Geol. Surv. Can., Paper 70-47)

Nova Scotia

11 E/12 Chalcocite occurs at two properties near Wentworth Centre, Cumberland County. At a property on the Tratt farm, chalcocite occurs in sandstone and conglomerate, where it replaces fossil plant fragments that have been converted to coal, less commonly it is associated with pyrite nodules. At the Palmer Mine located on the north bank of the west branch of the Wallace River, chalcocite with minor amounts of malachite, pyrite and bornite, occurs in coal-bearing fossil plant fragments and as solid fragments in shale. Specimens are available at a dump on the south bank of the river on the property of Mr. George Tuttle (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 54).

21 A/12 Massive chalcocite has been found at New Ross (H.C. Burchell, 1917: National Mineral Collection).

21 H/1 Chalcocite occurs as a supergene mineral at the Magnet Cove barium-lead-zinc-silver deposit, 4 km southwest of Walton (R.W. Boyle, 1960: Can. Mining J., vol. 83, No. 4, p. 104).

Ontario

31 M/5 Patches of chalcocite less than 6 mm in diameter occur in the Foster Mine near Cobalt. The sulphide is usually associated with quartz and was found upon analysis to be very pure, containing only a small amount of quartz impurity: Cu 79.58, S 20.10, SiO_2 0.34, total 100.02. Theoretical Composition: Cu 79.84, S 20.16, total 100.00 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 208).

34 D/4 Some chalcocite was present at the Barry-Hollinger gold mine in the Larder lake area. The mine site is 1.6 km north of Highway 564, about 7.4 km west of its junction with Highway 112 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 12).

41 J/5 A chalcocite specimen from the Rock Lake Mine in the south half of lot 3, conc. I, Aberdeen Township is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 100).

41 N/2 Veinlets up to 2.5 cm wide occur in three sets of closely spaced fractures on the Ranwick property, townships 28 and 29, ranges XIV and XV, in the Montreal River area. They contain chalcocite and galena as well as uranium minerals (E.W. Nuffield, 1955: Ont. Dept. Mines, Ann. Rept., vol. 64, Pt. III, p. 25).

Chalcocite, chalcopyrite, and native copper occur at the C.C. Houston property in the Mamainse Point area. The sulphides occur in breccias, veins and as amygdules in a volcanic rock. Native copper is found along late cross fractures in vein material occupying a fissure (J.E. Thomson, 1953: Ont. Dept. Mines, Ann. Rept., vol. 62, Pt. IV, p. 22).

41 P/10 Chalcocite has been observed as veinlets in chalcopyrite and as intergrowths with bornite in

a carbonate vein sample from the Siscoe Mine at Gowganda (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 204).

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The following specimens of chalcocite are listed in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: MP 70, p. 100).

42 D/11 West side of Patterson Island, Slate Island, Lake Superior.

52 A/3 Prince's Mine, Spar Island, near Prince Location, Lake Superior.

53 C/14 Halfway between North Wind Lake and Setting Net Lake, Kenora district.

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52 H/2 Blue chalcocite and a minor amount of native copper have been found in a porous bed of stromatolitic limestone at a copper prospect immediately northwest of Disraeli lake (M.E. Coates, 1972: Ont. Dept. Mines, GR 98, p. 27).

Quebec

21 L/3
21 L/6 Specimens of massive chalcocite in the National Mineral Collection were collected from Ireland Township, Inverness Township, and Leeds Township, lot 15, range XIV, and lot 17, range XV, all in Megantic County.

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Chalcocite has been reported to occur at the following localities in the Eastern Townships and along the south shore of the St. Lawrence River (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51).

21 E/5 At the Aldermac Moulton Hill Mine, about 10 km east of Sherbrooke, pyrite is the most abundant metallic mineral, closely associated with a fine-grained mixture of chalcopyrite, sphalerite, galena, tennantite and chalcocite.

21 L/8 Bornite, chalcopyrite, and chalcocite are the ore minerals found at the Harvey Hill copper mine, which operated continuously from 1858 to 1864. The mine is about 4 km from St-Pierre (West Broughton).

21 L/9 Chalcocite is a minor constituent of the ore at the Eastern Metals Mine. Chalcopyrite, the most conspicuous mineral present, is associated with millerite, pyrite, sphalerite and marcasite. the mine is 4.8 km from St-Fabien.

22 A/7 Small patches of chalcocite occur with grains of pyrite along a contact between volcanic rocks and quartzite in a cliff about 6 m above the beach on the north side of Anse-à-Blondel.

22 A/13 Chalcocite is one of the less abundant sulphides that together with major chalcopyrite and pyrrhotite, constitute the orebodies of Gaspé Copper Mines Limited at Murdochville.

31 H/2 Fine-grained, massive chalcopyrite, bornite, chalcocite and pyrite are the primary sulphide minerals at Sweet's Mine, located 4.8 km north of Sutton.

31 H/9 Bornite and chalcocite are the principal ore minerals at the old St. Francis Mine, on the H.B. Lanchard farm, 7.4 km northwest from Richmond.

31 H/10 At the Acton Mine, at Acton Vale, bornite is closely associated with chalcopyrite and chalcocite. The deposit yielded a rich copper ore from 1858 and 1864.

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32 C/4 Chalcocite is a constituent of the ore at the Louvem Mine, located 3.2 km north of Highway 69 from a junction 20 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 120).

32 D/14 The ore at the Normetal Mine contains some chalcocite. The mine is located at Normetal (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 58).

Saskatchewan

73 P/6 At the Anglo-Rouyn Mine, chalcopyrite, the main ore mineral is closely associated with pyrrhotite and pyrite. Chalcocite and native copper are also reported. The mine is on a peninsula on the east side of Waden Bay, Lac La Ronge, about 48 km northeast of La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5).

Yukon

105 D/11 Chalcopyrite, bornite, chalcocite and valleriite with minor native copper are ore minerals in the Little Chief and Arctic Chief areas of the Whitehorse copper belt (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Dept. Indian Affairs and Northern Development, p. 111).

105 G/5 Nine copper showings have been discovered on the Bell claims in the McNeil lake area (61°28'N., 131°46'W.). The main copper minerals are bornite, chalcopyrite, chalcocite and covellite (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 131).

115 F/15 The old Discovery copper grant, discovered in 1905 on the east side of upper White River about 29 km south of km 1879 on the Alaska Highway, yielded several large slabs of native copper, one of which weighed 1,359 kg and is now displayed outside the Yukon Historical Society McBride Museum in Whitehorse. Exploration by Silver City Mines Limited in 1967 revealed a new fracture zone in basalt containing veinlets, stringers and lenses of chalcocite with subordinate native copper and minor bornite (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 68).

115 G/6 Several showings of disseminated chalcocite, bornite and minor native copper in malachite-stained basalt have been found near the headwaters of Quill Creek (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 53).

CHALCOMENITE

$CuSeO_3.2H_2O$

Ontario

41 N/2 Chalcomenite is associated with klockmannite, pitchblende and secondary uranium minerals on the property of Ranwick Uranium Mines Limited, range XV, Township 2, 3 km southeast of the mouth of the Montreal River, at the eastern end of Lake Superior (M.H. Frohberg: private communication).

Saskatchewan

74 N/10 The rare selenite mineral, chalcomenite, is the principle alteration product in an occurrence of klockmannite, umangite, berzelianite, clausthalite, pyrite, hematite, and chalcopyrite in an area north of Hal Lake, which is about 450 m west of the Eagle shaft, in the Goldfields district. The minerals occur with a small amount of quartz in a sheared and brecciated rock (S.C. Robinson and E.J. Brooker, 1952: Am. Mineralogist, 37, p. 542).

CHALCOPYRITE

$CuFeS_2$

Chalcopyrite, the most important ore mineral of copper, is of common occurrence and is widely distributed throughout Canada, so much so that no attempt has been made here to report all occurrences. Instead, a number of typical occurrences have been arbitrarily selected.

British Columbia

82 F Chalcopyrite occurs with pyrrhotite, pyrite, galena, and sphalerite in the Nelson River area. The sulphides are confined to the Purcell sills where they appear in differentiate deposits or in occurrences of the quartz-calcite vein type (H.M.A. Rice, 1937: Geol. Surv. Can., Paper 37-27, p. 16).

82 F/4 Massive chalcopyrite occurs in veinlets and impregnations associated with pyrrhotite and pyrite at Rossland (C.W. Drysdale, 1915: Geol. Surv. Can., Mem. 77, p. 74).

82 G/11 The Bull River deposit consists of fracture fillings and massive replacements of chalcopyrite in quartz-siderite gangue. The mine is at 49°30' N, 115°23' W, 23.3 km due west of Fernie, extending north from the Bull River astride Burntbridge Creek at about 1070 m elevation (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1973, p. 84).

82 M/8
82 M/9 Two chalcopyrite deposits, with pyrrhotite, pyrite and a little sphalerite, have been worked in the Big Bend map-area. The Standard group is at the head of Standard Creek at 2,000 to 2,200 m elevation (82 M/8). The Montgomery group lies on the southwest ridge of Downie Peak, principally on slopes southeast of the ridge (82 M/9) (J.O. Wheeler, 1965: Geol. Surv. Can., Paper 64-32, p. 32-33).

92 B/5 Chalcopyrite occurs in cracks and veinlets throughout a hornblendite body in the Sooke and Duncan map-areas. It is concentrated in persistent shear zones (H.C. Cooke and C.H. Clapp, 1917: Geol. Surv. Can., Mem. 96, p. 324).

92 C/8 Chalcopyrite, pyrrhotite and pyrite are the main metallic minerals at the Sunro Mine. Molybdenite, cubanite, pentlandite and native copper have also been reported. The mine is at 48°27'N, 124°02'W, 1.6 km north of the mouth of Jordan River (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1974, p. 164).

92 F/12 Massive sulphide orebodies consisting mainly of chalcopyrite, galena, sphalerite and pyrite are present at the Lynx Mine on Myra Creek, 1.6 km west of the south end of Buttle Lake (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1972, p. 271).

92 G/11 Parallel quartz veins containing bornite, chalcopyrite, cuprite and molybdenite occur in granite at 49°42.5' N, 123°27.2' W, on Mount Donaldson, 21 km west of Squamish (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 277).

92 H/6 Chalcopyrite occurs with pentlandite as irregular grains in a coarse-grained mosaic of pyrrhotite, in ultrabasic rocks at Giant Nickel Mines Ltd., near Hope (-, 1960: Western Miner and Oil Review, vol. 33, No. 11, p. 39).

92 H/10 The chief ore mineral at the Independence Mine, 2.4 km due east of Coquihalla, is chalcopyrite. The sulphide occurs in a fracture zone in a granite porphyry near the contact between the Tulameen group and younger intrusives (C.E. Cairnes, 1924: Geol. Surv. Can., Mem. 139).

92 H/16 At the Brenda Mine, a major copper producer, chalcopyrite and molybdenite occur as fracture fillings in quartz diorite. The mine is at 49°53' N, 120°00.5' W, 2.4 km southeast of Brenda Lake (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 126).

92 I/2 Chalcopyrite is mined at the Craigmont Mine in the Merritt area, 386 km northwest of Vancouver. The mine is situated on the eastern slope of Promontory Hills 16 km northwest of Merritt. Chalcopyrite occurs as disseminated grains in magnetite and hematite, as fracture fillings, as platings between specularite lamellae, as disseminations replacing breccia fragments, as coarse grains in calcite breccia cement, as massive patches several feet across, and rarely, as finely banded replacements (C.C. Rennie, 1961: Can. Inst. Mining Met., Bull., vol. 54, No. 588, p. 297).

92 I/6 The ore at Highland Valley consists mainly of chalcopyrite in grey quartz gangue. Secondary azurite, malachite, and chalcocite are conspicuous, and tourmaline occurs in the vicinity (S. Duffell, 1947: Geol. Surv. Can., Paper 47-10, p. 5).

92 I/6 The main ore minerals at the Lornex Mine are chalcopyrite, bornite and molybdenite. The mine is at 50°27'N, 121°03'W, 42 km southeast of Ashcroft on the southern slope of Highland Valley (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 135).

92 I/6 The OK (Alwin) Mine located at 50°29' N, 121°06' W, at 1550 m to 1650 m elevation, 4.8 km west of Quiltanton Lake is a small high-grade vein deposit of chalcopyrite, bornite and primary chalcocite (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 155).

92 I/7 Chalcopyrite is the main ore mineral at the Bethlehem porphyry copper deposit on the north side of Highland Valley, 3.2 km east of Quiltanton Lake, at 50°29.5' N, 120°59' W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 146).

92 I/9 A specimen of chalcopyrite in selenite from the Iron Mask Mine near Kamloops is in the National Mineral Collection.

92 I/9
92 I/10 The lower part of the Afton copper deposit is mineralized with chalcopyrite and bornite and the upper part with native copper and chalcocite. The deposit is at an elevation of 640 m on the south side of the Trans-Canada Highway, 12.8 km west of Kamloops (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 209).

92 L/6 Chalcopyrite and bornite form veins, lenses and tabular bodies in skarn at the Old Sport Mine at Benson Lake, 41.7 km southwest of Port McNeill (J.E. Muller, K.E. Northcote and D. Carlisle, 1974: Geol. Surv. Can., Paper 74-8, p. 70).

92 L/11
92 L/12 Fine-grained chalcopyrite and molybdenite are the ore minerals at the Island Copper Mine on the north side of Rupert Inlet about 13 km south of Port Hardy (J.E. Muller, K.E. Northcote and D. Carlisle, 1974: Geol. Surv. Can., Paper 74-8, p. 57).

93 B/9 Chalcopyrite is mined at the Gibraltar Mine, a major producer located 19.3 km north of McLeese Lake at 52°31' N, 122°17' W, on the western slopes of Granite mountain at elevations of between 900 and 1200 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 299).

93 L/10 Pyrite, sphalerite, chalcopyrite, galena and tetrahedrite occur in several deposits on Grouse Mountain at the south end of the Babine Range, 19.3 km due north of Houston (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 397).

93 L/15 Quartz veins and silicified zones in volcanic rocks contain chalcopyrite, bornite and tetrahedrite at 54°52.1' N, 126°57' W, on Harvey Creek, a tributary of Driftwood Creek, 19.3 km northeast of Smithers (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 420).

93 L/16 The economic minerals at the Granisle porphyry copper deposit are chalcopyrite and bornite with minor gold and silver. The mine is at 54°56.5' N, 126°09.5' W, on McDonald Island, 14.4 km north of Topley Landing (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 265).

93 L/16
93 M/1 At the Bell (Newman) Mine, chalcopyrite, pyrite and pyrrhotite and some sphalerite and chalcocite are associated with feldspar porphyry. The mine is on the north end of Newman peninsula on Babine Lake at 55°00' N, 126°14' W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 266).

93 M/4 Sulphide lenses composed of pyrrhotite, chalcopyrite, and small amounts of pyrite and arsenopyrite occur near Hazelton on the Golden Wonder claim, on Rocher Déboulé Mountain (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 41).

93 M/4 Two distinct types of ore, silver-lead and chalcopyrite-hornblende, occur in the Rocher de Boule Mine in the Hazelton district. Each is associated with a distinctive suite of sulphide minerals. The mine is situated on the west side of Juniper Creek about 2 km from its head (J.J. O'Neill, 1919: Geol. Surv. Can., Mem. 110, p. 7).

94 D/10 Disseminations and veinlets of chalcocite, bornite, chalcopyrite and some native copper form a large stratiform deposit at 56°36' N, 126°40' W, 6.4 km west-northwest of Sustut Peak on the west side of the Sustut River at about 1800 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 309).

94 K/6 Quartz-carbonate veins mineralized with chalcopyrite have been explored at the following localities near Delano Creek: LADY LUCK claims on the west side of the north branch of Delano Creek at 58°28' N, 125°23.8' W; north and south of Delano Creek adjoining the Magnum mine claims to the east and south; JOAN and BE claims on Delano Creek at 58°28.6' N, 125°17.4' W, 9.6 km west of Racing River; HO and JOHN claims at elevations of 1500 m and 1560 to 1950 m, on the west side of Churchill Creek, from 8 to 18 km south of Delano Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 44-5).

94 K/11 Massive chalcopyrite is the ore mineral at the Churchill mine at the headwaters of Delano Creek about 4 km southwest of Yehde Lakes and 8.8 km northwest of Mount Roosevelt (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 16).

103 C/16 Chalcopyrite and magnetite orebodies are mined at the Tasu Mine, at 52°45.5' N, 132°03' W, on the south side of Tasu Sound, Moresby Island, extending vertically from sea-level to an elevation of 900 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 494).

103 P/5 Chalcopyrite, pyrite, pyrrhotite, sphalerite, and magnetite constitute the ores at Hidden Creek and Observatory Inlet, 128 km northeast of Prince Rupert (N. Campbell and W.T. Irvine, 1960: Can. Inst. Mining Met., Bull. 53, pp. 153-6).

The ore from the Bonanza Mine in the Portland Canal area is composed of chalcopyrite, pyrrhotite, sphalerite, and pyrite. It has been deposited in a shear zone in an amphibolite. The mine is located on Bonanza Creek about 1.2 km from its mouth (G. Hanson, 1935: Geol. Surv. Can., Mem. 175, p. 88).

104 B/1 The Granduc Mine is a major producer of chalcopyrite. The orebodies also contain pyrite, pyrrhotite and sphalerite. It is located at 56°13' N, 130°21' W, at the head of the Leduc River, 40 km north-northwest of Stewart, at elevations between 550 and 1250 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 514).

104 G/3 Disseminated chalcopyrite and bornite are the principal ore minerals at the Galore Creek deposits of Stikine Copper Limited, located east of the Stikine River at about 57°08' N, 131°28'W (J.G. Souther, 1972: Geol. Surv. Can., Paper 71-44, p. 24).

104 G/7 Chalcopyrite and molybdenite are the ore minerals at the Liard copper deposit which occurs in Triassic volcanics near the eastern contact of the Hickman batholith at about 57°22' N, 130°59' W (J.G. Souther, 1972 Geol. Surv. Can., Paper 71-44, p. 24).

104 I/1 Dispersed and massive chalcopyrite-sphalerite-bornite mineralization is present on claims centred at 58°12' N, 128°22' w, about 21 km southeast of the south end of Rainbow Lake at an elevation of about 1500 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 343).

104 K/10 A stockwork of quartz veins with chalcopyrite, tetrahedrite, stibnite and enargite occurs on the Thorn claims in the bottom of a deep valley occupied by a northwesterly flowing tributary of the Sutlahine River at about 58°33' N, 132°48'W (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 56).

104 K/12 The Tulsequah Chief Mine at 58°44' n, 133°35' W and the Big Bull (Manville) Mine at 58°40' N, 133°33' W , produced copper, lead, zinc, gold, silver and cadmium in the period 1951 to 1957. The ore consists of massive fine-grained pyrite and chalcopyrite in lenses, and sphalerite, pyrite and galena in quartz-carbonate-barite gangue (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, pp. 54-55).

104 P/3 Galena, sphalerite, chalcopyrite, scheelite and hydrozincite occur in a shear zone in limestone at the McDame Belle property on McDame Creek, about 1.6 km east of Centreville (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 114).

114 P/10 Copper-silver and lead-zinc mineralization occurs on Mineral Mountain and on Copper Butte, located northwest and north, respectively, of the hairpin turn at Mile 52 (83.5 km), Haines Road. The ore minerals are bornite, chalcocite, chalcopyrite, sphalerite and galena (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

Manitoba

52 L/6 Stringers and solid masses of pyrrhotite, chalcopyrite, pyrite, cubanite, magnetite, pentlandite and violarite are exposed on the Martin-Devlin, Chance and Wento claims on the north side of the Bird River, about 4.4 km north of the Bernic Lake Mine (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 58).

63 J/13 Chalcopyrite-sphalerite-pyrite-pyrrhotite orebodies occur at the Stall Lake and Osborne Lake mines (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 61-63).

63 K/12 Pyrite-chalcopyrite-sphalerite orebodies occur at the Mandy and Schist Lake mines on the shores of the northwest arm of Schist Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 38-39).

63 K/13 Chalcopyrite, sphalerite and pyrite are the common sulphide minerals in the Flin Flon ores. Gold, silver, and native copper occur in asociation with these (R.C. Wallace, 1920: Can. Mining J., 41, pp. 904-905).

63 K/13 The Don Jon deposit on the east side of Thompson Lake consists of strongly pyritized schist containing chalcopyrite. The schists have been derived from rhyolitic and dacitic flows and breccias with intercalated andesitic layers (J.D. Bateman and J.M. Harrison, 1944: Geol. Surv. Can., Paper 44-22, p. 6).

63 K/13 Pyrite and chalcopyrite are abundant at the Pine Bay Mine and Baker-Patton Deposit located on the shore just east of the north end of Sourdough Bay at the north end of Athapapuskow Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 43-45).

63 K/16 The Chisel Lake Mine ore consists of massive sphalerite, pyrite, pyrrhotite, chalcopyrite, galena and arsenopyrite with small amounts of gudmundite, meneghinite, tetrahedrite, bournonite and native gold. The orebody lies beneath the southern end of Chisel Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 65).

63 N/3 Chalcopyrite-pyrrhotite-sphalerite orebodies were worked at the Sherritt Gordon Mine at Sherridon from 1931 to 1951 (J.F. Davies, 1960: Can. Inst. Mining Met., Bull. 53, pp. 141-4).

63 P/12 Pyrrhotite and pentlandite with lesser amounts of pyrite, chalcopyrite, marcasite and gersdorffite constitute the ore at the Thompson Mine, south of the city of Thompson (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 74).

New Brunswick

21 G/7 Electron probe microanalysis of chalcopyrite from the Mount Pleasant tin deposit, by J. Rucklidge: Cu 34.2, 34.2; Sn 0.13, 0.15; Fe 29.4, 31.5; Zn 0.16, 0.48; S 34.2, 34.6; In 0.05, 0.15; Ag 0.0, 0.0; total 98.14, 101.08 (R.S. Boorman and D. Abbott, 1967: Can. Mineralogist, p. 166-179).

21 P/5 Chalcopyrite, the principal ore mineral at the Captain deposit occurs as masses and stringers in both the host rocks and pyrite body. Gold tellurides and galenobismutite occur as minute inclusions in some of the chalcopyrite. The deposit is situated on the headwaters of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland Counties, about 14 km east of Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can., Paper 66-18, p. 11).

Newfoundland

1 N/6 Massive chalcopyrite, chalcocite and bornite occur as irregular patches in volcanic rocks at a deposit on the north side of a bend in the Colliers River, south of Highway 60 (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 73).

1 N/7 The first attempt at mining in Newfoundland was made in 1778 at a deposit of chalcopyrite, chalcocite, bornite, and tetrahedrite in quartz-calcite veins cutting sandstone on the shoreline near Shoal Bay, about midway between Petty Harour and Bay Bulls (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 52).

2 D/8 Massive chalcopyrite and pyrite occur at Terra Nova (D.M. Baird, 1960: Can. Inst. Mining Met., Bull. 53, p. 79).

2 E/12
2 E/13 Chalcopyrite is found with pyrite at Pilleys Island; with pyrrhotite and pyrite at Little Bay; and with pyrite, sphalerite, magnetite and specularite at Tilt Cove, on Notre Dame Bay (D.M. Baird, 1960: Can. Inst. Mining Met., Bull. 53, p. 79).

2 F/4 Economic deposits consisting of chalcopyrite, arsenopyrite, and pyrite occur near the roof contact of a medium-grained gabbro with a fine-grained metavolcanic rock in western Newfoundland, near Bay of Islands (C.H. Smith, 1958: Geol. Surv. Can., Mem. 290, p. 88).

2 M/5 A copper deposit consisting of pyrite, pyrrhotite and chalcopyrite with minor sphalerite and magnetite has been known for many years southeast of Brimstone Ponds on the narrow strip of land between Goose Cove and Three Mountain Harbour, 370 m east of Highway 430 at a point 9.3 km south of the turn-off to St. Anthony (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 144).

12 A/15 The lead-zinc-copper ore of the Buchans Mine, located 4.8 km north of Red Indian Lake, contains chalcopyrite as aggregates and as exsolved blebs, always very fine-grained. It occurs as bands which have selectively replaced

certain beds within the ore horizon (E.A. Swanson and R.L. Brown, 1962: Can. Inst. Mining Met., Bull. 55, No. 605, p. 624).

12 G/1 At York Harbour, chalcopyrite occurs with pyrite and sphalerite (D.M. Baird, 1960: Can. Inst. Mining Met., Bull. 53, p. 79).

12 H/1 The ore at the Gullbridge Mine consisted mainly of chalcopyrite, pyrrhotite and pyrite. The mine is located at Mineral Point on the west side of Gull Lake. (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 108).

12 H/9 Schistose rocks and shear zones containing chalcopyrite and pyrite have been explored at the southeastern tip of Whales Back Pond and at Lady Pond about 1.6 km south of the north tip of Davis Pond. (E.R.W. Neale and W.A. Nash, 1963: Geol. Surv. Can., Paper 62-28, p. 34).

12 H/9 Chalcopyrite is the main copper mineral at the Whalesback Mine, one of many copper producers in the Notre Dame Bay area. The mine is located about 4 km west of Little Bay and 11.2 km northeast of Springdale. Pyrite, pyrrhotite, sphalerite, mackinawite, pentlandite, magnetite, cubanite, galena and ilmenite are also present in the shear zones (K. Kanehira and D. Bachinski 1968: Can. Jour. Earth Sci., 5, p. 1387).

12 H/16 The ore at Consolidated Rambler Mines consists of pyrite with chalcopyrite, pyrrhotite, galena and sphalerite. The mines are located south of Ming's Bight and are accessible via Highway 414. (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 121).

Northwest Territories

48 A/11 Chalcopyrite, chalcocite, malachite and azurite, with major galena and minor sphalerite occur along a fault on the Borden peninsula at 72°31'28"N, 82°07'42"W, 19.3 km north-northeast of the icefield east of Magda Plateau. (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 148; Dept. Indian and Northern Affairs).

55 K/2 Gossans containing pyrite, chalcopyrite, marcasite, pyrrhotite and minor malachite, azurite and bornite occur on a group of claims extending north from Whale Cove along the peninsula to the east of the mouth of Wilson Bay. Veinlets of massive molybdenite 2.5 cm wide are associated with aplite dykes and massive chalcopyrite has also been reported. (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 26; Dept. Indian and Northern Affairs).

55 K/6 A granodiorite body north of Whiterock Lake is cut by narrow quartz veins containing chalcopyrite, chalcocite, galena and molybdenite. (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 30; Dept. Indian and Northern Affairs).

55 L/6 Quartz veins containing pyrite, chalcopyrite, arsenopyrite and galena cut tonalite intrusions about 12.8 kn southeast of O'Neil Lake at 62°19'30"N, 95°08'15"W. Assay results showed gold and silver values. (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 36; Dept. Indian and Northern Affairs).

75 K/11 Disseminated chalcopyrite is widespread in narrow veins, breccia bodies and silicified dolomite on the GEM claims located on Maufelly Point of Great Slave Lake just west of Reliance. Occurrences of disseminated chalcopyrite and minor bornite in silicified dolomite have been reported on the north-central shore of Meridian Lake (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 27).

75 K/12 Quartz-carbonate stringers in fracture and breccia zones in dolomite contain disseminated chalcopyrite and minor bornite at the MARK group of claims north of McAteer Lake and south of Kinsey Lake about 27 km southwest of Reliance (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 27).

75 L/7 Chalcopyrite occurs in a series of rusty weathering quartz-carbonate veins in the Snowdrift area on the north shore of Duhamel Lake. These veins strike at right angles to one of the large faults in the area (F.Q. Barnes, 1951: Geol. Surv. Can., Paper 51-6, p. 29).

75 L/11 Disseminated chalcopyrite is present in a stockwork of quartz-carbonate veins in quartzite and sandstone that extends along the northwest shore of a small island about 10 km northeast of Taltheilei Narrows at latitude 62°40'N., longitude 111°24'W (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 23).

85 J/9 Parts of shear zones in the lavas and associated rocks on the Homer property have been replaced by chalcopyrite, galena, and sphalerite. The property is situated 19 km north of Yellowknife in the District of Mackenzie (C.S. Lord, 1951: Geol. Surv. Can., Mem. 261, p. 98).

86 F/13 Chalcopyrite is abundant and is associated with bornite and chalcocite at the B.E.A.R. silver deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 752).

Ontario

31 C/6 Chalcopyrite crystals have been found in quartz near the town of Madoc in Hastings County (National Mineral Collection).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16

Chalcopyrite is the most common sulphide mineral in the Cobalt-Gowganda deposits. It occurs in veins, and in the wall and country rock. Electron microprobe analyses are as follows:

Mine	Cu	Fe	S	Total
Hi-Ho	34.8	29.9	35.2	99.9
Silverfields	34.9	30.5	35.2	100.6
Langis	34.7	30.1	35.1	99.9
Silverfields	35.4	30.4	35.3	101.1
Deer Horn	35.1	30.5	35.4	101.0
Silverfields	35.1	30.4	34.5	100.0

(W. Petruk et al., 1971: Can. Mineralogist, 11, p. 198)

32 D/4 The ore at the Amity Mine in Pacaud Township consists of chalcopyrite with varying amounts of magnetite, pyrite, sphalerite and galena. The sulphides are banded with thin layers of grey cherty quartz. Chalcopyrite, bornite, and chalcocite are the principal ore minerals in the Tretheway-Ossian mine in Pacaud Township. Pyrite and small amounts of galena and sphalerite are present as well. The ore is laminated consisting of alternate layers of sulphide and grey quartz (K.D. Lawton, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. IV, p. 51).

41 I/7 Next to pyrrhotite, chalcopyrite is the most abundant ore mineral in the Sudbury ore deposits. A striking feature of massive, coarse-grained chalcopyrite from the Frood Mine is the beautifully developed lamellar twinning. In disseminated ores it occurs as composite blebs with pyrrhotite, and as veins and inclusions. Chemical analyses of two specimens of chalcopyrite by Michener: Cu 34.26, Fe 30.40, S 35.15, total 99.81; and Cu 33.68, Fe 30.94, S 35.00, total 99.62 (J.E. Hawley, 1962: Can. Mineralogist, 7, p. 59).

41 I/16 The number I orebody on the Temagami Island property of the Temagami Mining Company, consists of about 90 per cent chalcopyrite with pyrite, arsenides and carbonates. The host rock is a fragmental rhyolite (J.E. Thomson, 1960: Can. Inst. Mining Met. Bull., vol. 53, No. 575, pp. 136-140).

41 J/4
41 J/5 Copper deposits in the Bruce Mines district are of the fissure vein type and consist of chalcopyrite and bornite in a gangue of quartz intermixed with ankerite. Copper mining in North America began at the old Bruce Mine in 1846. Other deposits include: the Rock Lake Mine, 22.5 km north of Bruce Mines, and the Cameron or Stobie Mine, 4 km northwest of Desbarats station on the Canadian Pacific line (R. Bell, 1902: Geol. Surv. Can., Ann. Rept., XV, pp. 246-52).

41 P/15 Chalcopyrite and molybdenite were the ore minerals at the Ryan Lake Mine, a former producer of copper, molybdenum, silver and gold. The mine is on the west side of Highway 566, 6.6 km from Matachewan (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 105).

42 A/5 Chalcopyrite, associated with pyrite, pyrrhotite and sphalerite, is the ore mineral at the copper mine of Kam-Kotia Porcupine Mines Ltd., in Robb Township, west of Timmins. The mineralization is in a shear zone in Precambrian lavas and fragmentals (W. Hogg, 1962: Western Miner and Oil Review, vol. 35, No. 8, p. 18).

42 A/5 Copper-zinc ore consisting of chalcopyrite, pyrite and sphalerite was mined at the Genex deposit in Godfrey Township. Access to the property is by a road about 4.8 km long, leading west from Highway 576 at a point 6.7 km from its junction with Highway 101 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 152).

42 A/6 Copper ore, with chalcopyrite as the main ore mineral, has been mined at the McIntyre Mine in the Porcupine gold camp. The mine is on the shore of Pearl Lake at Schumacher (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 133).

42 A/9 The sulphide assemblage chalcopyrite-pyrrhotite-sphalerite-pyrite was mined at the Centre Hill Mine, a former producer in Munro Township. The deposit is 8.3 km by road, north of Highway 101 from a road junction 25.2 km east of Matheson (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 116).

42 A/11 The Kidd Creek Mine, located about 25.7 km north of Timmins is a world leader in the production of silver and zinc, and a substantial producer of copper, lead and cadmium. The copper production comes mainly from chalcopyrite (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 139).

42 F/4 Sulphide replacement bodies in the Manitouwadge area consist generally of massive pyrrhotite and sphalerite cores enclosed by disseminated chalcopyrite, pyrite, pyrrhotite and minor sphalerite (J.M. Harrison, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, p. 79).

52 B/9 The Shebandowan mine is located at the southwest end of Lower Shebandowan Lake. Pyrrhotite, pentlandite, chalcopyrite and pyrite are the main sulphides present in the ore. Polydmite, bravoite, violarite and millerite are present in minor amounts (J.A. Morin, 1973: Ont. Div. Mines, GR 110, p. 21).

52 B/10 The Tip Top Mine on the east side of Burchell Lake was worked for gold and copper. Chalcopyrite, pyrite, pyrrhotite, bornite and malachite were reported to be present. Access is by a 10.4 km road leading south from Highway 11 at a point 4 km west of Kashabowie (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 36).

52 G/15 The orebody at the Mattabi Mine is a massive chalcopyrite-sphalerite deposit with associated pyrite, galena, tetrahedrite-tennantite and arsenopyrite, minor pyrrhotite, and rare boulangerite and bournonite. The mine is located between Sturgeon and Bell Lakes about 80 km north of Ignace (J.M. Franklin, J. Kasarda and K.H. Poulsen, 1975: Econ. Geol., 70, p. 63).

52 L/16 A small high grade base-metal deposit has been found in Mulcahy Township about 32 km west of Red Lake and 1,200 m south-southwest of the south end of Trout Bay. The principal minerals consist of coarse grains of pyrrhotite, sphalerite and chalcopyrite. There are lesser amounts of galena, marcasite, arsenopyrite, cobaltite, pyrargyrite, paracostibite, gudmundite, stannite, argentian tetrahedrite, antimonial silver, allargentum, ilmenite, breithauptite, cassiterite and nisbite (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 232).

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The mineral collection of the Royal Ontario Museum includes specimens of chalcopyrite from the following occurrences in Ontario (J. Satterly, 1977: Ont. Geol. Surv., MP70, pp. 101-104):

31 C/11 Lot 2, conc. IX, Elzevir Township;

31 F/4 Highway 62 about 4.8 km north of Bancroft;

31 M/4 Cuniptau Mine, 6.4 km northwest of Temagami; and Net Lake, north of milepost 70, Ontario Northland Railway;

41 H/1 Wilcox Mine, lots 18 to 22, conc. IV, Cowper Township;

41 J/2 Pater Mine, southeast quarter of Section 29, Spragge Township, 0.4 km east of Spragge;

41 J/6 Glagoma Mine, north half of lot 1, conc. II; north half of lot 7, conc. I; and north half of lot 4, conc. V; all in Gladstone Township;

41 J/6 Brady Mine, No. 1 shaft, Section 26; Jury Mine, southwest quarter of Section 27; northeast quarter of Section 29; all in Patton Township;

41 J/10 Bi-Ore Mine, south shore of Cobre Lake, Sagard Township;

41 J/11 Cheney mine, lot 7, conc. V, 0.8 km south of Chub Lake on Highway 129, Gould Township;

41 K/16 Kristina (Supercrest, Superior) Mine, La Verendrye Township;

41 O/10 Consolidated Shunsby Mines Limited, 47°43'N, 82°40'W, Cunningham Township;

41 O/16
52 C/15 Parr Mines Limited, 47°47'N, 82°12'W, Genoa Township; near Mine Centre, 49°45'N, 92°37'W, east of Rainy Lake.

Quebec

22 A/13 Chalcopyrite is found in the Needle Mountain, Copper Mountain area at the headwaters of York River, near Murdochville in Holland Township, Gaspé. Associated minerals are pyrite, pyrrhotite, galena, sphalerite, bornite, chalcocite, tennantite, cubanite, molybdenite, scheelite and bismuth (R.E. Ford, 1959: Can. Inst. Mining Met. Bull., vol. 52, No. 567, p. 425).

31 H/8 Chalcopyrite occurs at the Huntingdon Mine in a mineralized greenstone host rock as disseminated particles, and as a constituent of sulphide masses. The mine is in Brome County, near Eastman (R.E. Hare, 1919: Can. Min. J., 40, p. 582-584).

31 M/7 The ore at the Lorraine Mine consisted of chalcopyrite, pyrrhotite, and pentlandite with minor amounts of pyrite, sphalerite and galena. The mine is located west of Belleterre. Access to the site is by road leading south for 5 km from Highway 62 at a point 20 km west of Belleterre (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 94).

32 C/4 Variable amounts of chalcopyrite occur with pyrrhotite in quartz veins cutting a shear zone in the Golden Manitou and Bidlamaque mines in Bourlamaque Township, Abitibi County (G.W.H. Norman, 1943: Geol. Surv. Can., Paper 43-2, p. 12).

32 C/4 The principal ore minerals at the Louvem Mine are chalcopyrite and sphalerite. The mine is 3.2 km by road from Highway 59, 20 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 120).

32 D/3 A small shatter zone on the property of West Wasa Mines Ltd., in Beauchastel Township is filled with pyrite and chalcopyrite (J. Claveau, W.N. Ingham, and W.G. Robinson, 1957: Que. Dept. Mines, Prelim. Rept., No. 256, p. 9-10).

32 D/6 Chalcopyrite, pyrite, pyrrhotite, and sphalerite are the principal ore minerals at the Amulet Mine and Waite-Ackerman-Montgomery Mine in Dufresnoy and Duprat townships in the Noranda district. The sulphides form veins and breccia fillings in the volcanics (M.E. Wilson, 1941: Geol. Surv. Can., Mem. 229, p. 105).

32 D/6 The Ribago Rouyn Mines property on range IX of Beauchastel Township is cut by a number of quartz veins which contain pyrite, pyrrhotite, chalcopyrite, and a little gold (J. Claveau, W.N. Ingham, and W.G. Robinson, 1957: Que. Dept. Mines, Prelim. Rept., No. 256, p. 8).

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The following occurrences of chalcopyrite are described by Ann P. Sabina, 1974, in Geol. Surv. Can., Paper 73-30, pp. 52, 53, 56, 57, 82, 86, 87, 90, 91.

32 D/6 Massive sulphide bodies consisting of pyrite, pyrrhotite, chalcopyrite and sphalerite have been mined at the Millenbach Mine, 8.3 km from Rouyn along Highway 46; and at the Norbec (Lake Dufault) Mine, 3 km west of Highway 46 from a point 12.5 km from Rouyn.

32 D/9 Chalcopyrite occurs abundantly in quartz and in sericite schist at the New Formaque Mine of Amos Mines Limited, about 7.2 km northeast of Amos.

32 D/10 Massive and disseminated chalcopyrite and pyrite ores have been mined at the Lyndhurst deposit located along the road to Laferté, 5.8 km from Highway 46.

32 D/11 Chalcopyrite was the ore mineral at the Hunter Mine situated 5.6 km by road east of Highway 63 from a point 4.8 km north of Duparquet.

32 E/8 A massive sulphide deposit of pyrite, chalcopyrite, sphalerite and pyrrhotite has been mined for copper and zinc at Joutel.

32 F/12
32 F/13 Massive sulphide ores consisting of pyrite, chalcopyrite, sphalerite and pyrrhotite are mined in the Matagami area at the Orchan, Mattagmi Lake and New Hosco copper-zinc mines.

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32 D/14 In the Normetal mine, on lots 43 and 44 of Desmeloizes Township, the sulphide minerals pyrite, sphalerite, and chalcopyrite tend to occur in separate bodies rather than together. They occur massive, and as disseminated replacements. The No. 1 orebody is relatively rich in chalcopyrite (C. Tolman, 1942: Que. Dept. Mines, Prelim. Rept., No. 170, p. 8).

32 F/12 Chalcopyrite with pyrite, pyrrhotite, sphalerite, and magnetite form a sulphide body at Garon Lake in the Mattagami Lake district (G.F. Jocklick, 1960: Econ. Geol., 55, No. 12).

32 G/14 The Opemiska Copper Mine ore occurs in vein-like lenses that have high chalcopyrite content along with a little gold (G.W.H. Norman, 1938: Geol. Surv. Can., Paper 38-11, p. 7).

32 H/14 Sulphide mineralization occurs in, and adjacent to, a dyke cutting a sheared anorthosite breccia on the property of Kayrand mining and Development Ltd., in Obalski Township, Abitibi East. Chalcopyrite, pyrite, pyrrhotite and sphalerite are the sulphide minerals. Small amounts of gold and silver are also present (R.B. Graham, 1956: Que. Dept. Mines, Geol. Rept., No. 71, p. 28 and 31).

Saskatchewan

63 L/9 Chalcopyrite occurs at Birch Lake with pyrrhotite, magnetite and pyrite, and at the Coronation Mine with pyrrhotite, magnetite, pyrite, sphalerite, gold and silver.

63 L/10 The sulphide occurrence at the Hudson Bay Mining and Smelting company property at Hanson Lake contains as principal minerals chalcopyrite, pyrite, pyrrhotite, sphalerite and arsenopyrite.

64 D/5 Chalcopyrite occurs with sphalerite, pyrite, pyrrhotite, and gold on the property of Churchill Minerals at Nistoassini Lake (A.R. Byers, 1960: Can. Inst. Mining Met., Bull. 53, p. 149).

73 P/6
73 P/7 Chalcopyrite is the main ore mineral at the Anglo Rouyn Mine situation 9.6 km by road south of Highway 2 from a point 47.7 km north of its intersection with Highway 166; similar ore occurs at the Eureka deposit on the north side

of Highway 2, 62.4 km north of its intersection with Highway 166 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5, 7).

74 A/7 The most abundant minerals in the orebody at the Rottenstone Mine are pyrrhotite, violarite and chalcopyrite. Associated minerals include: pentlandite, sperrylite, sphalerite and cubanite. The deposit is on a rusty dome on the southeast shore of Rottenstone Lake at 56°20'N, 104°49'W (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 8).

Yukon

105 C/14 Quartz veins containing considerable bornite and chalcopyrite are exposed on the Cone and Luck claims at 60°43'N., 133°22'W., on the south slope of a saddle cutting through Big Salmon Range about 4 km north-northeast of Cone Mountain (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 63).

105 D/10
105 D/11 The deposits of the Whitehorse copper belt consist of irregular lenses and patches occurring in skarn zones spread over a length of about 26 km immediately west of Whitehorse. In the Little Chief and Arctic Chief areas the ore minerals are chalcopyrite, bornite, chalcocite and valleriite with minor native copper. Bornite and chalcopyrite are the main ore minerals at War Eagle (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 110).

115 A/5 Lenses, veinlets and disseminated grains of chalcopyrite and bornite are found in andesite at the Johobo Mine at 60°29'N, 137°34'W, near Bornite Creek, 3.2 km southeast of Sockeye Lake and 5.6 km southwest of Kathleen Lakes. Access to the mine site is by truck road from Mile 142 (228 km) on the Haines road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 57).

115 A/11 High grade copper ore consisting of massive bornite and chalcopyrite replacing fractured andesite is found in the Kathleen Lakes area (-, 1961: Western Miner and Oil Review, vol. 34, No. 12, p. 45).

115 F/15 The nickel-copper sulphides pyrrhotite - pentlandite - chalcopyrite occur with sphalerite, pyrite and marcasite mainly as disseminations, less commonly as massive lenses, in very fine-grained volcanic rocks on the Canalask Nickel Mines property on the east and west banks of the White River. The property is reached by a 4.5 km access road that leaves the Alaska Highway at km 1878 (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 50).

115 G/5 Massive sulphides, mainly pyrrhotite, chalcopyrite and pentlandite with minor sphalerite, have been discovered on the Wellgreen property on Nickel Creek, a small tributary of Quill Creek, about 16 km west of Burwash Flats. The property may be reached by a 11 km access road from the Alaska Highway near km 1787 (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 52).

115 H/13
115 I/4 A porphyritic quartz diorite plug at the head of the south fork of Maloney Creek, 29 km from the confluence of Maloney Creek and the Nisling River (62°01'N., 137°54'W.) has a central zone containing pyrite, chalcopyrite, molybdenite, jarosite, azurite, malachite, magnetite and hematite, and a southern zone in which pyrite with minor chalcopyrite and molybdenite is widespread (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. of Indian Affairs and Northern Development, p. 77).

115 I/6 An irregular belt of altered breccia within and adjacent to quartz monzonite contains a pod of massive chalcopyrite and pyrite, and disseminated chalcopyrite is found in the monzonite and breccia, on the Yukon Revenue property located on Revenue Creek on the south side of the valley of Big Creek at 62°21'N., 137°12'W., about 56 km northwest of Carmacks (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. of Indian Affairs and Northern Development, p. 79).

115 I/7 Quartz lenses containing chalcopyrite and bornite have been explored at the Bonanza King property on the east side of Nancy Lee Creek about 300 m from the mouth, at 62°23'N., 136°38'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 42).

115 I/11 Porphyry copper deposits in which chalcopyrite and bornite are present as small veinlets and as disseminated grains have been explored on the DEF and MINTO claims, 62°37' to 62°38'N, 137°15'W, north of Dark Creek, about 72 km northwest of Carmacks (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory, p. 96-100; Dept. Indian and Northern Affairs).

115 J/10
115 J/15 Diamond drilling has outlined a large, low-grade, copper-molybdenum deposit on the Casino property (62°43'N., 138°49'W.) located 306 km northwest of Whitehorse in the Dawson Range. The property covers a watershed between Canadian Creek, a tributary of Britannia Creek which is a north-flowing tributary of the Yukon River, and Casino Creek, a southwest-flowing tributary of the Donjek River. Chalcopyrite, chalcocite and molybdenite are the ore minerals (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. of Indian Affairs and Northern Development, p. 57).

CHALCOSTIBITE

$CuSbS_2$

British Columbia

92 F/14 A minor amount of chalcostibite occurs at the Mount Washington Copper deposit situated on the northeast slope of Mount Washington near the summit, about 24 km northwest of Courtenay (J.E. Muller and D.J.T. Carson, 1969: Geol. Surv. Can., Paper 68-50, p. 42).

Northwest Territories

86 F/13 Chalcostibite was found veining native bismuth in a single specimen from the B.E.A.R. deposit on the north shore of Contact Lake about 14 km southeast of the Eldorado Mine on Labine Point (G.M. Furnival, 1939: Econ. Geol., 34, p. 754).

85 J/8 Chalcostibite has been found associated with other copper minerals in the gold deposits of the Yellowknife Bay area (L.C. Coleman, 1953: Am. Mineralogist, 35, p. 516).

Yukon

105 D/3 Chalcostibite, intergrown with stibnite, occurs in a quartz vein cutting granodiorite on the Porter property at Carbon Hill in the Wheaton

district. The chalcostibite occurs as laths rarely exceeding 3 millimetres in length (H.V. Warren and R.M. Thompson, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 82).

CHAMOSITE

$(Fe^{++}, Fe^{+++}, Mg,Al)_6(Si,Al)_4O_{10}(O,OH)_8$

Manitoba

63 J/13 Greenish grey massive chamosite has been identified in specimens from the property of Stall Lake Mines Limited (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 62).

Newfoundland

1 N/10 The iron ore at the Wabana Mine consisted of elongated spherules composed of alternating concentric layers of hematite and chamosite cemented by siderite. The mine, near the town of Wabana, was closed in 1966 after 72 years of production (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 62).

23 J/1 X-ray powder patterns have served to identify chamosite from Dyke Lake and Howells River, Labrador (E.W. Nuffield, and D.H. Gorman, 1960: private communication).

Ontario

31 E/1 Chamosite has been identified in a specimen from the Bicroft Mine, Bancroft (X-ray Laboratory, Geol. Surv. Can.).

52 A/6 A mineral from the Gunflint iron range near Port Arthur has been identified as chamosite from its X-ray powder pattern (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Quebec

31 G/11 Earthy green chamosite has been found in pegmatite at the Pedneaud Quarry near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 21).

CHAPMANITE

$Sb_2O_3.2Fe_2O_3.4SiO_2.H_2O$

Ontario

31 M/4 In the Keeley Mine near Cobalt, in South Lorrain Township, chapmanite occurs as a fine-grained green mineral associated with native silver, and iron and cobalt arsenides. The mineral was named in honour of E.J. Chapman, former Professor of Mineralogy and Geology (1853-1895) at the University of Toronto. Chemical analysis by E.W. Todd: FeO 33.91, Ni 0.36, Co 0.03, Cu 0.17, Bi 0.20, As 1.28, Al_2O_3 0.28, SiO_2 28.28, Sb_2O_5 31.65, H_2O 3.46, total 99.62 (T.L. Walker, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 5).

31 M/5 A specimen of chapmanite in the mineral collection of the Royal Ontario Museum was collected from the Nipissing Mine, claim RL404, north half of lot 5, conc. V, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 108)

chiastolite

(see ANDALUSITE)

CHILDRENITE

$FeAl(PO_4)(OH)_2.H_2O$

Yukon

117 A/9 Childrenite is one of a suite of phosphate minerals found at a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Other minerals found at the locality are: kulanite, lazulite, wardite, vivianite, ludlamite, metavivianite, arrojadite, augelite and brazilianite (J.A. Mandarino, and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

CHLOANTHITE

$(Ni,Co)As_{3-x}$

Chloanthite is the name applied to that portion of the cobalt-nickel arsenide series (skutterudite series) near $(Ni,Co)As_{3-x}$ where x = 0.5 to 1. Fe commonly substitutes for Ni and Co; Bi and Ag, less commonly. Small amounts of S may substitute for As.

Chaloanthite alters to greenish annabergite in contrast with its cobalt-rich counterpart, smaltite, which alters to rose-coloured erythrite.

Newfoundland

2 E/13 Tilt Cove Mines, the oldest copper producers in Newfoundland, are at Tilt Cove on the northeast shore of Notre Dame Bay. The West Mine also contained nickel ore consisting of maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Northwest Territories

86 K/4 Chloanthite occurs as zoned crystals of cubic habit at the Eldorado Mine on Great Bear Lake. Associated metallic minerals are skutterudite and smaltite. Quartz, carbonates, and a little chloritic mica are the principle gangue constituents. An analysis of a zoned crystal by A.E. Rothwell is as follows: Ni 19.23, Co 6.10, As 67.67, S 2.06, Fe 1.09, Sb nil, insol. 3.53, total 99.68 (Ellis Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 46).

Ontario

31 M/4 Crystals of a grey to white, metallic, cubo-octahedral mineral from the Keeley Mine near Cobalt were found to contain chloanthite as a constituent of their inner zones along with some löllingite and skutterudite. The outer zones are composed almost exclusively of the latter but annabergite and iron hydroxides are present as coatings (J. Mackintosh and E. Thomson, 1924: Univ. Toronto Stud., Geol. Ser., No. 17, p. 30).

31 M/5 Chloanthite, cobaltite, smaltite, native silver, and dyscrasite occur together on mining properties in Coleman Township in the Cobalt area (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, 201 A).

An analysis by Burrows of chloanthite from the La Rose Mine in Coleman Township is as follows: As 67.17, S 2.18, Ni 23.24, Co 4.11, Ag 2.78, total 99.48 (W.G. Miller, 1905: Ont. Bur. Mines, Ann. Rept., vol. 14, Pt. II, p. 9).

31 M/5 Chloanthite has been found in veins on the south shore of Cross Lake, 3.2 km southeast of Cobalt. Other minerals associated with the chloanthite are skutterudite, rammelsbergite, argentite, niccolite, cobaltite, safflorite, gersdorffite, smaltite, chalcopyrite, tetrahedrite, arsenopyrite, galena, sphalerite, pyrite, marcasite, pyrargyrite, silver, breithauptite and dyscrasite (E. Thomson, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 41).

31 M/5 Chloanthite intimately mixed with smaltite occurs in the Foster Mine in the Cobalt area. Analyses of two samples are as follows:

Co	Ni	Fe	Cu	As	S	Total
13.81	11.35	1.21	0.96	71.61	0.75	99.69
12.61	14.14	2.10	0.40	66.87	4.13	99.80

(H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 220).

41 P/10 Veins at the Miller Lake O'Brien Mine in the Gowganda district contain a considerable amount of chloanthite with associated skutterudite, safflorite, rammelsbergite, tetrahedrite, smaltite, arsenopyrite, cobaltite, galena, niccolite, breithauptite, chalcopyrite, and sphalerite. Gangue minerals are calcite and quartz (Ellis Thomson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 61).

41 P/10 Chloanthite has been found with niccolite, smaltite, and native silver in a calcite vein 2.5 to 5 cm wide, on claim H.R. 439, Charters Township, Gowganda area. A shallow shaft has been sunk in the vicinity of the vein (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 42).

CHLORAPATITE

$Ca_5(PO_4)_3Cl$

Ontario

31 C/10 Apatite from a small skarn deposit on the northern end of Bob's Lake, Oso Township, Frontenac County has been found to be monoclinic chlorapatite with the highest Cl content yet reported for an apatite. It occurs as pinkish-white crystals in a thin vein 15 to 20 cm wide and traceable for 4.5 m. Chemical analysis: CaO 53.4, P_2O_5 41.2, Cl_2 6.2, F_2 0.13, H_2O 0.09, total 101.02, less O for Cl, F 1.45, total 99.57 (A.W. Hounslow and G.Y. Chao, 1970: Can. Mineralogist, 10, p. 252).

CHLORARGYRITE

AgCl

Chlorargyrite (preferred name), also known as cerargyrite or horn silver, is a secondary mineral found in the oxidized zone of silver deposits especially in arid regions.

British Columbia

82 E/4 Acanthite, tetrahedrite, pyrargyrite, chlorargyrite, galena, sphalerite, pyrite and chalcopyrite occur as irregular concentrations and bands within a vein system at 49°03'N, 119°41'W, 16 km west-northwest of Osoyoos on Richter Mountain, from the Similkameen River road to Richter Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 43).

Ontario

Chlorargyrite specimens from the following two localities are present in the mineral collection of the Royal Ontario Museum. (J. Satterly, 1977: Geol. Surv. Can., MP 70, p. 110)

31 M/5 Nipissing Mine, Claim RL404, north half of lot 5, conc. V, Coleman Township.

52 A/7 Silver Islet Mine, Silver Islet, Lake Superior, Sibley Township.

CHLORITE

$(Mg,Fe^{++},Al,Fe^{+++})_6(Si,Al)_4O_{10}(OH)_8$

The chlorites are a group of layered silicate minerals occurring mainly as products of hydrothermal alteration in igneous and metamorphic rocks. Varietal names include: clinochlore, penninite, ripidolite, corundophilite, colerainite, thuringite, sheridanite.

Ontario

31 F/7 A chemical analysis of dark green transparent clinochlore folia from conc. VII, lot 16 of Bagot Township is as follows: SiO_2 27.23, Al_2O_3 19.44, Fe_2O_3 2.17, FeO 4.91, Cr_2O_3 0.99, MgO 32.67, K_2O 0.08, H_2O 12.04, total 99.53 (G.C. Hoffmann, 1892: Geol. Surv. Can., Ann. Rept., VI, p. 17 R).

The X-ray powder pattern of this chlorite has the following strongest lines (Fe radiation): 7.09 (10), 4.73 (7), 3.54 (9), 2.57 (7), 2.442 (7), 2.002 (6). The mineral corresponds to the IIb polytype of S.W. Bailey and B.E. Brown, 1962: Am. Mineralogist, 47, pp. 819-850 (X-ray Laboratory, Geol. Surv. Can.).

31 F/7 Masses of silvery green chlorite and dull green bladed actinolite occur at the Bluff Point Mine, an old magnetite deposit about 2.4 km south of Calabogie (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 8).

Quebec

21 L/3 Chemical analysis of colerainite crystals (corundophilite) from Standard Mine, near Black Lake, by M.F. Connor: SiO_2 24.40, Al_2O_3 22.77, Fe_2O_3 0.45, MgO 32.70, CaO 0.10, $(Na,K)_2O$ 0.30, MnO 0.09, H_2O 19.63, total 100.44; S.G. 2.51 (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Museum Bull. 27, p. 68).

Chlorite occurs as green plates in compact serpentine rock at the Montreal Chrome pit, Megantic County. Chemical analysis by R.J.C. Fabry (1930): SiO_2 34.39, Al_2O_3 17.35, Fe_2O_3 2.94, FeO 2.70, MgO 31.08, CaO 2.08, Na_2O 0.34, K_2O nil, H_2O^+ 9.25, H_2O^- 0.08, TiO_2 nil, MnO nil, CO_2 nil, total 100.21 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 365).

31 G/12 Chemical analysis of ripidolite from range IX, lot 18, Templeton Township, Papineau County, by Harrington: SiO_2 35.80, Al_2O_3 13.18, Fe_2O_3 4.28, FeO 10.18, MgO 22.80, H_2O 12.64 total 99.88; S.G. 2.61 (B.J. Harrington, 1877-8: Geol. Surv. Can., Rept. Prog. p. 34 G).

White or bluish white scales and broadly foliated aggregations of clinochlore have been found with scapolite and serpentine in Papineau County, Buckingham Township, range XII, lot 24.

The following is a chemical analysis by Johnston of a specimen from this locality: SiO_2 28.65, Al_2O_3 18.96, MgO 37.49, H_2O 15.22, total 100.32; S.G. 2.631 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 17 R).

CHLORITOID

$$(Mg,Fe^{++})_2Al_4Si_2O_{10}(OH)_4$$

Chloritoid as a rock-forming mineral is a characteristic constituent of low and medium grade regionally metamorphosed pelitic sediments. It is also found in hydrothermal quartz-carbonate veins. The varietal name, ottrelite, is sometimes used for manganese-rich chloritoid.

Nova Scotia

20 O/16 Chloritoid is associated with garnet, actinolite, staurolite, sillimanite and pyrite and occurs as small crystals in light grey schist which outcrops along the shore from Foote Cove south to Chegoggin Point, Yarmouth County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 78).

Ontario

42 A/6 Chloritoid occurs in the Hollinger Mine at Timmins as small green plates from 1 to 5 millimetres across, which are randomly oriented with regard to the rock cleavage. In thin section the plates appear to be rectangular with multiple twinning parallel to their length. Inclusions of ankerite and quartz are common. Concentrations of the mineral about pyrite and tourmaline grains in altered rock suggests a genetic relationship between them and the chloritoid (J.K. Gustafson, 1946: Am. Mineralogist, 31, p. 313).

42 C/2 Single crystals, sheaf-like bundles, and rosettes of chloritoid make up as much as twenty per cent of the schists that occur in the Josephine-Bartlett iron range, township 28, range XXV, Algoma district (E.S. Moore and H.S. Armstrong, 1946: Ont. Dept. Mines, Ann. Rept., vol. 55, Pt. IV, pp. 43-4).

42 L/4 X-ray powder patterns have served to identify chloritoid in specimens obtained from a locality 6.4 km west of Onaman Lake (E.W. Nuffield and D.H. Gorman, 1960: private communication).

52 G/15 Chloritoid forms coarse single metacrysts and irregular aggregates in the ore and wall rocks at the Mattabi Mine, a massive sulphide copper-zinc deposit located between Sturgeon Lake and Bell Lake about 80 km north of Ignace. (J.M. Franklin, J. Kasarda and K.H. Poulsen, 1975: Econ. Geol., 70, p. 63)

Quebec

21 L/3 Chemical analysis by Hunt, of chloritoid from Megantic County, Leeds Township: SiO_2 26.30, Al_2O_3 37.10, FeO 25.92, MnO 0.93, MgO 3.66, H_2O 6.10, total 100.01 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 498).

The chloritoid from this locality, now the Harvey Hill Mine, occurs as greenish black plates in quartz-carbonate veins (R.H. Milne, 1949; Am. Mineralogist, 34, p. 422).

31 H/2 Chloritoid has been reported from Brome and Sutton townships, Brome County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 28 T).

32 D/6 Ottrelite is reported to be a constitutent of the host rocks at the Horne Mine, Noranda. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 47)

32 D/14 At the Normetal mine, chloritoid is present as platy crystal aggregates in rhyolite and tuff. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 58)

CHONDRODITE

$$Mg(OH,F)_2.2Mg_2SiO_4$$

The humite group minerals, norbergite, chondrodite, humite and clinohumite occur almost exclusively in metamorphosed and metasomatized limestone. Identification of individual minerals of the group is difficult and often impossible without the use of X-ray diffraction techniques.

Ontario

31 C/7 Chondrodite has been identified by X-ray diffraction in specimens from the Foxton Mine, near Sydenham (X-ray Laboratory, Geol. Surv. Can.).

31 C/9 Chondrodite occurs in crystalline limestone near Newboro on lot 27, conc. III, South Crosby Township, Leeds County (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept. vol. 9, p. 196) (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 28 T).

A remarkably bright chondrodite is exposed in limestone at a railway cut near the Chaffey's Locks station (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 69).

31 C/10 Chondrodite has been reported in crystalline limestone at road-cuts along the Westport road about 11 km from Godfrey east of Highway 38. It forms transparent, orange, granular masses up to 12 mm across in white calcite. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 16.)

31 E/1 Minute grains of chondrodite are found in the calcite on lot 11, conc. I, Harcourt Township, Haliburton County (F.D. Adams and A.E. Barlow, 1910: Geol. Surv. Can., Mem. 6, p. 201).

31 E/1 A specimen of chondrodite from the Cardiff Uranium mine, lot A, conc. XVII, Cardiff Township, is in the Royal Ontario Museum mineral collection. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, po. 113)

31 F/1 The mineral collection of the Royal Ontario Museum includes a specimen of chondrodite from the Cameron quarry, lot 8, conc. IV, Ramsay Township. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 113)

31 F/10 Road-cuts on Highway 653, 2.2 and 10.7 km from Haley Station, expose crystalline limestone containing yellow and yellowish-orange chondrodite. (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 57)

31 F/10 Crystalline limestone at the Carswell quarry and in nearby road-cuts on the roads to Bryson and Grand Calumet, about 0.8 km from Highway 8, contains yellow chondrodite. (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 100-103)

31 F/11 Chondrodite occurs in crystalline limestone exposed in a road-cut on the south side of

Highway 60, 2.2 km west of the Lake Doré road junction at Golden Lake. (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 49)

Quebec

21 M/2 Limestones at Sault de la Puce in Montmorency County contain chondrodite with spinel (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 67).

31 F/9 An occurrence of chondrodite has been reported in Pontiac County, Aldfield Township, range IV, lot 10 (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 28 T).

31 F/15 The limestone and skarn rocks of Grand Calumet Township contain chondrodite. The mineral occurs on the property of Calumet Uranium Mines Ltd., range VII, lots 28 to 31, and range VI, lots 31 and 32 (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 31).

31 H/13 Chondrodite has been found near St. Jerome in Terrebonne County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 28 T).

31 J/3 Occurrences of chondrodite in the Grenville limestone of McGill Township are fairly common (E. Aubert de la Rue, 1948: Que. Dept. Mines, Prelim. Rept., 215, p. 6).

31 J/4 Chondrodite, usually with spinel, is found on lot 17, range II of Bigelow Township where its host rock, a limestone, has been cut by small granitic bodies. In some parts of the area chondrodite forms up to thirty per cent by volume of the rock (E. Aubert de la Rue, 1956: Que. Dept. Mines, Geol. Rept., 68, p. 7).

31 J/6 Orange-brown grains of chondrodite occur in limestone intruded by pegmatite on lots 42 and 43 of range VI, Kiamika Township (E. Aubert de la Rue, 1948: Que. Dept. Mines, Geol. Rept., 23, p. 56).

31 J/7 Cinnamon-brown chondrodite has been reported from the deposit at the Canada Marble and Lime Quarry near L'Annonciation. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 60.)

31 J/16 An occurrence of chondrodite is known on the Milieu River, 4.8 km north of Perrault Creek in Berthier County near the Maskinonge County line (R.W. Ells, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 26 J).

CHROMITE

$FeCr_2O_4$

Chromite, the only important ore mineral of chromium, has the theoretical composition $FeCr_2O_4$. The Cr_2O_3 content, however, is usually considerably less than the theoretical due to replacement of part of the iron by magnesium and part of the chromium by aluminium. Chromite occurs in ultrabasic rocks and in serpentine derived from them. It may occur in commercial amounts in stream sands derived from serpentine areas. Canadian chromites are generally low-grade, i.e., low Cr_2O_3 content and Cr:Fe ratio.

British Columbia

92 I/11 Massive and disseminated chromite occurs in lenses of serpentine near Highland Valley in the Ashcroft area (S. Duffell, 1947: Geol. Surv. Can., Paper 47-10, p. 5).

92 I/14 Chromite is found associated with magnetite and carbonates in serpentine rocks at Chrome Creek, at a point about 500 m above its entrance into Scottie Creek, and roughly twenty miles north of Ashcroft. Chemical analysis by R.A.A. Johnston is as follows: Cr_2O_3 55.90, Al_2O_3 13.83, FeO 14.64, MgO 15.01, SiO_2 0.60, total 99.98 (Leopold Reinecke, 1920: Geol. Surv. Can., Mem. 118, p. 86).

92 J/15 Small black crystals and irregular lumps of chromite are found in the Bridge River mining camp. Chemical analysis of a specimen from the district is as follows: SiO_2 4.82, Al_2O_3 19.94, CaO 0.05, Cr_2O_3 48.72, MgO 12.79, FeO 12.80, total 99.12 (C.E. Cairnes, 1937: Geol. Surv. Can., Mem. 213, p. 69).

92 O/2 Chromite has been found as films on fracture planes and filling cavities in serpentine in the Bridge River area, on the northwest corner of Taylor Basin (W.S. McCann, 1922: Geol. Surv. Can., Mem. 130. p. 74).

104 O/9 Chromite is an abundant accessory mineral in the dunite and peridotite of the Blue River intrusion. The largest observed concentration is associated with bands of dunite in the vicinity of Ice Lake (W.J. Wolfe, 1965: Geol. Surv. Can., Paper 64-68, p. 14).

Manitoba

52 L/5 Extensive deposits of chromite, occurring as small grains and octahedral crystals disseminated throughout a serpentine matrix, are present in the Bird River sill, a folded periodotite-gabbro intrusion in the Lac du Bonnet district. The chromite is consistently near the top of the sill (G.M. Brownell, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 101, J.D. Bateman, 1945: Am. Mineralogist, 30, p. 596, G.D. Springer, 1950: Manitoba Mines Br., Publ. 49-7, p. 6, J.P. Davies, 1952: Manitoba Mines Br., Publ., 51-3, p. 19).

New Brunswick

21 G/3 Chromite occurs in gabbro at the Atlantic Nickel Mine on Rogers Farm in Charlotte County (New Brunswick Mines Br., files).

Newfoundland

12 B/15
12 B/16 Chromite occurs in the vicinity of the Bay of Islands igneous complex in Western Newfoundland, at (1) the Blow-Me-Down Mountain pluton on the Fox Island River; (2) the Lewis Hills pluton on the Fox Island River; (3) the Chrome Point deposits - a small hill southeast of the Fox Island River and south of Springers Hill; (4) Mine Cave in the Lewis Brook Area.

12 G/1 Chromite also occurs as lenses in the upper part of the ultrabasic zone, in the Bay of Islands. At the Stowbridge deposit and at the southwest end of North Arm Mountain, the lenses are warped into flowage folds. The chromite is in dunite but peridotite layers occur nearby (C.H. Smith, 1958: Geol. Surv. Can., Mem. 290, p. 100).

Ontario

32 D/13 Analyses of samples taken from an outcrop of serpentine in Steel Township, conc. C, lots 3 and 4, indicate the presence of considerable chromite (M.B. Baker, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 273).

42 A/6 Chromite from the Porcupine district is represented in the National Mineral Collection.

42 A/10 Disseminated chromite and nests of chromite up to 7.5 cm in diameter occur in serpentine in Dundonald Township, on conc. I, lot 2, and on conc, II, lots 1 and 2 (P.E. Hopkins, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 207) (M.B. Baker, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 272).

42 A/14 A small body of chromiferous serpentine grading about 8 per cent Cr_2O_3 has been found in Reaume Township on conc. V and VI, lots 10 and 11 (P.E. Hopkins, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 206).

Quebec

Chromite has been found at many points in the serpentine rocks of the Eastern Townships and Gaspé. Some of the more noteworthy occurrences are as follows (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 67).

21 E/13 Wolfe County, South Ham Township, lots 24-27, range I.

21 E/14 Wolfe County, Garthby Township, lots b,c,i, range I and lot 8, range II.

21 L/3 Megantic County, Coleraine Township, A and B; Leeds Township, lot 1, range X, and lot 10, range X; Thetford Township, lots 16-18, range IV.

22 B/5 Matapedia County, Awantjish Township, lot 5, range III, and lots 10-12, range IV.

22 B/16 Gaspé County, Mount Albert.

31 H/1 Brome County, Bolton Township, lot 13, range IV; lot 26, range VI; lots 9, 13, 26, range VII.

31 H/8 Richmond County, Brompton Township, lots 25, 26 range IX.

31 H/9 Richmond County, Cleveland Township, lot 9, range X; Melbourne Township, lot 22, range VI.

chrompicotite

(see MAGNESIOCHROMITE)

CHRYSOBERYL

$BeAl_2O_4$

Newfoundland

2 F/4 Light yellow to greenish yellow chrysoberyl occurs sparingly in beryl-bearing pegmatite and granite exposed along the Wesleyville Road and in a roadside quarry. The occurrences are between 11 and 15 km from Wesleyville (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 92).

Quebec

31 I/13 An occurrence of chrysoberyl is reported near the forks of the Post River in Maskinonge County (H.S. Spence, 1930: Am. Mineralogist, 15, p. 439).

The crystals are tabular suggesting that they are of the alexandrite variety of the mineral (D.S.M. Field, 1952: Can. Mining J., 73, Pt. I, pp. 78-80).

31 J/5 A specimen of lime yellow chrysoberyl in the National Mineral Collection is reported to have been found on lot 25, range V, Robertson Township, near Mont Laurier.

CHRYSOCOLLA

$CuSiO_3.2H_2O$

British Columbia

82 F/11 Specimens in the National Mineral Collection were collected from the mountainside about 150 m up from Willow Point on the west arm of the Kootenay River (donated by R. McAllister).

92 H/6 Chrysocolla is associated with the copper ores of the King Solomon Mine in the Greenwood mining division (R. Bell, 1902-3; Geol. Surv. Can., Ann. Rept., XV, p. 125 A).

92 I/2 Quartz-calcite veins containing malachite, azurite, chrysocolla, chalcocite, bornite and chalcopyrite occur at 1680 m elevation on Iron Mountain, 8 km south-southeast of Merritt (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 142).

92 I/11 Chrysocolla occurs on the Transvaal claims in the Forge Mountains, Yale district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 68).

93 A/12 Chrysocolla, covellite, cuprite and malachite are present at an elevation of about 960 m surrounding Bootjack Lake, 8 km southwest of Likely, at 52°33.5'N, 121°38.5'W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 208).

93 M/4 The secondary minerals chrysocolla, brochantite and posnjakite have been identified on specimens from the Rocher Deboule Mine, about 10 km south of Hazelton. (X-ray Laboratory, Geol. Surv. Can.)

Newfoundland

1 L/14 The secondary copper minerals, malachite, chrysocolla and azurite, occupy pockets in fluorite at the St. Lawrence fluorite mines (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 87).

1 N/12 Crusts of chrysocolla and malachite occur on covellite and on rock surfaces exposed at a rock-cut on the Trans Canada Highway, 0.8 km north of the turn-off to Chance Cove. (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 83)

Northwest Territories

78 B/11 Chrysocolla has been found in volcanic rocks of the Natkusiak Formation in the Shaler Mountains on Victoria Island (R. Thorsteinsson and E.T. Tozer, 1962: Geol. Surv. Can., Mem. 330, p. 77).

Nova Scotia

11 D/14 Colourful specimens composed of chrysocolla with colourless quartz and white chalcedony have been found in the dumps of the Dunbrack Mine, 4.5 km from Musquodoboit Harbour along the road to Meaghers Grant, Halifax County. (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 7.)

Quebec

22 A/13 At the Copper Mountain deposit of Gaspé Copper Mines Limited, Murdochville, compact fine-grained, turquoise-coloured chrysocolla is found with malachite, azurite and tenorite. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81.)

32 D/9 Chrysocolla and malachite have been reported at the New Formaque Mine, about 7.2 km by road east of Amos (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 83).

Yukon

105 D/11 Chrysocolla, limonite, and green copper carbonate occur as incrustations on granite at the Pueblo claim on the west side of the Lewes River, Whitehorse mining division (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 19 R).

105 D/14 Vividly coloured malachite, chrysocolla and azurite occur half-way up a steep road-cut on the left side of the Alaska Highway 3.8 km north of the cut-off to Whitehorse (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 52).

115 F/15 Light blue crusts of chrysocolla on calcite have been identified on specimens from the Canalask Mine on the east side of the White River overlooking Miners Ridge. Access is by a 4.5 km road leading south from the Alaska Highway at Mile 1167.9 (1879.1 km) (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 73).

chrysotile

(see SERPENTINE)

CINNABAR

HgS

Cinnabar is the most important ore mineral of mercury. It is generally found in veins that have formed at low temperatures relatively near the surface in regions of recent volcanic and hotspring activity.

British Columbia

82 G/13 An occurrence, in the Fort Steele Mining division, of massive tetrahedrite with minor pyrite in a quartz-siderite gangue, was found to contain small red crystals of cinnabar. The locality is on the Red Rock claim group, on Copper Creek, a tributary of Skookumchuck Creek (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 548).

82 N/7 Cinnabar occurs in calcite veins near Golden on the Kicking Horse River (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 66 R).

92 C/14 The greenish grey feldspathic rocks at the eastern entrance of Sechart Channel in Barkley Sound, Vancouver Island, contain cinnabar and native mercury (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 66 R).

92 H/14 The gold placers of the Fraser River in the Boston Bar area are said to contain cinnabar in small quantities (G.C. Hoffmann, 1886: Geol. Surv. Can., Ann. Rept., II, p. 9 T).

92 I/3 Magnetite, garnet, ilmenite, zircon, rutile, olivine, platinum, gold, quartz, epidote, thorianite, chromite, feldspar, cinnabar, muscovite, calcite, scheelite, and sperrylite are present in the black sands of the Fraser River near Lytton (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 526).

92 I/10
92 I/15 Cinnabar is abundant in the volcanic rocks of the Nicola map-area between Tunkwa Lake and Criss Creek. It is accompanied by silicification or alteration to carbonates. Specimens have been obtained from a locality between Criss and Deadman creeks, 400 m from their junction (W.E. Cockfield, 1961: Geol. Surv. Can., Mem. 249, p. 82).

Veins largely composed of quartz, calcite, dolomite, barite, and feldspar also contain cinnabar, at Six Mile Point in the Kamloops mining division (G.M. Dawson, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 118 A).

Cinnabar also occurs at Cooper Creek in the same area (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 31 R).

92 I/15 Cinnabar occurs with pyrite in silicified felsite at elevations between 630 and 1400 m on the hill east of Carabine Creek, 5.6 km north of Copper Creek post office at the Merc, Lee and Wedge claims, formerly known as the Hardie Mountain showings (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 240).

92 J/15 Pyrite, stibnite and cinnabar occur in veins and as replacement bodies in greenstone at 900 m elevation on the north shore of Carpenter Lake at 50°53.8'N, 122°47.9'W, 4.8 km northeast of Gold Bridge (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 283).

92 J/15
92 O/2 A number of occurrences of cinnabar are known in the Bridge River district of British Columbia. It is disseminated in the rusty weathering greenstones of the Mercury Creek area, near Tyaughton Lake. It is present in small amounts in the Tyaughton Creek Valley scheelite deposit and is abundant in the vicinity of Tyaughton Creek near Relay, Mire, and Mercury Creeks (J.S. Stevenson, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 104) (C.E. Cairnes, 1943: Geol. Surv. Can., Paper 43-15, p. 33. K. Watson, 1950: Am. Mineralogist, 35, p. 457).

Cinnabar is associated with stibnite in fractures in conglomerate at 51°04'N, 122°48'W at an elevation of 1500 m on Relay creek, 2.4 km above Tyaughton Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 224).

92 K/15 An occurrence of cinnabar has been reported in the vicinity of the Homathco River in the Nanaimo mining division (G.S. Hoffmann, 1886: Geol. Surv. Can., Ann. Rept., II, p. 9 T).

93 K/8 Cinnabar occurs with quartz and carbonate in fractures in pyroxenite at 54°29.5'N, 124°08'W, just north of the Fort St. James to Manson Creek highway, 9.6 km northeast of Fort St. James near the northeast corner of lat. 4753 (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 157).

93 K/9 Cinnabar deposits of economic size and grade are present in brecciated fault zones in the Permian limestones of the Pinchi lake district. The cinnabar occurs as blebs, grains or veinlets, and may be red and massive or purplish red and crystalline (J.D. Gray, 1938: Geol. Surv. Can., Paper 38-14, p. 9, J.E. Armstrong, 1944: Geol. Surv. Can., Paper 44-5, p. 6, and 1949: Geol. Surv. Can., Mem. 252, p. 126).

93 N/11 Cinnabar is present as fracture fillings and replacements in limestone at the Jouston

property at 55°32.5'N, 125°21.5'W, on Fisher Creek, 2.4 km northwest of the confluence of Kwanika and West Kwanika creeks. The showings are immediately south of the former Bralorne Takla mercury mine (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 105).

93 N/11 Dolomitized and brecciated limestone and chert contains cinnabar on the Amy claims on Silver Creek at an elevation of 1000 m, at 55°40'N, 125°29'W, about 21 km north of the Bralorne Takla Mine (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 184).

New Brunswick

21 J/16 Cinnabar has been identified by X-ray powder pattern as present in specimens from Devils Brook (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Ontario

31 F/2 Disseminated tetrahedrite and minor cinnabar occur with barite veins in crystalline limestone on a property prospected by Carndesson Mines near Clyde Forks in Lanark County (I. Jonasson, 1971: Geol. Surv. Can., Paper 71-1A, p. 74).

CLAUSTHALITE

PbSe

Northwest Territories

56 D/2 A minor amount of clausthalite is associated with umangite, berzelianite and athabascaite as fracture fillings in carbonatized mafic intrusive rock from Christopher Island, Baker Lake (G.J. Pringle and A.R. Miller, 1977: Geol. Surv. Can., Paper 77-1B, p. 113).

Ontario

41 N/2 Clausthalite from the Theano Point, Montreal River, area has been described as a lustrous lead grey mineral with a faint bluish cast on fresh surfaces and having occasional reddish brown spots (J.W. Earley, 1950: Am. Mineralogist, 35, p. 338).

Clausthalite has been identified at the Camray Mine, near the mouth of the Montreal River. It was found in association with pitchblende, and an unidentified mineral (E.W. Nuffield, 1955: Ont. Dept. Mines, Ann. Rept., vol. 64, Pt. III, p. 18).

42 A/11 Clausthalite is one of the most commonly found selenide minerals in a bornite-rich zone on the 1200 level of the Kidd Creek Mine, north of Timmins. Electron microprobe analysis: Pb 67.9, Bi 3.7, Ag 1.05, Cu 0.04, Fe 0.02, Se 26.8, S 1.3, total 100.81. The mine is 25.7 km north of Highway 101 and may be reached via Highway 655 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

Saskatchewan

74 N/8
74 N/10 Selenide minerals are found in some of the uranium deposits in the Goldfields district of Saskatchewan. Clausthalite is associated with the copper selenides, unmangite, klockmannite, and berzelianite in a deposit north of Hal Lake, which is about 450 m west of the Eagle shaft; and is the only selenide present in other deposits where it is associated with pitchblende, bornite, and chalcocite (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, pp. 55-6).

cleavelandite

(see ALBITE)

clinochlore

(see CHLORITE)

CLINOHUMITE

$Mg(OH,F)_2.4Mg_2SiO_4$

The humite group minerals, norbergite, chondrodite, humite and clinohumite occur almost exclusively in metamorphosed and metasomatized limestone. Identification of individual minerals of the group is difficult and often impossible without the use of X-ray diffraction techniques.

British Columbia

82 K/7 Clinohumite has been identified as a constituent in the 'Upper Hamill' schist at Duncan Lake. (X-ray Laboratory, Geol. Surv. Can.)

Ontario

31 C/9 Fresh rounded grains of clinohumite are present in the crystalline limestones exposed at a railway cut near Chaffeys Locks. The mineral is amber yellow and has a vitreous lustre. Chemical analysis by H.C. Rickaby: SiO_2 37.42, TiO_2 1.14, Fe_2O_3 0.46, FeO 1.27, MgO 56.32, MnO 0.10, H_2O 0.56, F 5.04, total 102.31, less O=F 2.12, total 100.19. S.G. 3.17 (T.L. Walker and A.L. Parsons, 1927: Univ. Toronto Stud., Geol. Ser., 24, p. 15).

31 E/1 Clinohumite has been identified by X-ray powder pattern as present in a sample from a locality near the village of Wilberforce (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 F/4 Yellow to orange clinohumite occurs in marble at the York River tactite zone on the east side of the York River, 320 m north of Highway 500 from a point 11 km east of Bancroft; and in road-cuts on Highway 500 on the east side of the York River at a point 11 km east of the junction of Highways 500 and 62 in Bancroft (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

42 G/7 An occurrence of titaniferous clinohumite has been reported in a carbonatite complex at Cargill Lake. Electron microprobe analysis: SiO_2 36.1, TiO_2 3.14, FeO 14.6, MnO 0.62, MgO 44.7, F 1.15, H_2O (calc.) 1.46, total 101.77, less O for F 0.48, total 101.29 (V. Kocman and J. Rucklidge, 1973: Can. Mineralogist, 12, p. 39).

Quebec

31 F/10 Yellow transparent grains of clinohumite occur in crystalline limestone in a road-cut near Bryson on the road to Campbells Bay (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 102).

31 J/4 Clinohumite has been identified by its X-ray powder pattern as an abundant constituent of limestone on lot 17, range II, Bigelow Township (X-ray Laboratory, Geol. Surv. Can.).

31 J/4 Clinohumite occurs as bright orange aggregates, commonly 6 mm across, in limestone on a hill on the west side of the du Lièvre River near Notre-Dame-du-Laus (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 45).

31 J/11 At the Val-Barrette Quarries clinohumite occurs as orange granular patches averaging 6 mm across (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 57).

31 J/12 Orange clinohumite forms granular aggregates about 12 mm across in crystalline limestone roadcuts on Highway 35 north of St-Aimé (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 55).

CLINOSAFFLORITE

$CoAsS_2$

Ontario

31 M/5 Clinosafflorite, the monoclinic polymorph of safflorite, has been identified for the first time in natural occurrence in three specimens from Cobalt, intimately intergrown with skutterudite. The composition range, determined by electron microprobe is found to be $Co_{0.70-0.76}Fe_{0.14-0.26}Ni_{0.01-0.10}As_2$ (Dennis Radcliffe and L.G. Berry, 1971,: Can. Mineralogist, 10, p. 877.)

clinozoisite

(see EPIDOTE)

COALINGITE

$Mg_{10}Fe_2(CO_3)(OH)_{24}.2H_2O$

Northwest Territories

86 O/3 Coalingite, discovered in 1965 in the New Idria serpentinite, California, occurs as fracture fillings in drill cores from the Muskox Intrusion. It is believed to have formed in situ at room temperature during storage of the drill cores. Chemical analysis by J.L. Bouvier: MgO 42.9, MnO 1.0, FeO 0.7, Fe_2O_3 20.9, CO_2 1.6, H_2O 27.6, loss on ignition 4.2, total 98.9 (J.L. Jambor, 1969: Am. Mineralogist, 54, p. 437).

Quebec

32 D/9 Coalingite has been identified in drill core from the Dumont Nickel Corporation property near Amos (J.L. Jambor, 1975: Geol. Surv. Can., Paper 75-1A, p. 261).

COBALTITE

CoAsS

Cobaltite is an ore mineral of cobalt, found in vein deposits with sulphides and arsenides of cobalt, iron and nickel. It has a crystal structure similar to that of pyrite.

British Columbia

92 H/8 Mineralization on the Oregon property about 4.8 km east of Hedley consists of massive garnet, hedenbergite, wollastonite, calcite, and minor quartz with sparsely disseminated sulphides. Hedleyite and joseite occur together. Native bismuth, molybdenite, and gold are associated with these tellurides while bornite, chalcopyrite, cobaltite, and safflorite occur apart and are locally abundant (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

93 M/4 Cobaltite occurs with allanite, arsenopyrite, erythrite, molybdenite, and gold at the Homestake Group near Hazelton (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 41).

93 M/4 Cobaltite, erythrite, glaucodot, uraninite, scheelite and chalcopyrite occur in veins at the Rocher Déboulé Mine at the head of Juniper Creek about 12.8 km northeast of Skeena Crossing (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 81).

104 M/1 Greenish black serpentine containing disseminated or massive magnetite with minor chalcopyrite, specularite, pyrite, and cobaltite occurs on the west side of Hoboe Creek, 3.2 km from Atlin Lake. The deposit is at the contact between early Paleozoic amphibolites, schists and limestones and a granite intrusion which is part of the Coast Range batholith (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

New Brunswick

21 O/8 Cobaltite occurs with Cu, Zn, Pb mineralization at Devils Elbow in Northumberland County (A.L. McAllister, 1959: New Brunswick Mines Br., reproduction of Can. Inst. Mining Met., Bull.). Also at the United Montanban Mine on Little River Lake in Northumerland County (New Brunswick Mines Br., files).

Northwest Territories

86 E/9 Minor amounts of cobaltite, niccolite, gersdorffite and pararammelsbergite occur with matildite, native silver and bismuth, safflorite, skutterudite and rammelsbergite at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay, at latitude 65°36'14"N., longitude 118°06'45"W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 F/13 An assemblage of cobalt-nickel minerals, namely: cobaltite, safflorite-löllingite, glaucodot, niccolite, gersdorffite, rammelsbergite and breithauptite, occurs at the B.E.A.R. silver deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 759).

86 L/1 The cobalt and nickel minerals: safflorite, rammelsbergite, smaltite, chloanthite, cobaltite, and niccolite, occur in the uranium-silver deposits of the Great Bear Lake area (C.S. Lord, 1951: Geol. Surv. Can., Mem. 261, p. 47).

Isolated cobaltite crystals of rough cubic habit are associated with native silver, chalcopyrite, tetrahedrite, chloanthite, and skutterudite in two sections of the Eldorado Mine on Great Bear Lake (Ellis Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 47).

Ontario

31 M/4 Cobaltite, arsenopyrite, and bismuthinite are the chief opaque minerals in a calcite-quartz vein in a narrow aplite dyke on the west side of claim H.R. 616, northeast of Lorrain Lake.

About 800 m to the west of the outlet of McDonald Lake, in the Metabitchuan area, is a

small diabase dyke or vein containing cobaltite, arsenopyrite and pyrite (E.W. Todd, 1925: Ont. Dept. Mines, Ann. Rept., vol. 34, Pt. III, pp. 31, 34).

31 M/4 Cobaltite occurs with skutterudite in the Keeley Mine as the outer zone of crystals whose inner area is composed of gersdorffite with minor amounts of cobaltite, löllingite, and skutterudite (J.M. Bell and E. Thomson, 1924: Univ. Toronto Stud., Geol Ser., 17, p. 33).

31 M/5 Cobaltite in massive and crystalline form is found in Bucke Township, at the Benn Mine, on conc. I, lot 15 (W.G. Miller, 1905: Ont. Bur. Mines, Ann. Rept., vol. 14, Pt. II, p. 23).

Zoned crystals composed of breithauptite cores fringed by niccolite which is in turn bordered by cobaltite occur in the Hudson Bay Mines Ltd., workings at Cobalt. Cobaltite has been isolated and analyzed with the following results: Co 34.83, Ni nil, Fe 63.00, As 46.97, S 0.04, Ag 17.48, total 99.95 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 209).

Cobaltite from the Columbus claim in the Timiskaming district has been analyzed by De Lury. It was found to have the following composition: As 44.55, S 20.73, Co 29.10, Ni 0.97, Fe 4.55, total 99.90 (W.G. Miller, 1905: Ont. Bur. Mines, Ann. Rept., vol. 14, Pt. II, p. 23).

The crystals from the Columbus claim are said to be octahedral in habit and unsurpassed for perfection (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 221).

Veins on the M.J. O'Brien property at Cross Lake near Cobalt contain cobaltite, skutterudite, argentite, rammelsbergite, chloanthite, safflorite, gersdorffite, smaltite, niccolite, chalcopyrite, tetrahedrite, arsenopyrite, sphalerite, galena, pyrite, pyrargyrite, marcasite, silver, and some breithauptite (E. Thomson 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 41; and 1932: Geol. Ser., 32, p. 33).

Cobaltite is found in a vein with niccolite, and smaltite-chloanthite in the Silver Bar Mine near Cobalt. Small dendritic intergrowths of gersdorffite are present. Calcite is the principle gangue mineral (E.W. Todd, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 71).

31 M/5 Crystals of cobaltite measuring 12 mm in diameter were reported to be abundant in vein 8 of the Nipissing 404 Mine near Peterson Lake. Access to the mine is via Hound Chute Road. Specimens of cobaltite have been collected from mine dumps at the Hunter Cobalt and Cobalt Contact mines along Highway 567. Cobaltite was said to be the most common mineral at the Agaunico Mine on the steep western shore of Lake Timiskaming (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, pp. 37, 57,59,60).

31 M/5 The mineral collection of the Royal Ontario Museum includes cobaltite specimens from: Powell and Latchford claim, lot 14, conc. I, Bucke Township; Silverfields and Trethewey mines, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 116-117).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16

Electron probe microanalyses of cobaltites from the Cobalt Gowganda ores:

Co	Ni	Fe	As	S	Total
31.2	0.2	1.5	47.5	18.8	99.2
30.0	2.0	1.0	49.0	17.5	99.5
28.2	3.1	3.7	47.1	19.0	101.0
26.9	6.5	1.5	50.5	15.3	100.7
25.9	5.1	2.9	51.3	16.5	101.7
25.0	7.5	4.2	50.8	16.2	100.7
20.7	8.5	4.8	46.0	19.6	99.6
20.5	11.4	3.7	47.9	17.2	100.7
19.2	10.5	3.3	50.5	15.5	99.0
18.2	16.5	0.0	47.0	17.5	99.2
18.0	14.0	2.0	52.0	15.5	101.5
17.7	7.0	7.5	48.0	18.6	98.8
17.3	14.0	2.8	50.0	16.3	100.4

(W.Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 174)

41 I/4 Cobaltite crystals varying in size from 2.5 to 3.2 cm across have been found near a quartz vein cutting sedimentary rocks in Foster Township, conc. V, lot 11, southeast of Espanola. They have been exposed by an adit in a hill just east of Brazil Lake and many specimens have been collected from a nearby dump (Mrs. K. Edmond, 1963: private communication).

41 J/1 Cobaltite has been identified by X-ray powder pattern in a specimen from conc. V, lot 6, of Harrow Township (E.W. Nuffield and D.H. Gorman, 1960: private communication).

41 P/9 Specimens of cobaltite have been collected from old dumps near the main shaft of the abandoned Moose Horn Mine about 1.6 km from Elk Lake village (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 69).

41 P/10 Isolated and well formed crystals of cobaltite are found with niccolite at the Coleroy Mine in the Gowganda area (E.W. Todd, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. III, p. 76).

The La Rose Mine in Coleman Township contains cobaltite (W. Campbell, 1908: J. Can. Mining Inst., XI, p. 483).

Cobaltite is present in a vein with calcite, pyrite, and galena on claim W.D. 962, Nicol Township, northeast of Gowganda Lake (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 34).

Minute cubic crystals of cobaltite occur with radiating blades of löllingite-safflorite at the 178 m level of the Miller Lake O'Brien Mine in the Gowganda area (E.W. Todd, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. III, pp. 65 and 68).

42 A/11 The cobalt minerals carrollite, cobaltite and cattierite have been identified in a bornite-rich ore zone on the 1200 level at the Kidd Creek Mine north of Timmins. The mine is 25.7 km north of Highway 101 on Highway 655 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

52 A/7 Cobaltite is reported to be a constituent of the rich silver ore mined at the Silver Islet Mine located on the southwest end of Silver Islet (T.L. Tanton, 1931: Geol. Surv. Can., Memoir 167).

52 L/7 Cobaltite, chalcopyrite, pyrrhotite, pyrite, and magnetite occur together in a mineralized zone associated with a fault at the northeast end of

Werner Lake (H.D. Carlson, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. IV, p. 25). Cobaltite also occurs at the west end of Werner Lake (E.R. Rose, private communication).

52 L/16 Cobaltite is a lesser constituent of a massive base-metal sulphide deposit in Mulcahy Township about 32 km west of Red Lake and 1,200 m south-southwest of the south end of Trout Bay. Electron microprobe analysis gave: Co 29.9, Fe 1.7, Ni 0.5, As 45.6, S 20.6, total 98.3. The principal minerals in the deposit are pyrrhotite, sphalerite and chalcopyrite; other minerals present include galena, marcasite, arsenopyrite, pyrargyrite, paracostibite, gudmundite, stannite, argentian tetrahedrite, antimonial silver, allargentum, ilmenite, breithauptite, cassiterite and nisbite (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 232).

Quebec

23 B/14 Cobaltite, bismuth, bismuthinite, safflorite-löllingite, and arsenopyrite have been identified in specimens from the Quebec Cobalt property in the Mount Wright area. Specimens were submitted by S. Duffell (1956) and identification was made in the X-ray Labratory, Geol. Surv. Can.

32 C/4 Minor amounts of cobaltite are reported to be associated with the ore minerals pyrite, chalcopyrite and sphalerite at the Louvem Mine located 3.2 km by road from Highway 59, 20 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 120).

32 F/12 Cobaltite is a relatively abundant constituent of a telluride-rich zone in the massive sulphide orebody at the Mattagami Lake Mine which is located about 8 km southwest of the town of Matagami. Magnetite, altaite, pyrrhotite, pyrite, hessite, mattagamite and tellurantimony are also present (R.I. Thorpe and D.C. Harris, 1973: Can. Mineralogist, 12, p. 55).

32 G/16 Cobaltite has been identified by X-ray powder pattern in samples from Portage Island, Roy Township (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Yukon

106 C/14 Lenses and stringers of quartz-siderite material carrying chalcopyrite and cobaltite-chalcopyrite mineral assemblages have been found on the Mammoth group claims located at 64°56.5'N, 133°18'W., about 24 km east of Fairchild Lake in the Bonnet Plume Range (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 31).

COBALT PENTLANDITE

Co_9S_8

Cobalt pentlandite is the cobalt analogue and is isostructural with pentlandite. It has previously been reported only from several localities in Finland.

Ontario

31 M/12 Cobalt pentlandite has been identified in an arsenide-sulphide assemblage at the Langis Mine, Casey Township, Cobalt-Gowganda area. Other rare minerals present are: langisite, siegenite, parkerite and bravoite. Electron probe microanalysis by D.C. Harris: Co 54.1, Ni 10.4, S 34.2, total 98.7 (W. Petruk, D.C. Harris and J.M. Stewart, 1969: Can. Mineralogist, 9, p. 597-616).

Quebec

32 D/6 Oriented lamellae of cobalt pentlandite have been identified in linnaeite in chalcopyrite-rich portions of the orebodies at the Vauze Mine, located about 24 km north of Noranda. Electron probe microanalysis gave: Co 66.6, Ni 0.1, Fe 1.3, Cu 0.3, S 31.7, total 100.0 (E.F. Stumpfl and A.M. Clark, 1964: Neues. Jahr. Min., 8, p. 240-245).

32 D/8 Electron microprobe analyses of cobalt pentlandite associated with awaruite in serpentinized ultrabasic at the Dumont deposit.

	(1)	(2)	(3)	(4)
Ni	21.3	22.8	23.6	24.2
Fe	9.0	10.2	13.9	16.3
Co	37.4	34.5	29.7	26.3
S	32.2	32.5	31.9	32.5
Total	99.9	100.0	99.1	99.3

(D.C. Harris and E.H. Nickel, 1972: Can. Mineralogist, 11, p. 861)

COFFINITE

$U(SiO_4)_{1-x}\ OH)_{4x}$

Coffinite has been described from the uranium deposits of the Colorado Plateau where it occurs in association with uraninite and low valence vanadium minerals. In this and other areas including Texas and Oklahoma it is also found in conjunction with asphaltic material. Coffinite is black with an adamantine lustre.

Ontario

31 E/4 The mineral collection of the Royal Ontario Museum includes a specimen of coffinite from the McQuire Mine, lots 9 and 10, conc. IX, Conger Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 118).

31 F/8 An occurrence of radioactive mineralization has been reported 2.4 km southwest of Dunrobin. Black radioactive material has been identified as a mixture of hydrocarbon and coffinite with disseminated tiny grains of thorite (V. Ruzicka and H.R. Steacy, 1975: Geol. Surv. Can., Paper 75-1A, p. 234).

41 H/15 Dull black masses of coffinite have been found in the Besner pegmatite, lot 5, conc. B, near Britt, Henvey Township (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 336).

41 J/2 X-ray powder patterns have identified coffinite in specimens from the Algom Nordic property at Blind River (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Saskatchewan

64 L/4 Coffinite has been identified in specimens from the Rabbit Lake uranium deposit at 58°11'00"N, 103°42'36"W, west of Wollaston Lake. Electron microprobe analysis: UO_2 75.8, SiO_2 16.7, Al_2O_3 1.7, CaO 1.2, MgO 0.2, PbO 0.3, total 95.9 (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1B, p. 235).

73 P/1 Coffinite occurs as greenish brown to blackish brown crusts on feldspar and quartz at the Lee (Jahala) Lake deposit. The deposit is east of Lac La Ronge on a hill facing the northeastern end of Lee Lake at 55°12' N, 104°17' W (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 10).

74 N/9 Coffinite transects and coats pitchblende at the Ace Mine, Beaverlodge area (V. Koeppel, 1968: Geol. Surv. Can., Paper 67-31, p. 91).

colerainite

(see CHLORITE)

COLLINSITE

$Ca_2(Mg,Fe)(PO_4)_2 \cdot 2H_2O$

British Columbia

93 K/4 The mineral was named after William H. Collins, former Director, Geological Survey of Canada. It was found in a vein 10 to 30 cm wide between basaltic lava flows, 300 m from a farmhouse, 3.2 km northwest of the ferry landing on the north side of François Lake. The vein consists of botryoidal phosphate with some asphalt and brecciated andesite. Chemical analysis by E.A. Thompson: SiO_2 0.10, Al_2O_3 0.39, Fe_2O_3 0.80, FeO 6.86, MgO 6.34, CaO 32.18, H_2O^+ 12.28, H_2O^- 0.15, P_2O_5 39.83, CO_2 0.23, F 0.27, Mn_2O_3 0.36, organic matter 0.18; total 99.97, less O=F 0.11, final total 99.86; S.G. 2.95 (E. Poitevin, 1926: Geol. Surv. Can., Museum Bull. 46, pp. 1-21).

Chemical analysis by F.A. Gonyer: P_2O_5 41.13, CaO 32.03, MgO 9.31, FeO 7.31, H_2O 9.69, total 99.47 (C.W. Wolfe, 1940: Am. Mineralogist, 25, p. 746).

COLORADOITE

HgTe

Coloradoite is an iron-black mercuric telluride. It was first recognized from Boulder County, Colorado where it occurs sparingly.

Ontario

32 D/4 Large compact masses of coloradoite are associated with calaverite, altaite, gold, and molybdenite in brecciated quartz at the Bidgood Mine near Kirkland Lake (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 364).

Gold and compact masses of coloradoite occur in quartz at the Wright-Hargreaves Mine, Kirkland Lake (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 364).

42 A/1 Coloradoite has been reported by Todd (1929) to occur in the Teck-Hughes and Sylvanite mines in the Kirkland Lake district (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 364).

42 A/1 Coloradoite occurs in the Lakeshore Mine near Kirkland Lake. It is found in quartz veins in association with altaite, gold, and chalcopyrite. An analysis by Rickaby is as follows: Hg 58.55, Pb 1.60, Te 39.10, insol. 0.25, total 99.50 (E. Thomson, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 95) (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 364).

Small compact masses of coloradoite are embedded in coarsely crystalline calcite in the Kirkland Lake Mine. Associated minerals are hessite, chalcopyrite, and tetrahedrite (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 364).

Coloradoite in association with altaite, calaverite, tetradymite, hessite, gold, pyrite, and melonite, is present in the Tough-Oakes Mine near Kirkland Lake (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 99).

Coloradoite and altaite have been identified with native gold at the Macassa Mine located on the Goldthorpe Road at Kirkland Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 14).

42 A/6 Several fragments of coarsely crystalline calcite found in the Hollinger Mine at Timmins were coated with films of hessite, coloradoite, tetrahedrite, and chalcopyrite (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 364).

42 D/10 Galena and gold in the 210 vein of the McLeod-Cockshutt Mine in Ashmore Township, have been partly replaced by coloradoite and an undetermined mineral (E.G. Pye, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. V, p. 44).

52 B/10 Coloradoite, petzite, altaite, gold, chalcopyrite, pyrite, sphalerite, and hematite occur together in the Moss Mine in Moss Township (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 99).

Quebec

32 D/8 Coloradoite occurs in the Robb-Montbray Mine in Montbray Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 364).

Yukon

115 K/15 Tetradymite nuggets from the Reno Placer property on Canadian Creek were examined in polished section for precious metals. They were found to contain pinkish grey, isotropic inclusions which were identified as coloradoite (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 454).

COLUMBITE

$(Fe,Mn)(Nb,Ta)_2O_6$

Columbite is the niobium rich member of an isomorphous series involving mutual substitution of Nb and Ta. Like tantalite, the tantalum rich member, it commonly occurs in pegmatite. Intermediate varieties having approximately equal proportions of Nb and Ta are not uncommon and the iron-manganese ratio is allowed considerable fluctuation. Columbite is black to reddish brown and has submetallic lustre often showing iridescence.

British Columbia

82 F/9 Crystals of columbite-tantalite more than 2.5 cm across are reported with beryl and muscovite in a pegmatite that extends across the ridge from Hellroaring Creek to Angus Creek and is exposed along a road about 4.8 km south of St. Mary Lake (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept. 23, p. 62).

92 I/9 A mineral regarded as midway between the end members of the columbite-tantalite ismorphous series has been found in the Kamloops area (H.V. Ellsworth, 1932: Geol. Surv. Can., Geol. Ser., 11, p. 137).

Manitoba

52 L/5 A small sample from a pegmatite near the Bird River, southeast of Lake Winnipeg contained granular columbite-tantalite with cassiterite, and hematite (Ellis Thomson, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 103).

52 L/5 Columbite is present as lustrous, black, prismatic crystals from 1.2 to 5 cm long in a pegmatite on the property of the Silver Leaf mining syndicate in township 16, range 16, lot 17, near Point du Bois. An analysis by V.J. Oswald is as follows: FeO 14.77, MnO 2.17, CaO 2.66, MgO 0.45, Nb_2O_5 52.26, Ta_2O_5 26.41, TiO_2 0.49, SiO_2 0.13, ZrO_2 0.65, H_2O 0.21, total 100.20; S.G. 5.87 (T.L. Walker, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 11).

52 L/6 A mineral belonging to the columbite-tantalite series has been found in each of the two pegmatite bodies on the Huron and Silver leaf claims at 50°21'N, 95°22'W, about 6.4 km east of Lamprey Falls on the Winnipeg River (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 157).

52 L/6 Columbite-tantalite has been identified in specimens from a pegmatite near Shatford Lake at Lat. 50°23'N, Long. 95°29'W, in the Cat Lake, Winnipeg River district. Identification was made by the X-ray Labratory, Geol. Surv. Can., from a sample collected by R. Mulligan in 1957.

Northwest Territories

75 M/2 A few crystals of columbite-tantalite have been found with greenish-white to cream beryl in pegmatite at 63°01'N, 100°38'W, about 5.6 km east of Susu Lake (W.W. Heywood and A. Davidson, 1969: Geol. Surv. Can., Memoir 361, p. 33).

85 I/1 Small amounts of columbite-tantalite have been found associated with spodumene and amblygonite in pegmatite at the following claims. Moose and Big Hill on the north side of Hearne Channel; Best Bet on the west side of Drever Lake; Tan, just west of Johnston Lake about 1.6 km southwest of Best Bet. (R.B. Rowe, 1952: Geol. Surv. Can., Paper 52-8, p. 21-27).

85 I/1 A specimen of columbite from the DeStaffany Mine on Great Slave Lake was found to have a specific gravity of 5.808 and the following chemical composition: Nb_2O_5 59, Ta_2O_5 23, FeO 11, MnO 4, WO_3<2, ZrO_2 trace, TiO_2 not detected, Nb/Ta=2.56, Fe/Mn=2.75 (R.W. Hutchinson, 1955: Am. Mineralogist, 40, p. 435).

85 I/7 Spodumene-bearing pegmatites containing some columbite-tantalite comprise the Lita claims near the shore at the northwest corner of Buckham Lake, and the Ramona group about 8 km west of Buckham Lake. (R.B. Rowe, 1952: Geol. Surv. Can., Paper 52-8, p. 27-28).

85 I/11 A pegmatite exposed on the peninsula north of the narrowest part of Thompson Lake at 62°37'N, 113°29'W, contains columbite-tantalite crystals about 2.5 cm across, generally associated with beryl. Spodumene is also present (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept. 23, p. 66).

85 I/11 Columbite crystals are found in the Ross Lake area, District of Mackenzie, near the margins of the quartz-perthite cores of well zoned pegmatites (R.W. Hutchinson, 1915: Geol. Surv. Can., Bull. 34, p. 15).

85 I/12 Columbite occurs at Hidden Lake (R.W. Hutchinson, 1955: Am. Mineralogist, 40, p. 436).

85 I/13 Columbite has been identified in samples collected by R. Mulligan (1957) from a pegmatite on the Cota claim group in the Blaisdell Lake area at 62°51'N, 113°33'W. (X-ray Labratory, Geol. Surv. Can.).

Nova Scotia

21 A/11 Crystals often weighing several grams are found in pegmatite dykes in the New Ross and Lavers mines in Lunenberg County. An analysis by E.W. Todd is as follows: SiO_2 0.34, TiO_2 1.47, FeO 10.46, MnO 10.44, SnO 0.22, Ta_2O_5 14.48, Nb_2O_5 63.08, total 100.49; S.G. 5.613 (E.R. Faribault, 1907: Geol. Surv. Can., Summ. Rept., pp. 81-82) (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 257) (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto Stud., Geol. Ser., 16, p. 35).

Ontario

31 E/4 Columbite-tantalite occurs as crude crystals and masses in a feldspar quarry on lot 7, conc. X, of Conger Township. An analysis by Union Carbide and Carbon Research Laboratories indicated a niobium content of 20 per cent, and a tantalum content of 22 per cent (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 187).

31 F/4 Columbite is found with rutile and rare earth minerals at the abandoned Woodcox Mine on lot 17, conc. VIII of Monteagle Township, Hastings County. Analysis by E.W. Todd: Nb_2O_5 66.60 Ta_2O_5 1.74, FeO 8.61. TiO_2 5.22, MnO 9.06, ThO_2 3.44, H_2O 1.41, SiO_2 0.64, ZrO_2 1.25, SnO_2 0.36, rare earths 1.68, total 100.01; S.G. 5.147 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p.211) (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto Stud., Geol. Ser., 16, p. 35).

31 F/6 Thin, flat, disk-shaped masses of columbite occur on cleavages of feldspar in a pegmatite dyke in Lyndoch Township, conc. XV, lot 23, about 2.4 km north of Quadeville. Monazite, beryl, and cyrtolite are associated minerals. Analysis by E.W. Todd: Nb_2O_5 55.79, Ta_2O_5 15.21, MnO 10.24, FeO 10.90, TiO_2 5.19, SiO_2 1.28, CaO 0.15, SnO_2 0.56, rare earths 0.82, total 100.14 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 230) (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto Stud., Geol, Ser., 16, p. 35).

31 F/6 Columbite-tantalite has been found in a granite pegmatite in Renfrew County, Lyndoch Township, conc. XV, lot 30 (D.F. Hewitt, 1960: private communication).

41 I/7 Toddite, a variety of columbite in which some of the manganese and iron are replaced by uranium, has been found in a pegmatite dyke in the northwest corner of lot 4, conc. III, Dill Township. Chemical analysis by H.V. Ellsworth: SiO_2 1.77, TiO_2 0.85, BeO 0.47, Al_2O_3 0.04, Fe_2O_3 4.68, FeO 4.38, CaO 2.02, MgO 0.22, MnO 2.62, ZrO_2 0.06, SnO_2 0.53, Nb_2O_5 53.73, Ta_2O_5 8.97, PbO 0.44, UO_2 8.71, UO_3 2.37, ThO_2 0.47,$(Ce, La,Di)_2O_3$ 0.76, $(Y,Er)_2O_3$ 3.42, H_2O 4.94, loss on ignition (3.42), total 100.45; S.G. 5.041 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, pp. 171, 266).

52 F/15 Specimens from a pegmatite dyke located in the Dryden area south of Mavis Lake were found to

contain columbite-tantalite. It was identified by the X-ray diffraction method in a specimen submitted by R. Mulligan, 1957 (X-ray Labratory, Geol. Surv. Can.).

Quebec

32 C/5 Pegmatites in the Fiedmont area of Abitibi County contain a wide variety of minerals. Among them are spodumene, quartz, microcline, cleavelandite, lepidolite, albite, beryl, spessarite, columbite-tantalite, microlite, betafite, bismuthinite, molybdenite, and powellite (E.W. Heinrich and A.A. Levinson, 1958: Am. Mineralogist, 38, p. 35).

Black platy masses of columbite have been found at the Lacorne Molybdenite Mine, on the east side of Highway 60 between Val d'Or and Amos, 30.6 km from Val d'Or. Columbite-tantalite has also been reported at the Massberyl pegmatite about 6.4 km east of St-Benoit-de-Lacorne; and at the Quebec Lithium Mine, lot 54, range IX Lacorne Township, about 0.8 km south of Lac Lortie (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 104-107).

Saskatchewan

63 L/15 Columbite-tantalite and monazite occur sparsely with beryl crystals in pink pegmatites at several localities near the Birch Portage Indian Reservation. The occurrences extend along the west shore of the Sturgeon-Weir River for about 3.2 km north from Birch Rapids, and at a locality about 10.4 km north of the rapids (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 20).

Yukon

105 B/3 Crystals of black columbite were found with tourmaline, fluorite and topaz in a pegmatite on the north face of a mountain 1800 m high on the east side of Seagull Creek about 7.2 km north of the Alaska Highway at Mile 733 (1179 km) (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 33).

COLUSITE

$Cu_3(As,Sn,V,Fe)S_4$

Ontario

42 A/11 The tin-bearing minerals stannoidite, mawsonite, colusite and kesterite have been identified in a bornite-rich zone on the 1200 level at the Kidd Creek Mine, north of Timmins. An electron microprobe analysis of the colusite gave: Cu 47.8, Fe 0.3, Zn 0.7, V 3.3, Sn 9.0, As 7.3, Se 2.4, S 27.9, total 98.7. The mine may be reached via Highway 655, 25.7 km north of Highway 101 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

CONNELLITE

$Cu_{19}Cl_4SO_4(OH)_{32}\ .2H_2O$

Connellite, a rare secondary copper mineral is ismorphous with buttgenbachite, through replacement of SO_4 by $(NO_3)_2$. The two minerals are identical in appearance and give identical X-ray powder patterns (F.A. Bannister, Max H. Hey and G.F. Claringbull, 1950: Mineral Mag., 29, p. 280).

New Brunswick

21 P/15 Copper-bearing fossil plant beds are exposed in low sandstone cliffs along the shore at Pigeon Hill. Tiny aggregates of blue microscopic flakes of connellite occur with more abundant malachite as coatings on the plant remains (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 123).

COOKEITE

$LiAl_4(Si,Al)_4O_{10}(OH)_8$

British Columbia

82 N/8 Cookeite associated with galenite is present in the rocks of the Ottertail Creek area in the Golden mining division (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 30T).

92 P/11 Cookeite occurs in thin layers in sericite schist, and also in small cavities in a quartz vein that cuts the schist, on Wait-a-bit Creek. Analysis by Johnston: SiO_2 32.00, Al_2O_3 45.87, CaO 1.63, MgO 0.78, Li_2O 2.10, K_2O 0.06, Na_2O 0.65, F 0.02, H_2O 17.29, total 100.40, less O for F 0.01, total 100.39 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 22 R).

Ontario

31 C/10 A specimen of cookeite from the Richardson Mine, lot 1, conc. II, Bedford Township is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 121).

COPIAPITE

$Fe^{++}Fe_4^{+++}(SO_4)_6(OH)_2.20H_2O$

Members of the copiapite series are secondary minerals formed by the oxidation of sulphides, especially pyrite. A complete series exists between Fe^{++} and Mg and possibly also with Cu and Zn. The names, copiapite, magnesiocopiapite and cuprocopiapite have been given to the composition regions where Fe^{++}, Mg, and Cu, respectively, are the dominant cations.

Alberta

82 O/1 The National Mineral Collection contains specimens of fine-grained yellow copiapite from the Elbow River area.

British Columbia

92 I/11 Copiapite has been identified on specimens from the Spatsum Claim 17.6 km south of Ashcroft Manor on Highway 1, south of Cache Creek (X-ray Labratory, Geol. Surv. Can.).

94 M/8 Copiapite occurs near Liard Post on the Liard River as yellow microscopic crystals and crystal aggregates. Analysis by E.W. Todd: SiO_2 37.92, Fe_2O_3 24.96, Al_2O_3 0.52, MgO 3.10, H_2O 31.51, insol. 1.96, total 99.97. S.G. 2.087 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 84).

New Brunswick

21 P/5 Copiapite occurs in the gossan of the Brunwsick No. 6 Mine as pale yellow to canary-yellow, vitreous, finely granular to powdery coatings on sulphides (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

Northwest Territories

88 H/16 A yellow mineral occurring in black shale in the Raglan range on Melville Island has been identified as copiapite by the X-ray diffraction method (X-ray Laboratory, Geol. Surv. Can.).

Ontario

31 C/10 Sulphur-yellow to orange-yellow copiapite forms very fine granular to cauliflower-like encrustations on pyrite at the Enterprise Mine. It is commonly found on the north wall of the pit. The mine is located about 42 km north of Kingston and 16 km west of Godfrey (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

Quebec

31 G/12 Copiapite (bright yellow, botryoidal) occurs as encrustations on pegmatite and gneiss in roadcuts along the Gatineau Parkway (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 39).

COPPER

Cu

Naturally occurring metallic copper may contain small amounts of iron, lead, tin, silver, and antimony as impurities. It occurs in sandstone, clay slate, limestone, and igneous rocks, forming veins and blebs, and it may be found in streams as a placer mineral. Native copper is usually, if not always, of secondary origin. It is possibly the result of reduction of copper bearing minerals by organic material. Oxides and sulphides of copper are characteristically present with the native mineral. Occurrences are not uncommon but seldom is the quantity sufficient for use as an ore.

British Columbia

82 G/12 Specimens of native copper containing native silver have been found in placers on Wildhorse Creek in the west half of the Fernie map-area (G.B. Leech: private communication).

82 K/3 Native copper occurs in the Wellington Mine, Slocan mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 77).

92 F/11 Native copper has been encountered in a number of diamond-drill holes in the Cumberland district of Vancouver Island. It occurs in amygdaloidal meta-andesites belonging to the Vancouver series underlying the coal measures of the district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 77).

92 G/4 Copper occurs in an amygdaloidal trap near Nanaimo and on South Valdes Island (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 77).

92 H/6 Native copper is present in gold placers in many of the streams and rivers in the province. Notable among these are the Thompson, the Fraser, and the Dease (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 154 R).

92 H/15 Native copper has been found at Aspen Grove (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, 74-78 A).

92 I/10 The Afton copper deposit at 50°39.5N, 120°30.5'W, is 12.8 km west of Kamloops on the south side of the Trans-Canada Highway at about 640 m elevation. It is a complex syenitic porphyry in which the upper part is mineralized with native copper and chalcocite, and the lower part with bornite and chalcopyrite (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 209).

92 I/15 Copper-bearing igneous rocks occur in the Copper Creek area of the Greenwood mining division (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 154 R).

93 A/6 Copper occurs on the Big Sioux claims in a lava flow overlying placer gravels near Horsefly camp on Twenty Mile Creek, Quesnel mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 77).

94 D/10 Disseminations and veinlets of chalcocite, bornite, chalcopyrite and some native copper form a large stratiform deposit at 56°36'N, 126°40'W, 6.4 km west-northwest of Sustut Peak on the west side of Sustut River at an elevation of 1800 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 309).

104 N/5 Serpentine on Goat Island in Atlin Lake, about 30 km south of Atlin, is cut by copper-bearing calcite veins (G.M. Dawson, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 69 A).

Native copper has also been reported on Copper Island in Atlin Lake.

Manitoba

62 O/9 Native copper occurs in the amygdaloidal traps at the north end of Lake Manitoba and on Sugar Island in Lake St. Martin (R. Bell, 1903: Geol. Surv. Can., Ann. Rept., XV, p. 9 AA).

New Brunswick

21 B/10 The triassic traps occurring on Grand Manan Island, particularly in the vicinity of Southwest Head, contain nodules and stringers of native copper. They are of small size and show no tendency to concentrate anywhere (L.W. Bailey, 1897: Geol. Surv. Can., Ann. Rept., X, p. 19, 20 M).

21 G/2 Native copper occurs in the igneous rocks at Clark Point on the Mascarien Peninsula, Charlotte County (L.W. Bailey, 1897: Geol. Surv. Can., Ann. Rept., X, p. 24 M).

21 P/5 Native copper has been reported to be a very minor constituent of the orebody at the Brunswick No. 6 Mine (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

Newfoundland

2 E/13 The orebody at the West Mine on a hill immediately west of Tilt Cove is reported to have contained some native copper in addition to the main ore mineral, chalcopyrite. Tilt Cove is a narrow embayment on the northeast shore of Notre Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

12 B/15 Small amounts of native copper and cuprite occur in sheared dunite near the head of Pope Cove (G.C. Riley, 1962: Geol. Surv. Can., Mem. 323, p. 56).

12 H/16 Native copper was a constituent of the ore mined at the Terra Nova Mine located along Highway 410, opposite the turn-off to Seal Cove about

3.2 km south of Baie Verte village. Native copper is also reported in the ore of Consolidated Rambler Mines, south of Ming's Bight and accessible via Highway 414, the road to Tilt Cove (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 119, 121).

13 K/5 Mineralization in the Seal Lake area of Labrador consists of malachite, cuprite, native copper, chalcocite, bornite, chalcopyrite, pyrite, molybdenite, and covellite. Gangue minerals are quartz, calcite, albite, epidote, and chlorite (J.J. Brummer, 1960: Bull. Can. Inst. Mining Met., 53).

Northwest Territories

38 B/10 Native copper has been collected from Albert Harbour on Baffin Island (R.A.A. Johnston, 1908: Geol. Surv. Can., Summ. Rept., p. 166).

78 B/11 Small specks and flecks of native copper have been observed in the volcanic rocks of the Shaler Mountains on Victoria Island (R. Thorsteinsson and E.T. Tozer, 1962: Geol. Surv. Can., Mem. 330, p. 77).

86 J/14
86 O/3 Minor amounts of native copper occur in serpentinized dunite of the Muskox Instrusion. It is commonly associated with pyrrhotite and chalcocite (J.A. Chamberlain, C.R. McLeod, R.J. Traill and G.R. Lachance, 1965: Can. Jour. Earth Sci., 2, p. 188).

86 N Native copper is reported to occur in slabs and scales in the amygdaloidal traps of the Coppermine Mountains, north and east of the Dismal Lakes. The metal has been used in the past by Indians and Eskimos who recovered it from loose material in the valleys (G.M. Dawson, 1886: Geol. Surv. Can., Ann. Rept., II, p. 25 R) (National Mineral Collection).

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Many showings of native copper were reported in the Coppermine River area following a staking rush from 1966 to 1968. Some of the more important occurrences are as follows.

86 N/8 Adera Mining Limited and Central Point Resources Limited at about 67°27'N, 116°02'W. Plates of native copper up to 15 cm in diameter are exposed in a fracture zone on the southern face of a cliff near the northern boundary of claim WATER 22. A similar showing occurs on claim SWAK 2 towards the east boundary.

86 N/9 Native copper is present in narrow carbonate veins in basalt on the OOK 9 claim, and disseminated copper occurs in basalt on claims OOK 32, 57 and 58, on the property of Adera Mining Limited and Gyro Explorations Limited at about 67°31'N, 116°20'W.

86 N/9 Scattered mineralization consisting of copper sulphides and native copper was observed at several locations on the PENNY claims of Golden West Mines Limited at about 67°35'N, 116°15'W.

86 N/10 Native copper occurs in basalt and in calcite veinlets in float at about 67°37'20"N, 116°35'W, on the LEAH claims of Continental McKinney Mines Limited.

86 O/5 Native copper was discovered on about 24 MM claims on the property of Adera Mining Limited and Hardy Minerals Limited at about 67°18'30"N, 115°40'W.

86 O/5 Calcite and quartz veins containing native copper and native silver are present on the TOM claims at about 67°19'15"N, 115°52'W, near the north boundary of the property of Agassiz Mines Limited and Fundy Explorations Limited.

86 O/5 A vein or brecciated zone on JIM claim N92502 consists of chalcocite, native silver and native copper in calcite. The native copper and native silver occur as blebs and wires in the breccia matrix. Chalcocite and native copper are also reported on claim N92501. The property at about 67°21'10"N, 115°55'30"W, was prospected by D'Aragon Mines Limited and Willow Lake Mines Limited.

86 O/5 A showing of disseminated chalcocite and native copper in a hematitized flow top has been drilled at about 67°19'40"N, 115°37'W, on the KIL claims of Donalda Mines and Bernack Coppermine Exploration Company Limited.

86 O/5 Native copper occurs as plates and nuggets in the wall rocks and main fracture zones on the CU claims of Janus Exploration Limited at about 67°22'N, 115°48'W. Native silver has also been reported on claim T5086.

86 O/6 Native copper has been found on the following claims of East Coppermine Exploration Company Limited:

MIKE 21	at	67°29'05"N,	115°12'35"W
MIKE 32	at	67°28'50"N	115°13'10"W
NOR 91	at	67°27'10"N	115°13'15"W
NOR 47	at	67°26'35"N	115°13'00"W
NOR 48	at	67°26'20"N	115°13'25"W
NOR 48	at	67°26'25"N	115°13'45"W

86 O/7 Basalts containing native copper in amygdules and disseminated in certain flows are present at about 67°31'30"N, 114°50'W, on LEL claims 370 and 371 of Canadian Lencourt Mines Limited.

86 O/10 Narrow leaves and sheets of native copper occur in calcite veins on the property of Northair Mines Limited at about 67°36'45"N, 114°32'45"W.

86 O/10 A plate of native copper about 5 cm thick and 1.8 m deep was found in a fissure on the property of Nordic Explorations Limited at about 67°33'N, 114°54'W.

86 O/10 Occurrences of native copper are reported at about 67°38'30"N, 114°50'W, on WIN claims 71, 72, 76, 82, 102 and AL claims 41, 43, 44, 91 of Provident Resources Management Limited and Rolling Hills Copper Mines Limited.

86 O/10 Blebs and leaves of native copper are present in quartz-calcite veinlets at several locations on the HA claims of Artex Mines Limited at about 67°35'30"N, 114°50'W.

86 O/12 Disseminated native copper is reported at 67°33'30"N, 115°48'30" W, on the BUD claims of Casino Silver Mines Limited (R.I. Thorpe, 1970: Geol. Surv. Can., Paper 70-47).

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87 E The National Mineral Collection contains native copper from Prince Albert sound on Victoria Island. It was donated in 1911 by V. Stefansson.

Nova Scotia

Grains and irregular masses weighing up to several kg have been found in trap rocks at the following localities (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 30 T).

21 B/8 Briar Island, Digby County.

21 H/3 Margaretville, Annapolis County.

21 H/7 Cape d'Or and Spencers Island, Cumberland County.

21 H/8 Five Islands, Colchester County, and Two Islands, Cumberland County.

Ontario

31 M/5 Native copper is reported to have occurred with the silver-bearing ore minerals at the Victory Mine in the Cobalt area. Access is via the road between Cobalt and Brady Lake. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 51).

41 I/6 A specimen of native copper from the Vermilion Mine, lot 6, conc. IV, Denison Township is in the mineral collection of the Royal Ontario Museum. (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 122).

41 N/2 Mineralization on the Nipigon mining property in the Batchawana area consists of copper sulphides and native copper (E.S. Moore, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. II, p. 83).

41,42,52 Copper has been found on the north shore of Lake Superior and on adjacent islands at the following localities: Mamainse Point (41 N/2), Cape Gargantua (41 N/11), Michipocoten Island (41 N/12), Battle Island (42 D/13), Ignace and Spar Islands (52 A) (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, 30 T).

42 A/6 The gold-bearing quartz veins at the Coniaurum Mine contain some native copper. The mine is in the Timmins area about 2 km northeast of Schumacher. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 131).

42 A/8 Native copper is reported with native gold and native silver at the Ross Mine at Holtyre in Hislop Township. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 111).

52 A/5 The Beaver Mine in the Thunder Bay district contains native copper (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 197).

52 A/7 Tiny nuggets of native copper are found in amygdules in basic lava on Edward and Porphyry Islands. (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 27).

52 E/9 Small pellets and octahedrons of native copper up to about 6 mm in diameter are present in decomposed chlorite-serpentine rock at an old mine on the south side of Allie Island in Lake of the Woods, about 19 km directly south of Kenora. (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 49).

52 E/9 Small but perfect twinned octahedra of native copper have been found at Andrew Bay in Lake of the Woods (A. Blue, 1895: Ont. Bur. Mines, Ann. Rept., vol. 5, p. 105).

52 G/15 Native copper occurs at Sturgeon Lake, in the Thunder Bay district (R. Bell, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 94 A).

Quebec

21 L/9 Thin scales of native copper have been noted on slip surfaces of serpentinite at the Eastern Metals Mine, 4.8 km from St-Fabien. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 66).

21 L/11 Native copper has been noted in drift in the Chaudiere Valley (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 515).

Thin plates of native copper occur in red slates in the bed of the Etchemin River. Debris of the same rock contains copper at Point Levis (W.E. Logan, 1863: Geol. Can., p. 516).

31 H/9 Native copper has been reported from the St-Francis Mine on the H.B. Lanchard farm, 7.4 km northwest of Richmond (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 24).

Saskatchewan

63 K/13 A crystal aggregate of native copper was found during sinking of the No. 2 shaft at Flin Flon. (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 41).

73 P/6 Native copper has been reported at the Anglo-Rouyn Mine located on a peninsula east of Waden Bay, Lac La Ronge, about 48 km northeast of La Ronge. (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5).

74 N/10 Minor amounts of native copper have been observed in specimens from the Aurora Yellowknife deposit, south of Jean Lake at about 59°34'N., 108°39'W., and the Martin Lake Mine at 59°32.7'N, 108°32.9'W. (V. Koeppel, 1968: Geol. Surv. Can., Paper 67-31, p. 96-7).

Yukon

105 D/3 The breccias on the southwest face of Chieftain Hill, contain appreciable amounts of native copper (J.O. Wheeler, 1961: Geol. Surv. Can., Mem. 312, p. 79).

105 D/10
105 D/11 A minor amount of native copper is found in the ore deposits of the Little Chief and Arctic Chief areas of the Whitehorse copper belt immediately to the west of Whitehorse. Chalcopyrite and bornite are the principal ore minerals. (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. I, Dept. of Indian Affairs and Northern Development, p. 110).

115 A/6 Some native copper nuggets have been found in Beloud Creek in the Dezadeash area (E.D. Kindle, 1953: Geol. Surv. Can., Mem. 268, p. 55).

115 B Rounded nuggets and slabs of native copper weighing up to 700 gm have been found in Bullion, Sheep, Kimberley, and Burwash creeks in the Kluane mining district. They are not abundant in the creeks and are believed to be of vein origin (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284).

115 F/15 The Old Discovery Copper grant, discovered in 1905 and located on the east side of upper White River about 29 km south of km 1879 on the Alaska Highway, yielded several large slabs of native copper, one of which weighed 1360 kg and is now displayed outside the Yukon Historical Society McBride Museum in Whitehorse. Exploration by Silver City Mines Limited in 1967 revealed a new fracture zone in basalt containing veinlets, stringers and lenses of chalcocite with subordinate native copper and minor bornite. (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 68).

A minor amount of native copper occurs with disseminated bornite and chalcocite in malachite-stained basalt at several showings

near the headwaters of Quill creek (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 53).

115 H/9 Native copper was observed on fracture surfaces on andesite at Mack's copper showing, located at 61°38'N., 136°09'W., on a plateau between Nordenskiold River and Kirkland Creek. (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 44)

COQUIMBITE

$Fe_2(SO_4)_3 \cdot 9H_2O$

British Columbia

92 I/11 Mauve-coloured crystalline coquimbite has been identified on specimens from the Spatsum Claim, 17.6 km south of Ashcroft Manor on Highway 1, south of Cache Creek (X-ray laboratory, Geol. Surv. Can.).

coracite

(See URANINITE)

CORDIERITE

$(Mg, Fe^{++})_2Al_4Si_5O_{18}$

Cordierite is found characteristically in schists and gneisses formed by medium to high grade metamorphism of aluminium-rich rocks. It is a typical contact metamorphic mineral and has even been formed in sediments adjacent to burning coal seams. Transparent blue cordierite is used as a gemstone. Cordierite is also known as iolite and dichroite.

British Columbia

104 P/5 Along the east contact of the Cassiar batholith, west of the Cassiar Asbestos Mine, McDame map-area, cordierite is a constituent of a grey-green, spotted, fine-grained hornfels (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 25).

Manitoba

52 L/6 Cordierite-bearing rock is exposed along the south shore of Bird River near Bird Lake, and along the south shore of Bird Lake (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 58).

63 J/13
63 K/6 Dark smoky-green cordierite has been found with sulphides at the Stall Lake Mine beneath (Miller) Lake at 54°51.5'N, 99°56'W, and at the Anderson Lake Mine about 4.8 km to the west. The deposits may be reached via Highways 392, 393 and 395 (Ann P. Sabina, 1972: Geol. Surv. Can. Paper 71-27, p. 61,63).

63 N/2 Aggregates of blue, optically positive cordierite occur with quartz, feldspar, biotite, garnet and amphibole in the Kisseynew gneiss at Sherridon (R.V. Rutherford, 1936: Am. Mineralogist, 21, p. 386).

63 N/2 Cordierite, some reported to be of gem quality, has been found in the Batty Lake area. Chemical analyses of two samples: (I) SiO_2 46.55, Al_2O_3 33.80, FeO 7.92, CaO nil, MgO 10.85, total 99.12, (II) SiO_2 46.72, Al_2O_3 35.90, FeO 8.30, CaO 0.60, MgO 9.21, total 100.73 (D.S. Robertson, 1953: Geol. Surv. Can., Mem. 271, p. 31).

64 B/3 Cordierite is present in injection gneisses east of Misinagu Lake (G.M. Wright, 1953: Geol. Surv. Can., Paper 53-12, p. 5).

Newfoundland

2 D/10 Cordierite, is present in metamorphic rocks of the Gander Lake Group along the western margin of the Ackley granite batholith, and around the leucogranite near Dead Wolfe Pond (S.E. Jenness, 1963: Geol. Surv. Can., Mem. 327, p. 81).

12 H/I Greyish blue to almost black cordierite is associated with andalusite, chlorite and anthophyllite at the Gullbridge copper mine, a former producer located at Mineral Point on the west side of Gull Lake (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 108).

14 C/13 Rocks containing more than 70 per cent cordierite outcrop in the Hellasch Lake-Port Manvers area north of Webb Bay at 56°50'55"N, 61°47'10"W, and south of Deep Lake at 56°57'35"N, 61°55'W (S.A. Morse et al., 1974: Geol. Dept., Univ. of Massachusetts, Contrib. 13, p. 34).

14 D/8 Cordierite occurs with osumilite, quartz, hypersthene, orthoclase, plagioclase, graphite and pyrrhotite in the contact aureole of the anorthositic Nain complex. Specimens were collected along the north branch of Ikkinikulluit Brook at 56°28.8'N, 62°21.1'W. Electron microprobe analysis: SiO_2 49.83, Al_2O_3 33.82, TiO_2 0.01, Cr_2O_3 0.02, FeO 5.62, MnO 0.08, MgO 10.34, CaO 0.01, Na_2O 0.02, K_2O 0.02, total 99.77 (J.H. Berg and E.P. Wheeler, 1976: Am. Mineralogist, 61, p. 29).

Northwest Territories

46 K/2 Cordierite occurs on Garnet Island as flawless crystals up to 5 cm long (D.S.M. Field, 1951: Can. Mining J., 72, Pt. 2, pp. 76-78).

85 M/12 Cordierite is found with andalusite in metamorphosed greywackes and shales of the Yellowknife Group, Basler Lake (J.V. Ross and J.C. McGlynn, 1963: J. of Geology, vol. 71, No. 5, p. 644).

85 Optically positive, transparent, gem-quality cordierite occurs in an injection and assimilation gneiss in the area north of Great Slave Lake. It is associated with garnet, sillimanite, green spinel, graphite, biotite, orthoclase, microcline, oligoclase, quartz, and tourmaline. A chemical analysis of the cordierite is as follows: SiO_2 48.19, TiO_2 0.01, Al_2O_3 33.45, FeO 8.40, Fe_2O_3 0.55, MgO 7.95, MnO 0.18, Na_2O 0.22, K_2O 0.02, CaO 0.17, H_2O^- 0.01, H_2O^+ 0.67, total 99.82. S.G. 2.631 (R.E. Folinsbee, 1941: Am. Mineralogist, 26, p. 485) (E.W. Heinrich, 1950: Am. Mineralogist, 35, p. 173).

85 O/4 The variety of cordierite known as dichroite occurs at a locality on the 115th meridian, 11 km south of Ghost Lake. It forms irregular masses and prismatic crystals which when held up to the light and rotated, vary in colour from intense blue to dull yellow. Fine-grained graphite is an associated mineral (C.S. Lord, 1951: Geol. Surv. Can., Mem. 261, p. 154).

Nova Scotia

11 D/12 Cordierite is present in metamorphosed slate near granite contacts in the vicinity of Halifax (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 132).

11 F/5 Cordierite is present in a number of samples taken from the Guysborough map-area (X-ray Laboratory, Geol. Surv. Can.).

Ontario

31 C/9 Road-cuts on Highway 15 approximately 43.8 and 44.9 km north of Kingston show dark blue pods of cordierite (about 2.5 cm long) generally altered to a green mica or chlorite along the edges (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 45).

31 E/1 Cordierite is present in the amphibolite rocks on lot 11, conc XI, Harcourt Township, Haliburton County (N.N. Evans and J.A. Bancroft: Am. J. Sci., Ser. 4, XXV, p. 509).

31 E/1 Cordierite-gedrite rocks and associated gneisses occur on the north side of Fishtail Lake in Harcourt Township. Chemical analyses of hand-picked cordierite concentrates gave:

	(1)	(2)	(3)	(4)
SiO_2	49.62	51.50	44.92	48.00
TiO_2	0.30	0.18		0.20
Al_2O_3	30.04	30.02	35.28	32.82
Fe_2O_3	2.49	1.16	1.69	2.64
FeO	3.62	4.21	3.64	2.87
MnO	0.08	0.06	0.08	0.10
MgO	11.06	10.38	9.53	11.72
CaO	0.20		0.32	
Na_2O	0.42	1.68	0.70	0.84
K_2O	0.48		0.21	0.24
H_2O	1.55	0.93	3.56	0.83
Total	99.86	100.12	99.93	100.26

(R.K. Lal and W.W. Moorhouse, 1969: Can. Jour. Earth Sci., 6, p. 145)

42 A/9 Rounded grains of cordierite are found in a groundmass of chlorite, carbonate, epidote, magnetite, and pyrite on lot 1, conc. VI, Beattie Township (P.E. Hopkins, 1915: Ont. Dept. Mines, Ann. Rept., vol 24, Pt. IV, p. 173).

42 C/2 Cordierite occurs in a greenstone prong that cuts the west orebody at the Helen Mine in the Michipicoten district (E.S. Moore and H.S. Armstrong, 1946: Ont. Dept. Mines, Ann. Rept., vol. 55, Pt. IV, p. 97).

42 F/4 The mineral collection of the Royal Ontario Museum includes cordierite specimens from: Geco and Willroy mines in Gemmell Township; and Willecho Mine in east-central Mapledoram Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 123).

52 F/11 Cordierite has been identified by the X-ray diffraction method as present in metasediments southeast of Eagle River Station, Aubrey Township (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Quebec

31 F/16 Blue cordierite suitable for lapidary use occurs on the property of Albert Richard of Otter Lake, about 5.6 km northwest of Otter Lake village (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 95).

31 I/16 Cordierite is a fine-grained constituent of the paragneisses in the vicinity of Montauban les Mines in Portneuf County. It occurs in masses weighing up to 9 km (J.J. O'Neill and F.F. Osborne, 1938: Que. Dept. Mines, Prelim. Rept., 136, p. 18).

31 I/16 Cordierite localities in the Montauban area are as follows: range I, lots 33-41, 312-322; range II, lots 38-41 (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 30).

32 D/6 Cordierite from the Amulet anticlinorium in the Noranda district is colourless, impregnated with inclusions, and sometimes twinned (M.E. Wilson, 1941: Geol. Surv. Can., Mem. 229, p. 72).

Saskatchewan

74 A/7 Colourless to violet-blue cordierite occurs as stout prisms and irregular masses, some transparent and flawless, at the Rottenstone Mine on the southeast shore of Rottenstone Lake at about 56°20'N, 104°49'W (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 8).

CORDYLITE

$BaCe_2(CO_3)_3F_2$

Quebec

31 H/11 Cordylite, previously known only from Narssarssuk, Greenland, has been found at the Desourdy quarry on Mont St-Hilaire. Two small crystals were discovered on one specimen. An electron microprobe analysis gave: Ce_2O_3 35.83, La_2O_3 15.41, Yb_2O_3 0.08, ThO_2 0.26, BaO 22.54, SrO 0.58, CaO 0.66, CO_2 (20.97), F 4.75, total 101.08, less O for F 2.00, total 99.08 (T.T. Chen and G.Y. Chao, 1975: Can. Mineralogist, 13, p. 93).

corundophilite

(see CHLORITE)

CORUNDUM

Al_2O_3

Corundum, like diamond, is best known for its hardness and gem qualities. As a gem, it is most highly prized in the form of ruby and sapphire which are, respectively, red and blue transparent varieties. Few minerals occur in a greater variety of colours than cordundum. In addition to red and blue, gem corundum may be purple, yellow, green, brown and colourless. In its common form however it is usually brown or reddish. Among the naturally occurring minerals only diamond surpasses corundum in hardness.

British Columbia

82 F/4 A celandine green variety of corundum has been observed in the gold washings on the Pend d'Oreille River (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 15 R).

92 H/7 Minute grains of ruby corundum have been observed in the gravels of some of the creeks flowing into the Tulameen River (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 79).

Northwest Territories

85 H/11 Blue corundum occurs on the Outpost Islands in the east arm of Great Slave Lake. The crystals, in patches up to 1.2 cm in diameter, are embedded in andalusite in quartz pegmatite.

They are more or less transparent but are not quite of gem quality (H.C. Cooke, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 74) (J.E. Hawley, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 53).

Ontario

31 C/10 Corundum occurs at the following localities in Hinchenbrooke Township: (1) conc. V. lot 13; green and grey corundum is disseminated throughout a small syenite body. (2) conc. VI, lot 24; corundum occurs in granite gneiss. (3) conc. VII, lot 11; small quantities of green and grey corundum are disseminated throughout a syenite mass in gneissic country rock (W.D. Harding, 1947: Ont. Dept. Mines, Ann. Rept., vol 56, Pt. VI, p. 47).

31 C/12 Corundum has been reported in lot 14, conc. IX, of Methuen Township (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 15 R).

Rounded crysals of blue corundum occur embedded in muscovite books in Methuen Township (D.S.M. Field, 1951: Can. Mining J., 72, Pt. 2, pp. 75-77).

31 C/16 Light red to sapphire blue corundum occurs as grains in a feldspar, quartz, calcite, mica, titanite rock aggregate in conc. IX, lot 2, South Burgess Township, Leeds County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 499).

31 C/16 Pseudomorphs of corundum after spinel octahedra are present in a specimen in the mineral collection of the Royal Ontario Museum collected from lot 11, conc. I, Bathurst Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 125).

31 D/9 A specimen of corundum donated to the National Mineral Collection by F.D. Adam, in 1898, is reported to have been found in Methuen Township, conc. X, lot 16.

31 D/15 An occurrence of corundum has been reported in Lutterworth Township along the boundary between concs. III and IV, on lot 12. It outcrops along the road from Kinmount to Mines Bay (L. Moyd, 1949: Am. Mineralogist, 34, p. 745).

31 F/4 Small crystals of corundum make up about 5 per cent of a corundum syenite exposed in a pit on lot 13, conc. I of Monteagle Township (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept. vol. 63, Pt. VI, p. 29).

Blue-grey corundum occurs at the property of Monteagle Minerals on conc. II, lots 2 and 3, Monteagle Township. It forms fine-grained aggregates in a nepheline-biotite-scapolite-plagioclase gneiss (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. VI, p. 30).

Prismatic crystals up to 5 cm long have been observed in an outcrop on a ridge on the east bank of the York River in Monteagle Township 16 km northeast of Bancroft. The occurrence is on property owned by Monteagle Minerals (L. Moyd, 1949: Am. Mineralogist, 34, p. 743).

Corundum has been found in the following Monteagle Township localities: conc. III, lot 20; conc. IV, lots 21 and 22; conc. V, lot 14; conc. VI, lots 16 and 17 (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol 63, Pt. VI, p. 30).

A blue corundum crystal approaching star sapphire quality was cut for Dr. H.V. Ellsworth from material collected along York Branch in Dungannon Township (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 20).

Light bluish grey corundum is present in Dungannon Township on conc. XI, lot 18 (J.E. Thomson, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. III, p. 19).

Near Egan Chute on the York River, the nepheline rich gneisses contain considerable amounts of bluish corundum. The mineral has been found on both banks of the river on conc. XII, lot 12 of Dungannon Township (L. Moyd, 1949: Am. Mineralogist, 34, p. 743) (J.E. Thomson, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. III, p. 19).

Corundum occurs in the dark gneiss on lots 12 and 13 of concs. XIII and XIV, Dungannon Township. The corundum is abundant in the vicinity of pegmatite dykes (L. Moyd, 1949: Am. Mineralogist, 34, pp. 743-746).

31 F/4 Crystals of corundum with transparent blue centres fading to white or grey edges have been described from concs. XIV and XV, lot 12, Dungannon Township. Fine fractures or parting planes appear in all crystals but they are said to be the closest to gem quality sapphire known in Canada (J.E. Thomson, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. III, p. 20).

Nepheline rich gneisses in conc. XIII, lot 26, Dungannon Township, contain corundum (L. Moyd, 1949: Am. Mineralogist, 34, p. 743).

31 F/5 Corundum occurs in Carlow Township in an area comprising concs. XIII to XVI, lots 11 to 17. It is generally associated with syenitic and pegmatitic rocks. A number of cuts or trenches have been made in the locality, many of which contain exposures of corundum (L. Moyd, 1949: Am. Mineralogist, 34, p. 745).

Erratically distributed corundum may be found in conc. XVI, lots 29 and 30, Carlow Township (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. VI, p. 38).

Interbanded corundum-magnetite-muscovite syenite, bearing from 10 to 15 per cent corundum in crystals from 1.5 to 12 mm long, occurs in Carlow Township, conc. XIV, lot 15. In the same locality, near O'Grady's Lake are corrundum-bearing pegmatites in which the crystals vary in size from 6 mm to 10 cm.

On lot 18 of conc. XIV, crystals up to 15 cm long occur in a nepheline rock and smaller ones are found in syenites and pegmatites. The crystals are generally oriented with their long axis parallel to the foliation (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. VI).

Interbanded corundum syenite and scapolite gneiss on conc. XV, lots 11 and 12, Carlow Township, are cut by rusty weathering pegmatites. Bronze corundum in the rock southeast of Herb's Cuts makes up 20-30 per cent of the total volume for a length of about 3 m (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. VI, p. 35).

The following is a list of corundum occurrences in Raglan Township, Renfrew County.

Conc. XIV, lot 14. Corundum occurs in small albite dykes. Yellow crystals up to 18 cm in

diameter are intergrown with black tourmaline (J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. IV, p. 31).

Conc. XV, lot 22. Corundum occurs in a zone about 30 cm wide (J. Satterly, 1944).

Conc. XVII, lots 3, 4 (G.M. Dawson, 1900: Geol. Surv. Can., Ann. Rept., XIII, p. 128 A), lots 9, 10, 13, and 17 (J. Satterly, 1944) (L. Moyd, 1949: Am. Mineralogist, 34, p. 745).

Conc. XVIII, lots 3 and 4, and conc. XIX, lots 2, 3, 4, and 11. Corundum is concentrated in a complex system of nepheline-anorthite syenites and pegmatites. The Craig Mine at this occurrence was once one of the world's largest corundum mines (J.E. Thomson, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. III, p. 20).

Conc. XVIII, lot 3. Corundum forms large barrel-like crystals (D.S.M. Field, 1951: Can. Mining J., 72, Pt. 2, pp. 74-77).

Conc XVIII, lot 10. The rocks in the locality are pink and white syenitic gneisses cut by pink granite pegmatite. They contain about 1 per cent corundum as crystals from 6 to 12 mm long (J. Satterly, 1944: p. 33).

Conc. XVIII, lot 19. Corundum occurs in small patches which contain over 30 per cent of the mineral (J. Satterly, 1944: p. 33).

Conc. XVIII, lot 24. A small showing of corundum had been noted in brownish weathering syenitic gneiss (J. Satterly, 1944: p. 34).

Conc. XIX, lots 25, 26, 27. Corundum occurs in syenite pegmatite and to a lesser extent in a hybrid syenitic gneiss. Accessory minerals are feldspar, apatite, pyroxene, garnet and quartz (J. Satterly, 1944: pp. 34-35).

31 F/6 Corundum occurs in the following Lyndoch Township localities: Conc. XIV, and XV, lot 13. Crystals up to 5 cm in diameter occur in the syenite rocks. Granite pegmatites appear to have some control of the occurrence of the mineral (J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. III, pp. 29-30) (L. Moyd, 1949: Am Mineralogist, 34, p. 745).

In Sebastopol Township corundum has been found on: Conc. IV, lot 6; conc. V, lot 24; conc. V, lot 25. The corundum-bearing rocks occur near exposures of nepheline syenite (J. Satterly, 1944: p, 35).

Two open cuts about 8 m apart, on conc. XIX, lot 28, Raglan Township expose corundum-bearing syenite lenses in a hybrid syenitic gneiss rock (J. Satterly, 1944: p. 35).

Interbanding of nepheline and corundum-rich rocks is well illustrated on conc. I, lots 28-31 (L. Moyd, 1949: p. 743).

On lot 29 the hybrid syenite gneisses have been cut by syenitic pegmatite dykes with corundum zones at their centres; and on lot 31, scattered crystals of corundum are associated with hornblende granite pegmatites in an old pit (J. Satterly, 1944: p. 30).

A corundum-bearing zone of pink and white syenitic gneiss in a hybrid syenitic gneiss occurs in Radcliffe Township on conc. II, lots 31 and 32. The crystals are said to be from 3 to 12 mm across. They are present in bands from 2.5 to 30 cm thick in which they comprise about 1 per cent of the rock (J. Satterly, 1944: p. 31).

Good quality bronze corundum is found on the Gutz farm in Brudenell Township (D.S.M. Field, 1951: Can. Min. J., 72, Pt. 2, pp. 75-77).

Occurrences of corundum are known at the following localities in Brudenell Township: conc. IV, lot 34; conc V, lots 24 and 34, the mineral occurs in lenticular patches throughout a biotite pegmatite on lot 34; conc. VI, lots 24 and 25; conc. VII, lots 20, 32, 33, 34, drag folding is common on lot 34. The corundum is banded with nepheline and many crystals are intergrown with magnetite, and on lot 20, granite pegmatites are believed to have been significant in localizing the corundum (E.D. Ingall, 1897: Geol. Surv. Can., Ann. Rept., X, p. 16 S) (J. Satterly, 1944: p. 29) (L. Moyd, 1949: p. 745).

31 F/7 Corundum has been reported to occur on concs. XII and XIII, lots 11 and 12 of Brougham Township in the southern part of the Mount St. Patrick nepheline belt (L. Moyd, 1949: p. 745).

41 I/2 Transparent bluish to purplish grey prisms of corundum were collected from a small pit on the north side of Hartley Bay road at a point 5 km west of its junction with Highway 69, near Bigwood (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 336).

COSALITE

$CuPb_7Bi_8S_{22}$

British Columbia

93 E/6 Stubby crystals of cosalite occur in the easterly workings of the Harrison Group at Lindquist Lake in the Omineca mining district. They are associated with tetradymite and occasionally gold. One fragment of doubtful purity was found to have a specific gravity of 6.75 (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 85)

93 H/4 Cosalite is found in intimate association with gold in the Cariboo Gold Quartz Mine near Barkerville (H.V. Warren, 1936: Econ. Geol., 31, pp. 205-211).

The mineral is also present in the neighbouring Island Mountain Mine. X-ray powder photographs from the two Cariboo district occurrences are identical with those of cosalite from McElroy Township, Ont., and from Nordmark, Sweden (L.G. Berry and R.M. Thompson, 1962: Geol. Soc. Am., Mem. 85, p. 148).

93 M/5 Cosalite has been reported at the Sunrise group and Lead King group on Nine Mile Mountain, 9.6 km from New Hazelton (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 81).

103 P/6 Cosalite occurs with aikinite, nuffieldite, pyrite and molybdenite in vugs in narrow quartz veins in the Lime Creek quartz diorite stock on the property of B.C. Molybdenum Corporation, 9.6 km southeast of the town of Alice Arm (P.W. Kingston, 1968: Can. Mineralogist, 9, p. 439-452).

104 O/13 Cosalite has been identified in a quartz vein associated with a granite plug at Logjam Creek, 59°59'30"N, 131°36'W, in the Jennings River area (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept. 23, p. 55).

104 P/5 Quartz veins in porphyritic granite are mineralized with pyrite, bismuthinite, molybdenite, scheelite and cosalite at the Contact claims, 4.8 km by road northwest of Cassiar (H. Gabrielse, 1963: Geol. Surv. Can., Memoir 319, p. 119).

Manitoba

52 L/6 At the Tanco pegmatite, Bernic Lake, cosalite occurs with aikinite-bismuthinite intergrowths, gustavite, native bismuth, chalcopyrite, stannite and arsenopyrite (D.C. Harris and T.T. Chen, 1975: Can. Mineralogist, 13, p. 411).

New Brunswick

21 G/7 Inclusions of cosalite have been observed in galena in polished sections of ore specimens from Mount Pleasant, Charlotte County (R.S. Boorman, 1968: New Brunswick Res. Prod. Council, Res. Note 11).

Ontario

31 M/5 Tarnished dark grey crystals of cosalite occur within the smaltite and cobaltite of the Columbus Mine near Cobalt. The mineral has also been observed as slender crystals in cavities. It appears to be younger than the other sulphides accompanying it. A chemical analysis by E.W. Todd is as follows: Pb 37.88, Cu 1.24, Ag 1.67, Ni 0.05, Co 0.44, Fe 1.79, Bi 39.21, S 15.76, As 1.47, Sb 0.36, insol. 0.14, total 100.01. S.G. 6.55 (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 9).

32 D/4 Cosaltite occurs on the Mondoux claim in McElroy Township as nodular masses sometimes weighing several kg. Crystals of the mineral are slender, acicular, elastic, and have a tendency to split lengthwise. They are up to 12 mm long and are usually bent and twisted. Associated with the cosalite are quartz, chlorite, and calcite, and small amounts of bismuth and gold (T.L. Walker, 1921: Univ Toronto Stud., Geol. Ser., 12, p. 5) (L. G. Berry, 1939: Univ. Toronto Stud., Geol. Ser. 42, p. 24).

32 D/4 Cosalite has been recognized on the Peerless property in McElroy Township by Burrows and Hopkins and in the area broadly defined as the southwestern part of the same township, by Abraham (A.G. Burrows and P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. VI, p. 17) (E.M. Abraham, 1950: Ont. Dept. Mines. Ann. Rept., vol. 59, Pt. VI, p. 51).

41 I/10 An X-ray powder pattern has led to the identification of cosalite in a specimen from Loughrin Township (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Quebec

32 D/6 Cosalite has been found replacing pyrrhotite and chalcopyrite at the Waite-Ackerman-Montgomery Mine in the Noranda district (M.E. Wilson, 1937: Geol. Surv. Can., Mem. 209, p. 72).

COVELLITE

CuS

Alberta

82 H/5 Covellite, bornite and digenite are found in quartzites of the Upper Grinnell formation at the Yarrow Creek-Spionkop Creek copper deposit (R.J. Goble and D.G.W. Smith, 1973: Can. Mineralogist, 12, p. 95).

British Columbia

82 F/14 Small quantities of blue microcrystalline covellite have been found at the Highland Light mining claim on Ten Mile Creek in the Slocan mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 80).

93 A/12 Covellite, chrysocolla, cuprite and malachite are present at elevations of about 960 m surrounding Bootjack Lake 8 km southwest of Likely at 52°33.5'N, 121°38.5'W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 208).

103 I/9 The mineral association at the M and K Copper property consists of bornite, galena, and chalcopyrite in drag folds in Jurassic lavas and tuffaceous sedimentary rocks. Covellite occurs in narrow veinlets cutting the other minerals. The property is located on Legate Creek, 24 km from the Pacific (W.L. Uglow, 1922: Am. Mineralogist, 7, p. 1).

114 P/10 Covellite is associated with the copper-silver mineralization on Mineral Mountain and Copper Butte, located northwest and north, respectively, of the hairpin turn at Mile 52 (83.5 km) Haines Road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p.59).

New Brunswick

21 H/10 Covellite is found with chalcocite, malachite, chalcopyrite and azurite in grey sandstone at the Copp Copper deposit on the Copp farm near Germantown. The covellite is rare (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 24).

21 H/10 At the New Horton Copper Mine, also known as the Vernon Mine, on the west side of the New Horton road, 8.7 km south of its junction with Highway 14 south of Albert, rare covellite is associated with chalcocite, malachite, chalcopyrite, pyrite and azurite (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 25).

21 H/16 At the Dorchester copper mine, near Dorchester in Westmorland County, covellite is associated with chalcocite, pyrite and malachite, in grey sandstone and conglomerate (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 28).

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A publication of the New Brunswick Research and Productivity Council entitled The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, Record 2, Part B (1965), lists the following localities where covellite has been found.

21 G/7 Mount Pleasant Mine, Charlotte County.

21 O/8 Heath Steele Mine, Northumberland County.

21 O/9 Caribou-Chaleur Bay Mines Limited, Restigouche County.

21 P/5 Brunswick No. 6 Mine, Gloucester County.

21 P/13 Henry Brook, Beldune Station and Elmtree, Gloucester County.

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Newfoundland

1 N/12 Specimens of black covellite encrusted with green chrysocolla and malachite were collected

in a road-cut on the Trans Canada Highway 1.6 km north of the turn-off to Chance Cove (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 83).

2 E/12 Covellite was reported to be a minor constituent of the ore at the Little Bay Mine located 0.8 km southeast of Little Bay village, and on the south slope of a ridge on the peninsula between Little Bay and Little Bay Arm in Notre Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 113).

12 A/15 The lead-zinc sulphide ore mined at Buchans, contains covellite (R. Guimond, 1961: Precambrian, vol. 34, No. 9, p. 27).

12 H/9 The ore at the Whalesback Mine contained covellite in addition to the main ore mineral, chalcopyrite. The mine is at Whales Back Pond, northeast of Springdale (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 112).

Northwest Territories

85 H/11 Intergrowths of what has been interpreted as a solid solution of chalcocite and covellite occur on the Outpost Islands in Great Slave Lake. Associated minerals are pyrite, chalcopyrite, marcasite, limonite, ferberite, magnetite, specular hematite, ilmenite, bornite, chalcocite, chlorite, sericite, and gold (J.E. Hawley, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 64).

86 K/4 Covellite is present as a minor constituent, resulting from alteration of other copper minerals, at the Bear property 16 km southeast of Labine Point on Great Bear Lake. Associated minerals are silver, uraninite, chalcocite, bornite, chalcopyrite, pyrite, hematite, psilomelane, pyrolusite, skutterudite, sphalerite, galena, magnetite, and safflorite. These are given in order of their abundance from greatest to least.

Veins of covellite follow the fracture and cleavage cracks in bornite, chalcocite, and chalcopyrite at the Eldorado Mine on Great Bear Lake. The mineral also tends to coat massive areas of chalcocite. In both occurrences it is the result of alteration of the other copper minerals (E. Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 27, 47).

Nova Scotia

11 E/11 Covellite occurs with chalcocite at New Annan in Colchester County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 30 T).

An analysis of a specimen of covellite from this locality was made by Louis. The results are as follows: S 25.64, Cu 64.11, Fe_2O_3 and Al_2O_3 3.89, insol. 5.78, total 99.42 S.G. 4.3888 (H. Louis, 1875-78: Trans. Nova Scotia Inst. Nat. Sci., IV, p. 424).

Ontario

31 M/4 The orebodies at the Frontier and Keeley silver mines contained minor amounts of covellite. The mines are at Silver Centre, an abandoned settlement in South Lorrain Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 63).

31 M/5 Covellite was identified by ore microscopy in a specimen from a fault zone in the Christopher Mine, Cobalt. It occurs as a coating on chalcopyrite and tetrahedrite (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 207).

41 P/9 Covellite has been reported to occur in James and Tudhope Townships (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 80).

On conc. IV, lot 12, of Tudhope Township the covellite is secondary with malachite after bornite and chalcopyrite (W.W. Moorhouse, 1941: Ont. Dept. Mines, Ann. Rept. vol. 50, Pt. IV, p. 41).

41 P/12 Covellite occurs in the Three Duck Lake area on the east shore of Mesomekenda Lake and on Narrow Peninsula near Clam Lake (H.C. Laird, 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. III, pp. 27 and 33).

41 P/15 Chalcopyrite and molybdenite were the main ore minerals at the Ryan Lake Mine, a former producer of copper, molybdenum, silver and gold. Covellite is one of several other minerals found on mine dumps, on the west side of Highway 566, 6.6 km from Matachewan (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 105).

42 A/2 The copper-zinc ore at the Canadian Jamieson Mine in Godfry Township is reported to have contained some covellite. The property may be reached by road, 0.5 km long, leading west from Highway 576 at a point 13.2 km from its junction with Highway 101 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 153).

42 A/11 Covellite is present in the ore at the Kidd Creek Mine located about 25.7 km by road north of Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 139).

52 E/9 Covellite occurs with pyrite and other sulphide minerals at Pine Portage Bay on the north shore of Big Stone Bay in Lake of the Woods. It was found in a shaft being sunk into an auriferous vein about 1.2 km from the lake (E. Coste, 1882-84: Geol. Surv. Can., Rept. Prog., p. 15 K).

52 F/9 A quartz vein in the Dryden gold area at K. 641 (A.S. 15) contains covellite which has been described as forming a beautiful blue coating on other sulphides (Ellis Thomson, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 186).

Saskatchewan

63 K/12 Covellite is a minor constituent in the ore at the Coronation Mine near the shore of Phil (McNally) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

73 P/7 Sooty covellite occurs in fractures in quartz at the Eureka deposit located on a ridge forming a peninsula at the southern end of Heyer Bay (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 7).

Yukon

105 G/5 Bornite, chalcopyrite, chalcocite and covellite are the main copper minerals found on the Bell claims at 61°28'N., 131°46'W., in the McNeil Lake area (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. of Indian Affairs and Northern Development, p. 131).

COWLESITE

$CaAl_2Si_3O_{10} \cdot 6H_2O$

British Columbia

82 L/5 The new Ca-zeolite, cowlesite, is fairly abundant in basalt scoria and breccias exposed by logging roads south of Monte Lake. Associated zeolites are: analcime, thomsonite, ferrierite, levyne, stilbite, heulandite and chabazite. Electron microprobe analysis of cowlesite: SiO_2 45.74, Al_2O_3 27.89, CaO 15.36, Na_2O 0.53, K_2O 0.09, total 87.61 (W.S. Wise and R.W. Tschernich, 1975: Am. Mineralogist, 60, p. 951).

crocidolite

(see RIEBECKITE)

CRYOLITE

Na_3AlF_6

Quebec

31 H/12 The first reported occurrence of cryolite in Canada is at the Francon quarry on Montreal Island. Although relatively rare in the quarry, colourless to yellow transparent crystals about 1 mm in diameter form aggregates up to 15 mm large in cavities associated with colourless calcite, weloganite and dawsonite (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 16).

CRYPTOMELANE

$K_2Mn_8O_{16}$

Cryptomelane is one of several hard hydrous manganese oxides that occur typically as secondary minerals formed by surface weathering of other manganese minerals. Much of the material referred to as psilomelane in earlier reports is probably cryptomelane.

Quebec

23 J/15 Cryptomelane has been identified by X-ray diffraction pattern in specimens from the Gagnon A Mine near Knob Lake (X-ray Laboratory, Geol. Surv. Can.).

cryptomorphite

(see GINORITE)

CUBANITE

$CuFe_2S_3$

British Columbia

92 C/8 Some cubanite is reported with the main ore minerals, chalcopyrite, pyrrhotite and pyrite at the Sunro Mine, at 48°27'N, 124°02'W., 1.6 km north of the mouth of Jordan River (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1974, p. 164).

Manitoba

52 L/6 Solid masses and stringers consisting of pyrrhotite, chalcopyrite, pyrite, cubanite, magnetite, pentlandite and violarite are exposed on the Martin-Devlin, Chance and Wento claims on the north side of the Bird River, about 4.4 km north of the Bernic Lake Mine (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 58).

63 K/13 Cubanite is a minor constituent of the ore mined at Flin Flon (R.F. Coulter, 1962: Bull. Can. Inst. Mining Met., 55, No. 602, p. 376).

63 N/3 Slender needles of cubanite are sparsely distributed through chalcopyrite on the Sherritt claims at Cold Lake, 48 km northwest of Flin Flon (E. Thomson, 1927: Univ. Toronto Stud., Geol. Ser., 24, p. 44).

New Brunswick

21 P/5 Cubanite is reported to be a minor constituent of the ore at the Brunswick No. 6 Mine (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

Newfoundland

12 H/9 The ore at the Whalesback Mine is reported to contain some cubanite. The mine is at Whales Back Pond, northeast of Springdale (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 112).

Northwest Territories

86 J/7 Cubanite occurs disseminated in norite in the feeder dyke to the Muskox Instrusion at 66°28'N, 114°58'W (X-ray Labratory, Geol. Surv. Can.).

Ontario

31 F/6 Cubanite is the dominant metallic mineral at a sulphide occurrence in Raglan Township. It occurs both in acicular and granular forms but the latter is the more abundant. Chalcopyrite, arsenopyrite and sphalerite are also present; pyrrhotite has not been observed (E. Thomson, 1927: Univ. Toronto Stud., Geol. Ser., 24, p. 45).

41 I/7 Cubanite is estimated to supply about 15 per cent of the copper in the Sudbury ores. Chemical analysis by Michener: Cu 22.06, Fe 42.13, S 36.30, Co 0.01, total 100.50. Brassy yellow cubanite crystals, up to 5 millimetres across, have been obtained from the Frood Mine. Chemical analysis by Waern: Cu 22.88, Fe 41.41, S 35.35, total 99.64 (J.E. Hawley, 1962: Can. Mineralogist, 7, p. 62) (M.A. Peacock and G.M. Yatsevitch, 1936: Am. Mineralogist, 21, p. 55).

42 E/15 Cubanite has been recognized as a slender lath in a bleb of chalcopyrite enclosed in pyrite at the Hard Rock Mine in the Little Long Lac area (H.S. Armstrong, 1944: Am. Mineralogist, 29, p. 311).

Quebec

22 A/13 Small amounts of cubanite occur in the Needle Mountain orebody of Gaspé Copper Mines Limited at Murdochville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81).

Saskatchewan

63 K/12 A small amount of cubanite is reported in the ore at the Coronation Mine near the shore of Phil (McNally) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

74 A/7 At the Rottenstone Mine, cubanite occurs with pentlandite, sperrylite and sphalerite in an orebody which consists mainly of pyrrhotite, violarite and chalcopyrite. The mine is on the southeast shore of Rottenstone Lake at 56°20'N 104°49'W (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 8).

Yukon

105 H/16 Cubanite is associated with scheelite in the skarn zone of the Canada Tungsten Mine at 61°57'N, 128°15'W, in the Logan Mountains at an elevation of 1680 m overlooking the Flat River valley (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 22).

CUMMINGTONITE

$(Mg,Fe)_7Si_8O_{22}(OH)_2$

Newfoundland

23 B,G Cummingtonite is one of the most abundant silicates in both the lower and upper Wabush formations, occurring as prismatic grains associated with quartz, carbonate and magnetite. Partial chemical analyses of 5 cummingtonites by Courville: Boulder Lake, SiO_2 51.60, Al_2O_3 0.62, Fe_2O_3 1.37, FeO 38.09, CaO nil, MgO 6.10, MnO 0.66, F 0.02; White Lake, SiO_2 46.54, Al_2O_3 7.64, Fe_2O_3 3.75, FeO 30.62, CaO 0.14, MgO 8.06, MnO 0.34; Carol Lake, SiO_2 51.45, Al_2O_3 nil, Fe_2O_3 2.18, FeO 35.11, CaO nil, MgO 8.00, MnO 0.83; Wabush Lake, SiO_2 47.64, Al_2O_3 4.46, Fe_2O_3 3.22, FeO 34.10, CaO 0.04, MgO 7.11, MnO 0.36; Luce Lake, SiO_2 51.46, Al_2O_3 0.61, Fe_2O_3 0.40, FeO 33.01, CaO 1.14, MgO 10.93, MnO 0.58. The four strongest lines on the X-ray powder pattern of the specimen from White Lake (high alumina) are: 8.33 (10), 3.06 (7), 2.756 (7) and 2.189 (5) (Fe radiation, Mn filter).

Manganian cummingtonite occurs in the quartz-specularite-magnetite member of the upper Wabush iron-formation in the Wabush No. 6 and 7 deposits and also south of Little Wabush Lake. Chemical analysis of specimen from Wabush No. 7 by Klein: SiO_2 53.7, Al_2O_3 0.75, Fe_2O_3 2.16, MgO 19.1, FeO 3.63, MnO 16.8, Na_2O 0.22, CaO 1.12, K_2O 0.01, H_2O 2.21, P_2O_5 0.04, total 99.74. Partial chemical analysis of specimen from south of Little Wabush Lake, by Courville: SiO_2 53.00, Al_2O_3 5.81, Fe_2O_3 5.72, MgO 17.39, FeO 5.44, MnO 7.29, CaO 1.50. The spacings and intensities of the four strongest lines in the X-ray pattern of the latter specimen are: 9.02 (8), 8.32 (10), 3.07 (10) and 2.72 (10) (Fe radiation, Mn filter) (K.L. Chakraborty, 1963: Can. Mineralogist, 7, pp. 738-750).

23 B/15 Chemical analyses of manganoan cummingtonites from Wabush iron formation, Labrador City area, by Jun Ito.

SiO_2	55.27	55.74	55.10
TiO_2	0.00	0.00	0.00
Al_2O_3	0.34	0.23	0.10
FeO	4.52	7.09	11.08
MnO	16.62	14.73	13.17
MgO	19.18	18.55	17.00
CaO	1.19	1.04	1.22
Na_2O	0.26	0.08	0.13
K_2O	0.00	0.02	0.02
H_2O^+	2.16	2.26	2.05
H_2O^-	0.30	0.43	0.43
F	0.40	0.28	0.23
P_2O_5	0.09		
Total	100.33	100.45	100.53
F_2=0	0.17	0.11	0.10
Total	100.16	100.34	100.43

(C. Klein, 1964: Am. Mineralogist, 49, p. 963-982)

Northwest Territories

86 B/12 Cummingtonite has been found in metamorphic rocks of the Snare Croup near Boland Lake (J.C. McGlynn and J.V. Ross, 1963: Geol. Surv. Can., Paper 63-26, p. 4).

CUPRITE

Cu_2O

Cuprite, sometimes referred to as red copper ore, chalcotrichite, or tile ore, is of secondary origin formed by oxidation and alteration of copper minerals.

British Columbia

82 E/2 Small transparent crystals of cuprite have been found in the King Solomon Mine at Copper Creek in the Greenwood mining division (R. Bell, 1902: Geol. Surv. Can., Ann. Rept., XV, p. 125 A).

92 G/11 Parallel quartz veins containing bornite, chalcopyrite, cuprite and molybdenite occur in granite at 49°42.5'N, 123°27.2'W, on Mount Donaldson, 20.9 km west of Squamish (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 277).

93 A/12 The copper minerals cuprite, chrysocolla, covellite and malachite are reported at about 960 m elevation surrounding Bootjack Lake at 52°33.5'N, 121°38.5'W, 8 km southwest of Likely (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 208).

104 G/3 Secondary cuprite occurs locally in the Galore Creek deposits of Stikine Copper Limited at about 57°08'N, 131°28'W. Chalcopyrite and bornite are the principal ore minerals (J.G. Souther, 1972: Geol. Surv. Can., Paper 71-44, p. 24).

Newfoundland

12 B/15 Small amounts of native copper and cuprite occur in a sheared dunite near the head of Pope Cove (G.C. Riley, 1962: Geol. Surv. Can., Mem. 323, p. 56).

Nova Scotia

21 H/7 Native copper, copper carbonate and cuprite occur at Bennett Brook, Cape d'Or, and Spencer Island in Cumberland County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 31 T).

21 H/8 Cuprite occurs at Two Islands in Cumberland County (National Mineral Collection: C.W. Willimott, 1901).

Ontario

41 N
42 D
52 A Cuprite has been found with native copper in the trap rocks on the north shore of Lake Superior (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 196).

41 I/6 The mineral collection at the Royal Ontario Museum includes cuprite from the Vermilion Mine, lot 6, conc. IV, Denison Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 130).

42 A/8 Cuprite has been reported at the Ross Mine at Holtyre in Hislop Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 111).

Quebec

31 H/7 An earthy form of cuprite occurs with bornite and malachite on range IX, lot 9, Sutton Township, in Brome County (G.C. Hoffmann, 1892-93; Geol. Surv. Can., Ann. Rept. VI, p. 26 R).

31 H/8 Cuprite forms red stains on the shales at the copper deposits at Acton in Bagot County (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV. p. 31 T).

Yukon

105 D/11 Cuprite was encountered in several of the drillholes put down on the Pueblo property in the Whitehorse copper belt. Drillhole number 1 passed through 7 m of cuprite at a depth of 76 m. Holes 5, 6, and 21 all encountered copper ore (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 582).

115 F/15 An occurrence of cuprite with native copper, chalcocite, and chalcopyrite has been reported at the Discovery Copper claims on the southeast bank of the upper canyon of White River, nearly opposite the mouth of Boulder Creek, 2.4 km upstream from the abandoned settlement of Canyon City (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 75).

CUPROSKLODOWSKITE

$Cu(UO_2)_2Si_2O_7.6(or\ 7)H_2O$

Saskatchewan

74 N/8 Cuprosklodowskite occurs as small bright yellowish green needles associated with other uranium minerals in a fissure at the Nicholson Mine, east of Goldfields. The fissure cuts the talcose argillaceous rock on the north shore of Lake Athabasca (D.D. Hogarth, 1951: Am. Mineralogist, 36, p. 411).

CUPROSPINEL

$CuFe_2O_4$

Newfoundland

12 H/16 The new mineral, cuprospinel, was found in several specimens from an ore dump on the property of Consolidated Rambler Mines Limited near Baie Verte. It is associated with other spinels and with hematite and Orthopyroxene. Electron microprobe analysis: Fe_2O_3 65.7, FeO 1.7, CuO 27.8, MgO 1.8, ZnO 0.7, CoO 0.6, MnO 0.2, Al_2O_3 2.6, total 101.1; iron was determined as Fe and recalculated into the oxides to satisfy the spinel formula (E.H. Nickel, 1973: Can. Mineralogist, 11, p. 1003).

CURITE

$Pb_2U_5O_{17}.4H_2O$

Northwest Territories

86 L/1 Curite, becquerelite, and liebigite have been reported as secondary minerals at the Eldorado Mine on the east shore of Great Bear Lake (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can. Econ. Geol. Ser., 16, p. 190).

Ontario

31 D/16 Curite has been identified in a specimen from lot 22, conc. IX of Cardiff Township. The locality is on a group of fifteen claims near Paudash Lake on the property of Aumacho River Mines Ltd. (X-ray Laboratory, Geol. Surv. Can.).

Saskatchewan

73 P/1 Curite occurs as orange and greenish-yellow to olive-green layers or crusts on quartz and feldspar at the Lee (Jahala) Lake uranium deposit on the side of a hill facing the northeastern end of Lee (Jahala) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 10).

cyanite

(see KYANITE)

CYANOCHROITE

$K_2Cu(SO_4)_2.6H_2O$

British Columbia

92 H/6 Green transparent cyanochroite has been identified on a specimen from the Giant Mascot Mine at Hope. It is associated with hexahydrite (X-ray Labratory, Geol. Surv. Can.).

CYANOLITE

$CaSi_4O_9.H_2O$

The above is given only as an approximation of the formula for cyanolite. It is probable that cyanolite is not a distinct mineral species but rather, an impure form of gyrolite. For comparison, the composition of gyrolite is written $Ca_2Si_3O_7(OH)_2.H_2O$ (M.H. Hey, 1955: Chemical Index of Minerals, p. 54).

Nova Scotia

11 E/6 The name cyanolite was applied to the bluish inner portion of a nodule found in an amygdaloid near Black Rock in Colchester county. Associated minerals were centrallasite and cerinite. Two analyses by How are as follows: (1) SiO_2 74.15, Al_2O_3 0.84, CaO 17.52, MgO trace, K_2O 0.53, H_2O 7.39, total 100.43. S.G. 2.495, (2) SiO_2 72.32, Al_2O_3 1.24, CaO 18.19, MgO trace, K_2O 0.61, H_2O 6.91, total 99.47 (H. How, 1859: Edin. New Phil. J., X, p. 84).

CYANOTRICHITE

$Cu_4Al_2SO_4(OH)_{12}.2H_2O$

Cyanotrichite is a sky-blue secondary mineral found sparingly in copper deposits.

Quebec

21 L/9 Cyanotrichite, allophane and hisingerite are reported to occur as secondary minerals with the copper-nickel zinc ore at the Eastern Metals Mine, 4.8 km from St-Fabien (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 66).

cyrtolite

(see ZIRCON)

damourite

(see MUSCOVITE)

danaite

(see ARSENOPYRITE)

DANALITE

$(Fe,Mn,Zn)_4Be_3Si_3O_{12}S$

British Columbia

104 P/4 Translucent, reddish brown grains of danalite are present in an iron rich skarn on Needlepoint Mountain in the McDame area. They are anhedral, up to 3 millimetres across, and occur in a groundmass of magnetite, chlorite, fluorite, sericite, carbonate, and quartz with minor native bismuth. The locality is on the southwest slope at the 1500 m level and about 3 km northeast of the junction of Bass Creek and the Cottonwood River. A partial chemical analysis by G.C.B. Cave is as follows: Fe 25.1, Mn 10.5, Zn 2.9; L.G. Berry of Queen's University reports the following composition: Fe 25.2, Mn 11.05, Zn 2.05. (R.M. Thompson, 1957: Can Mineralogist, 6, pp. 68-71).

Quebec

33 D/15 Danalite has been observed as small crystals in a vein on Walrus Island on the east coast of James Bay. Other minerals in the vein were orthoclase, spodumene, and quartz (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., XII, p. 15 R).

DANBURITE

$CaB_2Si_2O_8$

Northwest Territories

69 F/10 Danburite occurs as whitish to greyish black, transparent to translucent prismatic crystals up to 3.5 cm long in carbonate rocks within the Dumbells Salt Dome, Ellef Ringnes Island, Arctic Archipelago. Specimens collected by H.E. Dunsmore, Geological Survey of Canada at 78°37'08"N, 101°19'53"W, are in the National Mineral Collection.

Nova Scotia

11 F/15 Gypsum-anhydrite cliffs containing howlite and danburite occur along the shore about 3.2 km southwest of the ferry landing at Iona, Cape Breton Island. The danburite forms white nodules resembling unglazed porcelain and botryoidal masses in anhydrite. (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 22).

22 H/1 White nodular aggregates of danburite have been found in association with anhydrite in gypsum cliffs northeast of the wharf at Cheverie, Hants County. (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 54).

DATOLITE

$CaBSiO_4OH$

Ontario

31 C/7 Fine crystals of datolite have been found in Loughborough Township, conc. VII, lot 11, at the Smith and Lacey Mine (L.V. Pirsson: Am. J. Sci., XLV, pp. 100-102).

31 C/10 Datolite has been reported to occur at the Bobs Lake Mine, conc. VI, lot 30, Bedford Township (H.S. de Schmid, 1912: Can. Dept. Mines, Mines Br. Publ., 118, p. 285).

52 A/10 An occurrence of datolite is located 1.6 km west of Loon Station in the Thunder Bay district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 83).

A specimen of datolite in the mineral collection of the Royal Ontario Museum is from Silver Harbour Mine, MacGregor Township. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 131).

Quebec

31 G/11 Massive datolite from Derry Township, range I, lot 9, has been analyzed by Johnston with the following results: SiO_2 36.94, B_2O_3 22.34, CaO 34.90, Al_2O_3 0.02, Fe_2O_3 0.02, MgO 0.05, H_2O 5.68, total 100.08. S.G. 2.985. The sample was obtained from the Daisy Mine (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 17 R, 18 R).

31 H/11 Datolite is reported to occur in inclusions in nepheline syenite with coarse-grained pectolite and calcite and abundant soda amphibole at the Desourdy quarry on the northeast slope of Mont St-Hilaire. (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

DAVIDITE

$(Fe,La,U,Ca)_6(Ti,Fe)_{15}(O,OH)_{36}$

Ontario

31 F/4 Davidite has been identified in specimens from the 270 m level in the Faraday uranium mine, lots 16 and 17, conc. XI, Faraday Township (X-ray Labratory, Geol. Surv. Can.).

Saskatchewan

74 A/11 Davidite has been identified in specimens from a Baska Uranium Mines prospect in the Foster Lakes area, probable located near the centre of the east shore of Kotelmach Lake. (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 295).

DAWSONITE

$NaAlCO_3(OH)_2$

Dawsonite was first described by B.J. Harrington in 1874. The name is in honour of John William Dawson, former Principal of McGill University, Montreal.

Ontario

31 F/4 Dawsonite has been discovered at the Princess sodalite quarry near Bancroft. It occurs as colourless to white silky fibres about 1 mm long forming cross-fibre veinlets and radiating, stellate, parallel and felted aggregates, and as transparent striated masses with a bright vitreous lustre. The masses and aggregates are up to 1 cm long and are embedded in natrolite. The specimens were collected from a new open cut in the east side of the original quarry. (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 336).

Quebec

31 H/11 Dawsonite has been identified at the Royal Ontario Museum in specimens from a quarry

operated by the Richelieu Paving Company (later known as the Dulude quarry) at St-Bruno on the north side of the mountain. The dawsonite occurs in fractures in black limestone and is associated with quartz, pyrite and analcime (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 378).

31 H/11 Dawsonite has been identified in specimens from the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 H/12 An analysis of dawsonite from the Hochelaga County reservoir, Montreal, is as follows: CO_2 32.23, Al_2O_3 24.71, Na_2O 15.64, CaO 16.85, MnO_2 0.23, SiO_2 0.84, H_2O 9.06, total 99.26. The foregoing analysis by Harrison was made on a specimen which contained calcium carbonate and other impurities. If these are deducted, and the remaining constituents recalculated for 100 parts, the results are as follows: CO_2 27.78, Al_2O_3 36.12, Na_2O 22.86, H_2O 13.24. This represents the composition of the mineral (B.J. Harrington, 1874: Can. Nat., Ser. 2, VII, pp. 305-309; X, pp. 84-86).

31 H/12 Dawsonite occurs in the joints of a feldspathic dyke cutting the Trenton limestone near McGill University in Montreal. It was from this locality that the mineral was first described. Two analyses of specimens containing calcium and magnesium carbonate impurities are as follows: (1) CO_2 29.88, Al_2O_3 32.84, Na_2O 20.20, K_2O 0.38, CaO 5.95, MgO trace, SiO_2 0.40, H_2O 11.91, total 101.56. S.G. 2.40. (2) CO_2 30.72, Al_2O_3 32.68, Na_2O 20.17, CaO 5.65, MgO 0.45, H_2O 10.33, total 100.00. If the impurities are deducted and the remaining constituents recalculated for 100 parts, the following values for the compositions of the two specimens are obtained: (1) CO_2 27.96, Al_2O_3 36.42, Na_2O 22.41, H_2O 13.21. (2) CO_2 29.06, Al_2O_3 36.70, Na_2O 22.65, H_2O 11.59 (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 31 T).

31 H/12 Numerous cavities in a grey, dense igneous sill at the Francon Quarry, Montreal Island, are lined with dawsonite as colourless, transparent, striated, tiny square prsims, and as white finely granular patches with satin lustre (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 67).

31 H/12 Small cavities in igneous dykes at the Miron Quarry, Montreal Island, contain colourless striated crystals of dawsonite generally associated with calcite crystals (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 68).

desmine

(see STILBITE)

DEVILLINE

$Cu_4Ca(SO_4)_2(OH)_6 \cdot 3H_2O$

Manitoba

63 K/12 Light blue flaky devilline has been identified with brochantite coating host rocks at the Cuprus Mine. The mine is along Highway 10, 16.1 km east of Flin Flon (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 42).

63 N/3 Coating of light blue devilline are present on ore-bearing specimens from the Sherritt-Gordon Mine at Sherridon (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 48).

Quebec

21 E/5 Devilline has been identified at three copper deposits in the Sherbrooke area. the Suffield Mine on the Jardine farm, 5.1 km east of Rock Forest; the Capelton and Albert Mine, 3.2 km north of Eustis; and the Aldermac Moulton Hill Mine, south of Highway 1, about 4.8 km east of Sherbrooke (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 29).

32 D/3 Greenish-blue devilline has been found as coatings on ore specimens collected from a small dump at the railway on the north side of Highway 59 at Aldermac (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 70-30, p. 41).

Saskatchewan

63 K/12 Secondary copper minerals identified at the Coronation Mine include: devilline, posnjakite, brochantite and antlerite (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

63 L/9 The secondary copper minerals brochantite, atacamite and devilline are present on specimens from the Birch Lake mine, located on the north end of a small island in Birch Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 26).

DIAMOND

C

Speculation concerning the existence of Canadian diamonds began in the latter part of the 19th century soon after the discovery of gems in moraine material south of the Great Lakes. Their occurrence in the glacial drift indicates that they have been transported from the north, possibly from Canada. As yet, no source has been found but glacial evidence suggests that it lies somewhere between Lake Superior and James Bay. Diamonds have been reported from various other parts of Canada but unfortunately, many of the claims have since proved false and no deposits of commercial value have been found.

British Columbia

92 H/10 Diamonds in chromite have been reported to occur near Olivine Mountain in the Similkameen mining division (C. Camsell, 1910: Geol. Surv. Can., Sum. Rept., pp. 112-113). The supposed microscopic-sized diamonds were subsequently shown to be periclase (A.H. Lang, 1956: Geol. Surv. Can., Econ. Geol. Ser., 7, p. 298).

92 I/14 Small diamonds have been reported with the chrompicotite at Scottie Creek in the Bonaparte River area north of Ashcroft (R.A.A. Johnston, 1911: Geol. Surv. Can., Sum. Rept., p. 360). The supposed microscopic-sized diamonds were subsequently shown to be periclase (A.H. Lang, 1956: Geol. Surv. Can., Econ. Geol. Ser., 7, p. 298).

Ontario

42 A/14 Microscopic diamonds are said to be present in certain deposits of chromite and in what appears to be an associated altered pyroxene rock in Reaume Township about 32 km north of Porcupine (T.W. Gibson, 1914: Ont. Bur. Mines, Ann. Rept., vol. 23, p. 47).

Quebec

31 H/12 An occurrence of kimberlite was discovered in 1966 on Ile Bizard, about 15 km west of the City of Montreal. A bulk sample was shipped to South Africa for milling and several tiny diamonds were recovered. Five of these are housed in the National Mineral Collection. The possibility exists that the diamonds may be contamination from previous samples in the milling system.

32 C/4 Diamond fragments were found to be present in a diamond-drill hole in range VII, Vassan Township. They were discovered in rock cuttings recovered from the hole after it had been stopped at a depth of 18 m by some extremely hard material. The find prompted the sinking of a shaft to a depth of 20 m from which a sample of 134 tonnes of rock was removed and sent for treatment. The results however, were inconclusive (D.S.M. Field: J. of Gemm., 3, No. 3, p. 119).

Saskatchewan

63 L A kimberlite occurrence, from which five diamonds are said to have been obtained, has been reported in an area vaguely described as within 160 km of Flin Flon. The Saskatchewan government made an offer of a tax free, 300 acre concession to the discoverer provided he could produce one specimen from the locality as proof of its existence. He declined the offer (D.S.M. Field: J. of Gemm., 2, No. 3, p. 103).

DIASPORE

$AlO(OH)$

Diaspore is isostructural with goethite and dimorphous with boehmite. Minor amounts of Fe and Mn may substitute for Al.

Newfoundland

1 N/7 Light blue diaspore intergrown with barite is rare in pyrophyllite at the Foxtrap Mine. The deposit extends south about 9.6 km from Manuels (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 67).

Ontario

41 I/2 Diaspore has been identified in a specimen collected from a small pit on the north side of Hartley road at a point 5 km west of its junction with Highway 69 near Bigwood. It occurs as partial replacement of corundum (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 336).

41 J/5
41 J/10 Diaspore and kaolinite are associated with pyrophyllite and quartz in quartzites of the Lorrain Formation in the Bruce Mines and Flack Lake areas (F.W. Chandler, G.M. Young and J. Wood, 1969: Can. Jour. Earth Sci., 6, p. 337-340).

Quebec

21 E/13 Lavender coloured masses of diaspore up to 2 cm long with good prismatic cleavage have been found at the Jeffrey Mine at 45°46'25"N, 71°57'12"W, lots 9-10, ranges II-III, Shipton Township, Richmond County (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

DICKITE

$Al_2Si_2O_5(OH)_4$

Dickite is a polytype of kaolinite. It was first identified in material of hydrothermal origin and was later recognized as authigenic in sandstone. Dickite does not form in clayey sediments or soils.

New Brunswick

21 G/7 Well-crystallized dickite is reported to be of frequent occurrence in the upper North Zone of the Mount Pleasant deposit, Brunswick Tin Mines (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

DIOPSIDE

$MgCaSi_2O_6$

Diopside is a monoclinic calcium-magnesium mineral of the pyroxene group. It usually contains a small amount of iron which replaces magnesium. Diopsides may be white, yellowish, grey, green, black and occasionally colourless and pale blue. It occurs in prismatic crystals and also in massive form and is a common constituent of metamorphosed limestone.

Northwest Territories

35 P/10 Dark olive-green diopside forms elongated prismatic crystals on MacDonald Island, on the southwest coast of Baffin Island. The basal cleavage is perfectly developed as are the prismatic faces. Terminal faces however may be considerably etched. An analysis by E.W. Todd is as follows: SiO_2 53.28, Al_2O_3 nil, Fe_2O_3 1.07, FeO 4.42, MgO 16.06, CaO 24.48, Na_2O 0.44, K_2O 0.06, TiO_2 0.04, total 99.85. S.G. 3.313 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 74).

Ontario

31 C/7
31 C/8
31 C/9 Diopside crystals occur with phlogopite in a coarsely crystalline limestone in Storrington Township. They are pale to greenish yellow with a perfect basal cleavage. An analysis by E.W. Todd is as follows: SiO_2 55.26, Al_2O_3 0.48, Fe_2O_3 0.16, FeO 0.85, CaO 25.24, MgO 18.26, Na_2O 0.05, K_2O 0.02, TiO_2 0.12, total 100.43. S.G. 3.272 (A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 76).

31 C/7 At the Lacey mica mine, very large crystals of light to dark green pyroxene up to 15 cm across and 45 cm long have been found in veins within pyroxenite. Other minerals that are also very coarsely-crystalline include mica, apatite, titanite and zircon. The mine is located at about 27 km north of Kingston and 8 km west of the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 25).

31 C/9 Chemical analysis of pyroxene from scapolite gneiss on Sea Point, Buck Lake: SiO_2 53.70, Al_2O_3 4.82, Fe_2O_3 5.15, FeO 3.05, MgO 11.60, CaO 19.10, Na_2O 1.12, K_2O 0.30, MnO 0.55, TiO_2 0.16, total 99.55 (H.R. Wynne-Edwards, 1967: Geol. Surv. Can., Memoir 346, p. 28).

31 C/10 Light to dark green crystals and masses of diopside are common in crystalline limestone

exposed in a rock-cut about 11 km east of Godfrey along the Westport road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 16).

31 C/16 Diopside crystals measuring up to 12 cm long and 5 cm across have been found in a feldspar pegmatite at the Silver Queen Mine. Other closely associated minerals include feldspar, quartz, titanite and apatite. The mine is located about 73.2 km (road log) north of Kingston along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 C/16 Pyroxene occurs as rosettes of silvery acicular crystals in an apatite and mica deposit (Rogers Mine) at a contact of gneiss and pyroxenite. The mine is located at Noble Bay about 18 km south of Perth and 6.4 km east of the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 31).

31 C/16 Analyses of two specimens of diopside from Bathurst Township gave the following compositions (1) SiO_2 51.50, Al_2O_3 6.15, Fe_2O_3 0.35, CaO 23.80, MgO 17.69, H_2O 1.10, total 100.59. S.G. 3.19. (2) SiO_2 50.90, Fe_2O_3 6.77, CaO 23.74, MgO 18.14, H_2O 0.90, total 100.45 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 467).

31 F/1 Slender transparent to translucent crystals of bright green diopside have been collected from Cardiff Township, conc. XXI, lot 1. The mineral also occurs in granular massive form (National Mineral Collection).

31 F/2 Diopside from High Falls on the Madawaska River, Blyfield Township, has been analyzed and found to have the following composition: SiO_2 54.20, FeO 3.24, CaO 25.65, MgO 17.02, H_2O 0.45, total 100.56. S.G. 3.273 to 3.275 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 467).

31 F/4 Pale green diopside is intimately associated with vesuvianite in Dungannon Township, near Bancroft. An analysis by H.C. Rickaby, of material dried at 20°C, is as follows: SiO_2 54.15, Al_2O_3 0.50, Fe_2O_3 0.57, FeO 4.01, MnO 0.11, CaO 24.56, MgO 15.95, Na_2O 0.46, K_2O 0.28, total 100.59. S.G. 3.278 (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 12).

Light green diopside occurs at Birds Creek in Herschel Township, Hastings County (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 76).

31 F/7 Dark green diopside crystals about 2.5 cm in diameter occur with pink to white calcite at the Zenith molybdenite deposit in Bagot Township, lot 28, conc. IV, about 8 km south of Renfrew (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 15).

31 F/10 White diopside is associated with abundant tremolite at a deposit formerly worked for terrazzo on the farm of Herb Wright near Haley Station (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 58).

Quebec

21 E/13 Grass green diopside, white to greenish white prehnite, white fibrous wollastonite, pink garnet and vesuvianite occur at the Jeffrey Mine, Asbestos, at the contact of peridotite with granitic rock (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 26).

21 E/13 Electron microprobe analyses of diopsides from the Jeffrey Mine: (1) white, SiO_2 54.05, TiO_2 0.05, Al_2O_3 0.81, Cr_2O_3 0.00, FeO 9.03, MnO 0.83, MgO 11.32, CaO 24.28, Na_2O 0.30, total 100.67; (2) green, SiO_2 51.32, TiO_2 0.04, Al_2O_3 0.27, Cr_2O_3 0.00, FeO 15.01, MnO 1.08, MgO 7.91, CaO 24.04, Na_2O 0.17, total 99.84. The mine is at 45°46'25"N, 71°57'12"W, lots 9-10, ranges II-III, Shipton Township, Richmond County (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

21 E/14 Dyke-like bodies of diopside rock cut serpentine and massive chromite at the Montreal Chrome pit, lot 2, range XXV, Coleraine Township, Megantic County. The diopside is colourless and very fresh and clean. Chemical analysis: SiO_2 54.77, Fe_2O_3 0.17, FeO 0.89, MgO 18.46, CaO 26.33, MnO 0.11, total 100.73. S.G. 3.267 (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Museum Bull. 27, p. 41).

Chemical analysis of diopside from the Montreal Chrome pit by R.J.C. Fabry (1929): SiO_2 51.94, Al_2O_3 3.46, Fe_2O_3 0.23, FeO 0.49, MgO 15.93, CaO 27.15, H_2O^+ 0.19, H_2O^- 0.25, TiO_2 nil, MnO 0.29, CO_2 nil, total 99.93 (J.A. Maxwell, et al., 1965: Geol. Surv. Can., Bull. 115, p. 349).

21 L/3 Diopside occurs with uvarovite at the Normandie Mine (Asbestos Corporation Limited), 4.8 km southwest of Black Lake village. Euhedral bright green uvarovite crystals and acicular green diopside crystals are found in vugs in white to colourless massive diopside. Chemical analysis of white diopside by T.H. Donnelly gave: SiO_2 52.70, Al_2O_3 1.87, Fe_2O_3 0.43, FeO 2.97, MgO 15.75, CaO 24.57, Na_2O 0.42, K_2O 0.18, Li_2O 0.12, H_2O 0.08, Cr_2O_3 nil, TiO_2 0.12, P_2O_5 nil, MnO 0.10, total 99.31: Chemical analysis of green diopside: SiO_2 51.7, Al_2O_3 4.3, Fe_2O_3 0.4, FeO 3.04, MgO 14.40, CaO 24.90, Na_2O 0.40, K_2O nil, Li_2O nil, H_2O nd., Cr_2O_3 0.92, TiO_2 0.05, P_2O_5 nd., MnO nd., total 100.1 (P.L.C. Grubb, 1965: Can. Mineralogist, 8, p. 241-248).

31 F/10 Analysis of diopside from Calumet Island near Calumet Falls: SiO_2 54.90, CaO 27.67, MgO 16.76, H_2O 0.80, total 100.13 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 468).

31 G/5
31 G/11
31 G/12
31 G/13
31 G/14
31 J/4
Greyish-green diopside occurs with apatite, phlogopite and white to salmon-pink calcite in pyroxenite and pegmatite deposits throughout the Gatineau region north of Ottawa-Hull. Many of the deposits were formerly mined on a small scale for mica and phosphate. Descriptions of about 40 of these deposits and precise details of how to reach them are given by Ann P. Sabina in Geol. Surv. Can., Papers 68-51 (1969) and 69-50 (1970).

31 G/8
31 G/9
Chemical analysis by O. Ingamells of diopside from the Oka Complex located 32 km west of Montreal on the north shore of the Lake of Two Mountains: SiO_2 53.60, TiO_2 0.07, Fe_2O_3 1.12, FeO 1.33, MnO 1.33, MgO 16.38, CaO 25.24, Na_2O 0.04, K_2O 0.01, P_2O_5 0.38, H_2O^+ 0.07, F 0.06, SrO_2 0.07, BaO 0.02, less O for F 0.02, total 99.70, S.G. 3.29 (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 G/10 Diopside occurs with mica at a number of localities in Grenville Township. An analysis by Harrington of a specimen from a mica mine is as follows: SiO_2 51.27, Al_2O_3 4.00, Fe_2O_3 0.10, CaO 25.27, MgO 17.46, K_2O 0.14, Na_2O 0.62, Li_2O trace, H_2O 1.63, total 100.49. S.G. 3.35 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., p. 302).

31 G/12 Diopside crystals, remarkable for their size and orthopinacoidal development, occur at the Rainville Mine in lot 15, range VIII, Templeton Township. Good specimens have been obtained from the dump although all exhibit etched surfaces.

In lot 23, range VIII, of Templeton Township is a small knoll of crystalline limestone in which crystals of diopside and phlogopite are present. They are usually rounded and less than 4 cm long. An analysis of diopside from this locality by A.R. Graham is as follows: SiO_2 53.82, Al_2O_3 0.87, Fe_2O_3 1.26, FeO 0.79, MnO 0.06, CaO 24.78, MgO 18.28, Na_2O 0.28, K_2O 0.08, H_2O 0.18, total 100.40 (A.L. Parsons, 1930: Univ. Toronto Stud., Geol. Ser., 29, pp. 25, 26).

31 G/12 Diopside crystals occur in mica deposits throughout the Gatineau district. A specimen from Hull Township has been analyzed by E.W. Todd: SiO_2 53.02, Al_2O_3 2.24, Fe_2O_3 0.94, FeO 2.28, CaO 23.50, MgO 17.12, Na_2O 0.49, K_2O 0.29, TiO_2 0.10, total 99.98. S.G. 3.275 (A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 78).

31 G/16 Pale green crystals of diopside are present in crystalline limestone near Laurel in Argenteuil County. They are transparent and have been cut into interesting gems (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 48) (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 76).

31 H/9 A few transparent green crystals of diopside as well as a brown columnar variety of the mineral have been obtained for the National Mineral Collection from Orford Townhip, range XII, lot 6. An analysis by Hunt of diopside from Orford Township is as follows: SiO_2 54.50, FeO 4.86, CaO 25.20, MgO 15.29, H_2O 0.55, total 100.40. S.G. 3.13 to 3.15 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, pp. 467-8).

31 K/2 Crystals of green diopside averaging 1 cm in diameter occur at the Squaw Lake molybdenite deposit in Huddersfield Township about 22.5 km northwest of Otter Lake village (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 98).

Yukon

115 A/12 Light green tabular crystals of diopside occur with large olivine crystals in peridotite along a mountain slope on the west side of Dezadeash River. Access is via the trail to Sugden Creek which leaves the Alaska Highway at a point 9.8 km west of Haines Junction. The occurrence is 12.8 km from the highway (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 66).

DJURLEITE

$Cu_{1.96}S$

Ontario

31 M/5 An occurrence of djurleite coating rock faces in a fracture zone has been reported in Vein no. 7 at the Christopher Mine, Cobalt (W. Petruk, 1971: Can. Mineralogist, 11, p. 133).

DOLOMITE

$CaMg(CO_3)_2$

The term dolomite is usually applied to the carbonate mineral and to the rock it forms. Dolomite crystals may occur as the main constituent in coarse-grained dolomitic sedimentary rocks or in veins frequently associated with metallic minerals. Crystalline dolomite is not uncommonly found with serpentines and other magnesium rich rocks.

British Columbia

94 K/11 Curved rhombohedral and platy crystals of colourless to white dolomite are associated with colourless quartz crystals and tiny tetrahedrons of chalcopyrite at the Churchill copper mine located at the headwaters of Delano Creek about 4 km southwest of Yehde Lakes and 8.8 km northwest of Mount Roosevelt (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 16).

Northwest Territories

86 F/12 Chemical analysis of manganiferous dolomite from a silver-bearing vein cutting volcanics, How claims 4 and 5, north bank of the Camsell River: Al_2O_3 1.06, Fe_2O_3 0.97, FeO 1.06, MgO 16.88, CaO 29.87, MnO 2.89, CO_2 44.48, insol. 2.74, total 99.95.

Chemical analysis of coarsely crystalline, pale pink, manganiferous dolomite from a vein lying in diabase, White Eagle Silver Mine, north bank of Camsell River 14.4 km east of its mouth in Conjuror Bay: Al_2O_3 0.12, Fe_2O_3 0.69, FeO 1.16, MgO 14.96, CaO 24.93, MnO 2.12, CO_2 38.08, insol. 17.52, total 99.58 (J.A. Maxwell, et al., 1965: Geol. Surv. Can., Bull. 115, p. 318).

Ontario

31 E/1 An analysis of dolomite from conc. III, lots 22 and 23, Herschel Township, is as follows: SiO_2 1.40, $CaCO_3$ 53.25, $MgCO_3$ 41.84, H_2O 1.54 (J.E. Thomson, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. III, p. 23).

31 E/1 Polysynthetically twinned dolomite occurs in Herschel Township, lot 31, conc. I (A.L. Parsons, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 25).

31 F/6 Crystalline dolomite is associated with celestine on lot 7, conc. X of Bagot Township near Calabogie. Analysis by H.C. Rickaby: CO_2 45.55, FeO 0.66, CaO 30.68, MgO 22.07, MnO 0.12, H_2O 0.45, insol. 0.23, total 99.76. S.G. 2.829. The dolomite occurs in a vein which cuts diorite gneiss and is presumed to have formed at high temperature (T.L. Walker and A.L. Parson, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 69).

31 F/10 A band of dolomite 1070 m long and 76 m wide occurs on conc. V, lot 20, Ross Township, in the Renfrew area. An analysis of a specimen from this locality was made by Pidgeon: MgO 20.48 to 21.55, CaO 30.85 to 31.95, insol 0.25 to 0.65, R_2O_3 0.25 to 0.60, loss on ignition 46.8 to 47.1, theoretical values, MgO 21.88, CaO 30.35, loss on ignition 47.77 (J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. III, p. 65).

Chemical analysis of dolomite from Haley Station, Ross Township by R.A. Howie: SiO_2 0.12, FeO 0.22, MgO 21.12, CaO 31.27, CO_2 47.22, H_2O^- 0.02, total 99.97. S.G. 2.86 (R.I. Harker and O.F. Tuttle, 1955: Am. J. Sci., 253, pp. 209-224).

31 M/4
31 M/5
31 M/12 Calcite, dolomite, quartz and chlorite make up more than 95 percent of the gangue in the ore veins of the Gowganda area. The dolomite is

41 P/9
41 P/10
41 P/15
41 P/16

pink or light grey and weathers to various shades of brown. Electron microprobe analyses indicate considerable variation in composition: CaO 29.6, 30.3, 31.0; MgO 14.9, 16.6, 19.4; MnO 3.1, 2.1, 0.8 (J.L. Jambor, 1971: Can. Mineralogist, 11, p. 239).

DOMEYKITE

Cu_3As

New Brunswick

21 P/5 Domeykite is reported to occur sparingly in the orebody at the Brunswick No. 6 Mine (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

Northwest Territories

75 L/8 The minerals domeykite and meta-domeykite (hexagonal phase) have been identified as fine veinlets in a specimen of silicified dolomite from the HAR group of claims (Nahanni Mines Limited) at about 62°29'07"N., 110°03'25"W. (X-ray Laboratory, Geol. Surv. Can., specimen from R. Thorpe).

Ontario

41 N/12 Domeykite occurs in association with niccolite in a vein on Michipicoten Island in Lake Superior (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 506).

52 A/7 An occurrence of domeykite has been reported on Silver Islet in Lake Superior (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol 9, p. 198).

DONNAYITE

$NaCaSr_3Y(CO_3)_6 \cdot 3H_2O$

Quebec

31 H/11 Donnayite, named in honour of Professors J.D.H. Donnay and G. Donnay, occurs in pegmatite dykes, miarolytic cavities and interstices in nepheline syenite at Mont St-Hilaire. Donnayite is isomorphous with weloganite and mckelveyite. Electron microprobe analysis of donnayite: Na_2O 3.37, CaO 5.75, BaO 0.85, SrO 35.8, Y_2O_3 13.1, Nd_2O_3 1.83, La_2O_3 0.45, CO_2 (30.98), H_2O (6.34), sum 98.47; CO_2 and H_2O are assumed to be stoichiometric (G.Y. Chao, P.R. Mainwaring and J. Baker, 1978: Can. Mineralogist, 16, p. 335).

doverite

(see SYNCHYSITE-(Y))

DRESSERITE

$Ba_2Al_4(CO_3)_4(OH)_8 \cdot 3H_2O$

Quebec

31 H/12 The new mineral dresserite was discovered in an alkalic sill which intrudes Trenton limestone in a large quarry operated by Francon (1966) Limitée at St-Michel, Montreal Island. It is associated with weloganite and dawsonite and is named in honour of J.A. Dresser (1866-1954) in recognition of his contributions to the geology of the Monteregian Hills. Dresserite is the barium analogue of the lead mineral, dundasite (J.L. Jambor, D.G. Fong and Ann P. Sabina, 1970: Can. Mineralogist, 10, p. 84-89).

DUFRENITE

$Fe^{++}Fe^{+++}{}_4(PO_4)_3(OH)_5 \cdot 2H_2O$

Crystals of dufrenite are small, indistinct, and comparatively rare. Usually in the massive form, dufrenite most commonly occurs in association with limonite and as an alteration product of triplite. It is dull green with a silky lustre and may be found with other phosphate minerals. (C. Frondel, 1949: Am. Mineralogist, 34, p. 538).

Ontario

31 C/12 Dufrenite has been obtained from Moores Mine in conc. V, lot 17, Madoc Township (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 89).

DUMORTIERITE

$(Al,Fe)_7BSi_3O_{18}$

British Columbia

92 L/11
92 L/12

Dumortierite occurs with pyrophyllite in a breccia zone at the Island Copper Mine on the north side of Rupert Inlet about 13 km south of Port Hardy. (J.E. Muller, K.E. Northcote and D. Carlisle, 1974: Geol. Surv. Can., Paper 74-8, p. 57).

Ontario

31 F/3 Dumortierite occurs in lot 31, conc. XIV, Ashby Township, Addington County, in a pegmatite vein about 30 cm wide. Microcline, quartz, kyanite, muscovite, and tourmaline, in descending order of abundance are also present. The dumortierite forms slender prisms in the cleavage planes of the mica or stouter more complex crystal aggregates in quartz and feldspar. An analysis of dumortierite from this locality, by E.W. Todd is as follows: SiO_2 30.46, Al_2O_3 60.80, Fe_2O_3 1.08, TiO_2 0.08, MnO 0.11, MgO 0.77, B_2O_3 5.37, H_2O 1.32, total 99.99 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 80).

42 L/3 E.S. Moore has identified dumortierite in jasper and slate from the Flaherty claims in the Kowkash area (P.E. Hopkins, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 246).

42 L/3
42 L/6

Fibrous and prismatic crystals, irregular grains, and plates of deep blue dumortierite are associated with magnetite in slates from the Onaman iron range. Specimens have been obtained from the Miller claim at the headwaters of the Red Paint River, northeast of Humbolt Bay, Lake Nipigon (E.S. Moore, 1909: Ont. Bur. Mines, Ann. Rept., vol. 18, Pt. I, p. 213).

DUNDASITE

$PbAl_2(CO_3)_2(OH)_4 \cdot 2H_2O$

Yukon

105 M/14 Dundasite is present in small amounts as white to faintly yellowish felted crusts and small radiating crystal aggregates in several deposits on Keno and Galena Hills. Good specimens were also found in the Bellekeno veins on Sourdough Hill. It is associated with cerussite, kaolinite and serpentine, generally on highly oxidized siderite. (R.W. Boyle, 1965: Geol. Surv. Can., Bull. iii, p. 153).

DURANGITE

$Na(AlF)AsO_4$

Durangite is an orange-red monoclinic fluo-arsenate of sodium. It was named after Durango, Mexico.

Nova Scotia

21 A/9 A pegmatite dyke at New Ross in Lunenburg County is reported to contain a small amount of durangite, with amblygonite and cassiterite (R.A.A. Johnston, 1907: Geol. Surv. Can., Summ. Rept., p. 96). Examination of specimens from this locality in 1963 failed to reveal any durangite (X-ray Laboratory, Geol. Surv. Can.).

DYSCRASITE

Ag_3Sb

British Columbia

104 P/5 Dyscrasite is present as pale yellowish grains in galena in a vein cutting dolomitized limestone near the headwaters of McDame and Cottonwood Creeks. The vein is composed chiefly of galena, sphalerite and magnetite and is located on the Contact Group. The dyscrasite often shows rhombic outlines and tends to tarnish quite rapidly (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 527).

Ontario

31 M/5 Dyscrasite is abundant in the LaRose and O'Brien mines near Cobalt (W.G. Miller, 1905: Ont. Bur. Mines, Ann. Rept., vol. 14, Pt. II, p. 23).

Skutterudite, löllingite, argentite, and cobaltite occur with silver and dyscrasite in the O'Brien Mine. An intergrowth of the grating type in which argentite replaces dyscrasite has been found in vein B at the 120 m level of this mine on the shore of Cross Lake (E. Thomson, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 41).

31 M/5 X-ray powder photographs of a mineral specimen from the Buffalo Mine near Cobalt, indicate that it is composed chiefly of dyscrasite partly replaced by antimony and silver. In polished section the dyscrasite appears as needle and leaf-like areas in a matrix of antimonial silver (M.A. Peacock, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 45).

Polished section examination of a brittle metallic mineral specimen from the Kerr Lake Mine indicates that it is composed of an intimate intergrowth of silver and dyscrasite. An analysis by E.W. Todd follows: Ag 85.47, Sb 12.99, As 1.12, total 99.58. S.G. 9.93 (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 20) (M.A. Peacock, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 43).

42 A/1 Dyscrasite has been identified by X-ray powder patterns in specimens from the Kirkland Lake Mine (E.W. Nuffield and D. Gorman, 1960: private communication).

53 D/2 X-ray powder photographs by R.B. Ferguson have conclusively proved that dyscrasite occurs in the ore of the Barens River Mine in the Kenora district. The dyscrasite, in fact, appears to be the most abundant silver mineral in the ore. It is invariably associated with tetrahedrite and occurs as isolated blebs in the galena or in the contact areas between the galena and sphalerite or gangue (T.A. Oliver, 1949: Can. Mining J., 70, pp. 82-86).

DZHALINDITE

$In(OH)_3$

New Brunswick

21 G/7 Dzhalindite was first described from a tin deposit in Russia. A mineral believed to be a stannian dzhalindite has been reported at the Mount Pleasant tin deposit, where it is associated with calcite, galena and quartz in fractures in sphalerite containing exsolved chalcopyrite and stannite. An electron microprobe analysis gave Zn 1.65, In 61.59, Sn 7.36, Fe 1.74. The identification was not verified by X-ray diffraction (J.K. Sutherland, 1971: Can. Mineralogist, 10, p. 781).

edenite

(see HORNBLENDE)

EKANITE

$Th_{1.8}(Na,Ca)_{3-7}K_{1.2}Si_{16}O_{40}$

Quebec

31 H/11 Ekanite occurs in cavities in pegmatite veins in the nepheline syenite phase at the Desourdy quarry on the northeast slope of Mont St-Hilaire. It is associated with nenadkevichite, analcime and aegirine. Chemical analysis: SiO_2 50.0, ThO_2 24.20, CeO_2 0.41, PbO 0.06, K_2O 2.95, CaO 4.25, Na_2O 2.90, MgO 0.15, MnO 1.42, H_2O^- 11.6, total 97.94 (G. Perrault and P. Richard, 1973: Can. Mineralogist, 11, p. 913).

ELECTRUM

Au,Ag

Ordinary native gold may contain considerable silver. The alloy produced when the silver content is higher than about 16 per cent is known as electrum. It is a soft, pale yellow mineral with a specific gravity of 12.5 to 15.5, somewhat lower than that of gold. Some varieties of electrum contain copper, palladium, bismuth, and rhodium.

British Columbia

94 E/6 Fine-grained native gold, silver and electrum are reported in silicified breccia on the Lawyers claim at 57°18'N, 127°12'W, 9.6 km southwest of Toodoggone Lake at an elevation of about 1700 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 312).

104 B/1 Electrum was present in the ore from the Silbak-Premier Mine in the Salmon River district. Gold, silver and sulphides were closely associated (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 15).

104 B/8 The X-ray powder pattern of electrum from East Gold Mine in the Bowser River district, Portland Canal area, has strongest lines at 0.938 (6), 0.913 (6), 0.834 (7) and 0.786 (10). The composition of the electrum approximates $AuAg_3$ (L.G. Berry and R.M. Thompson, 1962: Geol. Surv. Am., Mem. 85, p. 11).

Manitoba

63 K/13 Electrum is one of the minor minerals associated with the copper-lead-zinc sulphide ores at Flin Flon (R.F. Coulter, 1962: Bull. Can. Inst. Mining Met., vol. 55, No. 602, p. 376).

Quebec

31 I/16 Electrum is reported to occur with the gold, silver, graphite, and sulphide minerals of the Montauban ore zone in Montauban and Price Townships, on the properties of Anacon Lead Mines Ltd., and the United Montauban Mines (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 28).

32 D/6 Native gold, electrum and precious metal tellurides occurred in the ore at the Horne Mine, Noranda (Ann P. Sabina, 1974: Geol. Surv. Can. Paper 73-30, p. 47).

32 D/7 Minor amounts of electrum were reported at the D'Eldona (Delbridge) Mine. The mine is 5.8 km northeast of Rouyn via Rue Perrault (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 60).

Yukon

116 B/3 The silver content in gold from placers in the Klondyke is high enough so that almost all of the nuggets could be called electrum. The silver to gold ratio varies from about 1:1 to about 1:5 (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 222).

ellsworthite

(see PYROCHLORE)

ELPIDITE

$Na_2ZrSi_6O_{15} \cdot 3H_2O$

Quebec

31 H/11 Elpidite occurs in veins and vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire. It was identified by its X-ray powder pattern. (G.Y. Chao, D.C. Harris, A.Q. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123). Partial chemical analysis: SiO_2 58.88, TiO_2 0.05, MnO 0.03, Na_2O 10.38, K_2O 0.1, ZrO_2 20.77, total Fe 0.01. (G.Y. Chao, 1967: Can. Mineralogist, 9, p. 286). Complete chemical analysis by T.A. Capitonova: SiO_2 56.46, ZrO_2 21.51, TiO_2 0.17, Nb_2O_5 0.60, Ta_2O_5 0.07, Fe_2O_3 0.30, CaO 0.29, Na_2O 9.65, K_2O 0.80, H_2O 9.68, total 99.53 (Guy Perrault, E.I. Semenov, A.V. Bikova and T.A. Capitonova, 1969: Can. Mineralogist, 9, p. 585-596).

31 H/12 Colourless and white acicular crystals of elpidite up to 1 mm long form fibrous aggregates that are associated with rare yellow cryolite at the Francon quarry, Montreal Island (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 16).

EMPLECTITE

$CuBiS_2$

Northwest Territories

75 L Emplectite has been identified in specimens from the Nix claim on the north shore of the east arm of Great Slave Lake (X-ray Labratory, Geol. Surv. Can.).

Ontario

31 M/8 Emplectite occurs in the Floyd Mine in Bucke Township, 9.6 km west of Haileybury (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., p. 264).

EMPRESSITE

AgTe

British Columbia

103 I/9 Small masses of empressite occur sparingly in a quartz vein on the Grotto Group on Hardscrabble Creek, 1.6 km west of the Canadian National Railways line near Pitman. The vein is on the contact between an andesine porphyry dyke and andesite. Other minerals are pyrite, chalcopyrite, specularite and a little native tellurium and rickardite (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 527).

ENARGITE

Cu_3AsS_4

Although it is a comparatively rare mineral, enargite is sometimes found in sufficient quantity for economic exploitation. It is usually of primary origin and may be associated with bornite, chalcocite, covellite, tetrahedrite, sphalerite, pyrite, barite, and quartz. Enargite is the arsenic bearing end-member of an isomorphous series. Both it and famatinite, the antimony end member, tend to occur in near surface deposits.

Alberta

74 D/11 A solid cleavable mass of enargite with minor calcite and malachite has been found east of McMurray on the Clearwater River (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 546).

82 O/4 A small hand specimen from Copper Mountain on the Bow River was found to consist of granular quartz with azurite and malachite, and contained a patch of enargite one centimetre long. The identity of the enargite was confirmed by X-ray powder photograph (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 546).

British Columbia

92 H/6 Enargite, stibnite and chalcopyrite are reported to be present at the Emancipation Mine in Coquihalla valley opposite the mouth of Dewdney Creek. The mine was worked for gold (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 78).

104 K/10 A stockwork of quartz veins with chalcopyrite, tetrahedrite, stibnite and enargite occurs on the Thorn claims in the bottom of a deep valley occupied by a northwesterly flowing tributary of Sutlahine River at about 58°33'N, 132°48'W (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 56).

Manitoba

63 K/13 Enargite is reported to occur in the ores of the Flin Flon and Schist Lake mines. The latter property is on the shore of the northwest arm of Schist Lake about 8 km south of Flin Flon (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 39, 41).

New Brunswick

21 P/5 Enargite occurs with other sulphides at Brunswick No. 12 and No. 6 in Gloucester County (A.L. McAllister, 1959: New Brunswick, Mines Br., reproduction of Can. Inst. Mining Met., Bull.).

ENSTATITE

$MgSiO_3$

Enstatite is the magnesian end-member of the orthopyroxene series. The series ranges in composition from enstatite to a theoretical ferroan end-member orthoferrosilite (Fs). Intermediate members of the series have been named as follows: enstatite, Fs_{0-12}, bronzite, Fs_{12-30}; hypersthene, Fs_{30-50}; ferrohypersthene, Fs_{50-70}; eulite, Fs_{70-88}; orthoferrosilite, Fs_{88-100}.

Newfoundland

12 B/2 Enstatite is present in the ultrabasic rocks of the Lewis Hills and Blow Me Down Mountain, in the Stephenville map-area (G.C. Riley, 1962: Geol. Surv. Can., Mem. 323, p. 38).

Quebec

22 B/16 Chemical analysis of enstatite from the Mount Albert pluton by S. Courville: SiO_2 56.46, Al_2O_3 2.41, Cr_2O_3 0.33, Fe_2O_3 0.51, FeO 4.64, MnO 0.12, MgO 34.95, NiO 0.11, CaO 0.40, TiO_2 0.06, Na_2O 0.05, H_2O 0.15, total 99.86. (X-ray Laboratory, Geol. Surv. Can.

31 N/12 Bronzite, the iron rich variety of enstatite occurs in large crystals frequently enclosing other minerals at a locality on the east side of the Canimitic River and 6.4 km above its junction with the Chochocouane River, in Pontiac County (N.B. Gillies, 1952: Que. Dept. Mines, Geol. Rept., No. 52).

Yukon

105 C/6 Enstatite as subhedral, tabular or prismatic crystals up to 6 millimetres long may be found in ultramafic intrusive bodies in the Hayer Peak area west of Teslin Lake (R. Mulligan, 1963: Geol. Surv. Can., Mem. 326, p. 59).

EOSPHORITE

$(Mn,Fe)AlPO_4(OH)_2 \cdot H_2O$

Nova Scotia

21 A/9 Eosphorite is reported to occur sparingly near the Molybdenite Mine, Larder River, New Ross (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 90).

EPIDIDYMITE

$NaBeSi_3O_7OH$

Quebec

31 H/11 The rare mineral epididymite has been identified by X-ray diffraction in specimens from the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 121).

EPIDOTE

$Ca_2(Al,Fe)_3Si_3O_{12}OH$

The name epidote has been used both as a group and as a mineral name. The epidote group minerals, zoisite, clinozoisite, and epidote occur in low to medium-grade regionally metamorphosed rocks and the latter two members also occur in igneous rocks. Because of the lack of a generally accepted nomenclature for the epidote minerals no attempt is made here to separate the reported occurrences into distinct species. Minerals of the epidote group characteristically occur in low to medium-grade metamorphic rocks such as schists and gneisses, also in contact metamorphosed limestones and in cavities in basalts. No attempt has been made to record all such occurrences.

British Columbia

92 H/5
92 H/12 Green prismatic crystals of epidote in a quartz matrix have been collected near Harrison Lake (National Mineral Collection: A.M. Bowman, 1884).

104 O/7 Tin-bearing skarn occurs at latitude 59°17'30'N., longitude 130°31'00"W., and elsewhere in the vicinity of Ash Mountain. It includes a tin-bearing epidote. Chemical analysis by J.L. Bouvier: SiO_2 38.2, Al_2O_3 24.9, Fe_2O_3 10.1, FeO 1.5, SnO_2 0.8, MnO 0.1, MgO 0.3, CaO 23.2, H_2O 1.9, total 101.0 (R. Mulligan and J.L. Jambor, 1968: Can. Mineralogist, 9, p. 358-370).

Newfoundland

12 G/1 Calcic hornfels, exposed in a stream flowing into the north arm of Bay of Islands in northwestern Newfoundland, has been altered to a mass of prehnite, xonotlite, calcite, and clinozoisite. Only ragged relicts of original diopside remain (C.H. Smith, 1954: Am. Mineralogist, 39, p. 531).

12 I/1 Clinozoisite forms clusters of euhedral prisms interstitial to feldspar laths in rocks near Baie Verte (K. Watson, 1942: Am. Mineralogist, 27, p. 368).

Ontario

31 C/13 Dark green acicular crystals of epidote have been found at Gilmour in Tudor Township (National Mineral Collection).

31 F/5 Slender crystals of dark green epidote occur in quartz in the northeast corner of Rawdon Township (National Mineral Collection: A.T. McKinnon, 1922).

32 D/5 Epidote occurs in quartz and garnet on claim 13138 in Harker Township. It forms radiating and sheaf-like aggregates up to 10 cm long and of a pistachio green colour. One unusual sample of this epidote-rich rock weighed around 22 kg (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 70).

42 A/6 A road-cut on the right of Highway 655 about 0.8 km north of its junction with Highway 101 east of Timmins exposes veins of white quartz containing radiating aggregates of brownish to greyish yellow clinozoisite (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 139).

42 A/6 Specimens of yellowish green epidote are common on the rock dumps of the abandoned Faymar Mine in Deloro Township about 11.2 km southeast of Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 143).

42 A/8 Red acicular crystals of epidote are present with granular epidote at the Elzina gold mine in Maisonville Township (National Mineral Collection).

42 A/9 Radiating aggregates of light greyish to brownish green clinozoisite occur in quartz at the Munro asbestos mine. Access to the mine is by road 2.2 km long leading north from Highway 101 East, at a point 15.6 km east of its intersection with Highway 11 at Matheson (Ann P. Sabina, 1974: Geol. Surv. Can. Paper 73-13, p. 114).

52 B/13 Clinozoisite has been collected from two western Ontario localities: (1) at Straw Hat Lake, about 6.4 km northeast of Atikokan; (2) west of Atikokan and about 1.6 km north of Overflow, a station on the Canadian National Railways line (National Mineral Collection: T.L. Tanton).

52 E/9 Elongated crystals of epidote in sugary dolomite are found at the Cameron-Earngey deposit, 200 m from the southeast end of Bigstone Bay (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 48).

Quebec

21 E/13 Zoisite and clinozoisite specimens have been collected at the Jeffrey Mine, at 45°46'25"N, 71°57'12"W. Electron microprobe analyses: pink zoisite, SiO_2 40.29, Al_2O_3 31.21, FeO 1.47, MnO 0.05, MgO 0.04, CaO 24.01, total 97.07; grey clinozoisite, SiO_2 40.65, Al_2O_3 31.27, FeO 1.54, MnO 0.04, MgO 0.01, CaO 24.57, total 98.08 (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

21 L/3 Pink, fine-grained zoisite occurs with feldspar at the Union Mine and Bennett-Martin and Bell pits in the Thetford area (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 51, 53).

22 B/16 Clinozoisite occurs in the country rock surrounding the Mt. Albert ultramafic pluton. Chemical analysis by H. Asari: SiO_2 37.33, Al_2O_3 24.97, Fe_2O_3 11.42, FeO 0.76, CaO 22.97, MgO 0.56, Na_2O 0.21, K_2O 0.04, TiO_2 0.61, MnO 0.20, H_2O 1.01, total 100.08 (X-ray Laboratory, Geol. Surv. Can.).

31 G/5 Yellowish green epidote occurs at the Pinks Lake mica mine (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 8).

31 G/12 Yellow-green epidote associated with pyroxene and pyrite is present at the Jackson Rae Mine near Perkins Mills, and greyish epidote is exposed in roadcuts along Highway 35 near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 13, 31).

31 G/14 Transparent, yellowish-green massive epidote is associated with pyroxene and calcite at the Cole Lake Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 28).

31 I/16 Clinozoisite occurs as a constituent of a granitic rock in Montauban Township on range I, lots 1 to 3, and on range IV, lots 11 and 12 (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 13 and 18).

31 D/6 An ornamented rock consisting of abundant epidote in pink to red granite is common on the dumps at the Eldrich Mine. It takes a good polish. The mine is about 14.4 km by road northwest of Evain (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 45).

32 D/7 Green prismatic crystals of epidote, 3 mm wide and 25 mm long, were collected from a large dump at the Mooshla Mine. The mine is 4.2 km north of Highway 59 on the road to Cléricy which intersects the highway 8.8 km east of Joannès (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 66).

33 D/15 Green epidote in granular and acicular crystalline forms occurs on Walrus Island near the east coast of James Bay (National Mineral Collection).

34 C/1, 34 C/8 Granular green epidote has been reported from Richmond Gulf in Hudson Bay (National Mineral Collection).

Yukon

105 D/10, 105 D/11, 105 D/14 The skarn zone that hosts the Whitehorse copper deposits contains abundant light yellow to yellowish green crystals and aggregates of epidote. Attractive pink massive zoisite was found on the dumps of the Little Chief Mine (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 46).

EPISTILBITE

$CaAl_2Si_6O_{16} \cdot 5H_2O$

Epistilbite is a rare member of the zeolite group closely related in crystallographic and chemical characteristics to mordenite, heulandite, and brewsterite.

New Brunswick

21 B/10, 21 B/15 Epistilbite is associated with scolecite, heulandite, laumontite, analcime, natrolite, thomsonite, stilbite, quartz crystals, copper, hematite and chlorite in seams and amygdaloidal cavities in basalt cliffs along the coastline of Grand Manan Island. The coast at Seven Days Work is one of the best collecting sites (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 10).

Nova Scotia

21 A/12 Stilbite, epistilbite and heulandite occur in thin veins cutting basalt and reddish quartz seams at Deep Cove, Digby County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 73).

21 H/3 Epistilbite was found with stilbite in trap rock at Margaretville, about 11 km east of Port George (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 32 T).

Chemical analysis by How (1858): SiO_2 58.57, Al_2O_3 15.34, Fe_2O_3 1.58, CaO 7.00, K_2O 0.99, Na_2O 0.99, H_2O 15.42, total 99.89 (Am. J. Sci., XXXVI, Ser. II, p. 33).

EPSOMITE

$MgSO_4 \cdot 7H_2O$

Alberta

82 J/15 Chemical analysis by Johnston of epsomite from a spring near the Canyon Branch of the Elbow

River; SO_3 36.43, Fe_2O_3 13.15, FeO 0.93, Al_2O_3 5.57, MgO 5.92, H_2O 36.98, insol. 0.48, total 99.46 (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept., IX, pp. 12-13 R).

British Columbia

82 E/4 Epsomite has been mined at Spotted Lake, located near Highway 3A about 9.6 km from Osoyoos (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 104).

92 I/11 Deposits of hydrous salts of magnesium, sodium, and calcium occur in a small valley midway between Venables Valley and the gorge of Oregon Jack Creek in the Ashcroft district. The most prominent minerals present are epsomite and bloedite (S. Duffell and K.C. McTaggart, 1952: Geol. Surv. Can., Mem. 262, p. 112).

92 I/14 Five lakes filled with white epsomite occur on the Hammond ranch, near Epsom Siding, 29 km from Ashcroft. The material grades about 45 per cent epsomite and 11 per cent mirabilite. Imperfectly formed sodium sulphate crystals are also present. A chemical analysis by E.W. Todd is as follows: MgO 16.26, Na_2O+K_2O 0.055, Al_2O_3 + Fe_2O_3 <0.05, SO_3 32.41, Cl .003, H_2O 51.32, insol. 0.005 (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 43).

92 P/4 Fresh crystals of epsomite from 6 mm to 5 cm long, occur with their earthy alteration product, kieserite, at a deposit near Clinton (L. Reinecke, 1920: Geol. Surv. Can., Mem. 118, p. 53).

94 A/2 Epsomite and mirabilite form encrustations on shale cliffs near the Peace River at Fort St. John (G.C. Hoffmann, 1875-6: Geol. Surv. Can., Rept. Prog., p. 421).

Nova Scotia

11 J/4 Epsomite occurs with melanterite and sideronatrite in the Phalen seam at the 1-B Mine, No. 26 Colliery, Glace Bay (E.L. Zodrow and K. McCandlish, 1978: Can. Mineralogist, 16, p. 17).

21 H/1 Epsomite occurs at the Clifton gypsum quarry in Hants County near Windsor (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 32 T).

Ontario

30 M/3 Encrustations of epsomite occur on sheltered surfaces of dolomites and shales in southern Ontario between Niagara Falls and Lake Huron.

Geodes found in the Niagara region have been reported to contain epsomite with gypsum (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 33 T).

30 M/5 Epsomite is found as earthy white encrustations on specimens from the Dundas quarry, Dundas. Identification was made at the Royal Ontario Museum. (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 378).

31 C/12 Epsomite has formed as an efflorescence on serpentine rocks near the iron ore beds at Crow Lake in Marmora Township (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 33 T).

Quebec

21 L/14 Epsomite is found on some of the black shales at Quebec city (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 32 T).

31 H/12 The shale of the Utica Formation in the vicinity of Montreal is occasionally coated with an efflorescent layer of epsomite (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 32 T).

Yukon

106 K/5 Epsomite forms a thin coating on clay at Alum Hill on the Peel River about 5 km above the George River. It has been deposited in places where water seeps from the bank (C. Camsell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 34 CC).

ERIONITE

$$(Ca,Na_2,K_2)_4Al_8Si_{72}.27H_2O$$

British Columbia

92 I/10 The rare zeolite mineral erionite has been identified as a white fibrous mass on green opal from the opal claim on Savona Mountain (X-ray Laboratory, Geol. Surv. Can.).

ERYTHRITE

$$Co_3(AsO_4)_2 .8H_2O$$

British Columbia

82 F/2 Erythrite has been reported to occur between Creston and Kootenay Landing along the right-of-way of the Crows Nest branch of the Canadian Pacific railway (R. Bell, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 238 A).

82 F/4 Bladed crystals of erythrite are said to occur on the Evening Star claims near Rossland. Neighbouring mineral occurrences contain erythrite as an earthy coating on pyrrhotite and arsenopyrite (C.W. Drysdale, 1915: Geol. Surv. Can., Mem. 77, p. 80).

Cobalt bloom is found with the arsenic-bearing ores at Monte Christo Mountain, north of Rossland (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 13 R).

92 F/15 Erythrite occurs in the Little Billy Mine on Texada Island (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 94).

92 H/8 An earthy variety of erythrite is found at Nickel Plate Mountain in the Osoyoos mining division (C. Camsell, 1914: Geol. Surv. Can., Mem. 2, p. 149).

93 M/4 Erythrite with allanite, arsenopyrite, cobaltite, molybdenite, and gold is found on the Homestake Group near Hazelton (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 41).

Erythrite is present with the sulphides, arsenides, silver, and gold in the Hazelton View Mine on the north slope of Rocher Déboulé Mountain, south of Hazelton (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 453).

104 M/1 Erythrite is present as a surface coating on a sulphide-bearing serpentine occurring on the Laverdiere Group, 3.2 km from Atlin Lake on the west side of Hobo Creek. The sulphides are found in the vicinity of the contact between the Paleozoic sedimentary rocks and a granitic intrusion which forms part of the coast range batholith (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

Specimens coated with erythrite have been obtained from the Holy Cross claim on Hobo Creek (National Mineral Collection).

Newfoundland

2 E/13 Tilt Cove Mines, the oldest copper producers in Newfoundland, are located at Tilt Cove on the northeast shore of Notre Dame Bay. The West Mine also contained nickel ore consisting of maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann P. Sabina, 1975: Geol. Surv. Can. Paper 75-36, p. 123).

Northwest Territories

75 L/8 A shear zone on the Rag Group, on the south shore of Stark Lake, cuts quartz diorite and contains erythrite with small amounts of pitchblende, chalcopyrite, molybdenite, and gold. Stark Lake is 22.5 km east of Snowdrift on the east arm of Great Slave Lake (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 65).

75 L/16 Erythrite occurs on a chalcopyrite-bearing greenstone near McLeod Bay, Great Slave Lake (G.M. Dawson, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 108 A).

86 E/1 Quartz veins on the Pitch 27 and 28 group at the northeast corner of Hottah Lake contain erythrite and sulphide minerals (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 59).

86 I Cobalt bloom forms a stain on some of the rocks east of McTavish Bay, Great Bear Lake (J.B. Tyrrell: J. Can. Min. Inst., XI, p. 361).

Ontario

31 C/5 An erythrite specimen in the mineral collection of the Royal Ontaio Museum is from the Dominion (Bankers Lake) Mine on lot 2, conc. II, Madoc Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 142).

31 C/6 Erythrite is present on rocks from the Cross Mine, near Madoc (G.M. Dawson, 1897: Geol. Surv. Can., Ann. Rept., X, p. 117 A).

31 C/12 Erythrite, magnetite, and arsenopyrite occur in quartz at the Dominion Iron Mine, conc. II, lot 2, Madoc Township, Hastings County (G.M. Dawson, 1895: Geol. surv. Can., Ann. Rept., VIII, p. 128 A).

31 M/4 Cobalt bloom is fairly common in many of the silver mines and prospects in the Timiskaming district. An occurrence on the west shore of Rabbit Lake in that district has been known for many years (W.F. Ferrier, 1896: Ottawa Naturalist, IX, No. 10, p. 193).

31 M/4 Erythrite is present in samples from the dump near an old shaft on claim E.D. 161 south of Sauvé Lake. Associated minerals are cobaltite, arsenopyrite, pyrite, chalcopyrite, gold, and silver in traces (E.W. Todd, 1925: Ont. Dept. Mines, Ann. Rept., vol. 34, Pt. III, p. 31).

31 M/4 Specimens of erythrite are common on the dumps of the Frontier and Keeley mines at the abandoned settlement of Silver Centre in South Lorrain Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 63).

31 M/5 Erythrite has been reported at the following mines in the Cobalt area: Princess, Nipissing 404, Nova Scotia, Timiskaming, Harrison-Hibbert, Cobalt Contact and Agaunico. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13) Specimens of erythrite in the Royal Ontario Museum mineral collection are from the Christopher, Hargrave, Foster, Nipissing, Silver Queen, Cross Lake O'Brien, LaRose, Chambers-Ferland, Coniagas and Hudson Bay mines (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 143, 144).

31 M/12 The mine dumps at the Langis (Casey) Mine in Casey Township contain abundant erythrite. The occurrence is 1.6 km north of the settlement of Sutton Bay (Ann P. Sabina, 1974: Geol. Surv. Can. Paper 73-13, p. 85).

41 H/3 Erythrite occurs with other nickel and cobalt minerals, and a little silver in the Kilpatrick vein on the property of Castle-Tretheway Mines Ltd., near Miller Lake. The vein, situated near the Capitol Shaft, has been trenched for a distance of 210 m (E.S. Moore, 1955: Ont. Dept. Mines, Ann Rept., vol. 64, Pt. V, p. 33).

41 I/12 The mineral collection of the Royal Ontario Museum includes erythrite from the Iron Mask cobalt-silver mine, lots 6 and 7, conc. V, Hart Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 142).

41 J/1 Erythrite is present in a scapolite vein cutting Nipissing diabase at the Richer occurrence on lot 7, conc. V, Harrow Township. A specimen is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 142).

41 J/5 Cobalt bloom has been noted in trap quarried for road material near Bruce Mines on an island opposite Desbarats (C.W. Knight, 1915: Ont. Dept. Mines, Ann. Rept., vol. 24, Pt. I, p. 239).

41 J/12 An irregular vein composed of quartz and white calcite cuts the Nipissing diabase in conc. II, lot 6, north half, McMahon Township, and is reported to contain erythrite, chalcopyrite, and pyrite (C.W. Knight, 1915: Ont. Dept. Mines, Ann. Rept., vol. 24, Pt I, p. 239).

41 P/9 Cobalt bloom occurs with uranium stain on a sample from the Cane Silver property in Cane Township, 32 km northwest of New Liskeard (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p 150).

41 P/9 A specimen containing erythrite and silver from the Lucky Godfrey Mine in Willet Township has been donated to the National Mineral Collection.

41 P/9 Specimens of erythrite were found on the dumps near the main shaft of the Moose Horn Mine, a former silver producer located about 1.6 km from Elk Lake village (Ann P. Sabina, 1974: Geo. Surv. Can., Paper 73-13, p. 69).

41 P/10 Erythrite is present on mine dumps at the Morrison Mine, a former silver producer situated about 3.2 km east of Gowganda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 76).

41 P/10 Erythrite occurs along the walls of veins on the west side of the Montreal River in the south part of Charters Township (A.G. Burrows, 1921: Ont. Bur. Mines, Ann. Rept., vol. 30, Pt. III, p. 42).

41 P/15 The National Mineral Collection contains specimens of erythrite on quartz and calcite

from Duncans Lake, Upper Montreal River. They were donated in 1908 by A.M. Campbell.

42 A/2 An excavation in an altered iron-formation on the O'Connor claim (10243), McNeil Township revealed the presence of erythrite, sulphide minerals and quartz-calcite gangue (P.E. Hopkins, 1924: Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. III, p. 40).

52 A/3 Erythrite is found with the silver ores in Prince's Mine on Spar Island, Lake Superior (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 33 T).

52 A/7 The silver ore from Silver Islet in Lake Superior contains quantities of erythrite (E.D. Ingall, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 27 H).

52 B/9 Erythrite is present in fissures near Mine Centre in the Lake Shebandowan area (A.L. Parson, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 176).

Yukon

105 D/11 The copper minerals found in pits on the Rabbits Foot claim, Whitehorse area, are associated in at least one locality with erythrite. The mineralization appears to be controlled by a fine-grained dyke, containing inclusions of limestone, and cutting granite (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 35).

106 C/14 Cobalt-bloom staining has been noted on the Mammoth group claims located at 64°56.5'N., 133°18'W., about 24 km east of Fairchild Lake in the Bonnet Plume Range (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 31).

eschynite

(see AESCHYNITE)

ESKEBORNITE

$CuFeSe_2$

Saskatchewan

74 N/10 The rare selenide mineral, eskebornite, has been identified in polished sections from two localities in the Lake Athabasca area: the Martin Lake Mine located at the northeast corner of Martin Lake on the neck of land between Beaverlodge Lake and Martin Lake; and from the Eagle group claims, north of Hal Lake, about 450 m west of the Eagle shaft. Eskebornite occurs as island remnants in umangite and is associated with hematite, klockmannite, clausthalite and tyrrellite. Electron microprobe analyses: Martin Lake, Cu 23.62, Fe 19.75, Se 55.96, total 99.32; Eagle group Cu 23.0, Fe 19.7, Se 57.5, total 100.2 (D.C. Harris and E.A.J. Burke, 1971: Can. Mineralogist, 10, p. 787).

EUCAIRITE

CuAgSe

Ontario

42 A/11 Eucairite is one of the most abundant selenide minerals encountered in a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine. The mine, located north of Timmins may be reached by Highway 655, 25.7 km north from Highway 101. Electron microprobe analyses: Ag 44.4, Cu 24.7, Fe 0.02, Se 31.4, S 0.07, total 100.59 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

Saskatchewan

74 N/10 Eucairite has been identified in specimens from the Martin Lake Mine, located at the northeast corner of Martin Lake in the neck of land between Martin Lake and Beaverlodge Lake. (D.C. Harris, L.J. Cabri and S. Kaiman, 1970: Can. Mineralogist, 10, p. 207-215.

eucolite

(see EUDIALYTE)

EUCRYPTITE

$LiAlSiO_4$

Manitoba

52 L/6 Eucryptite has been identified in the Tanco pegmatite at Bernic Lake, closely associated with spodumene-quartz pseudomorphs after petalite. Chemical analyses by K. Ramlal and R.M. Hill of two specimens contaminated by intergrown cesian analcime: SiO_2 45.20, 45.75; Al_2O_3 41.16, 40.80; CaO 0.06, 0.01, Na_2O 0.21, 1.46; K_2O 0.07, 0.03; Cs_2O 0.15, 1.65; Li_2O 10.76, 9.04; H_2O^- 0.10, 0.26; H_2O^+ 1.40, 1.22; total 99.11, 100.22. Analyses recalculated to 100% after deduction of admixed analcime: SiO_2 45.93, 44.43; Al_2O_3 42.74, 44.84; Li_2O 11.33, 10.73 (P. Černý, 1972: Can. Mineralogist, 11, p. 709).

Ontario

42 L/2 Eucryptite has been identified by X-ray powder pattern in several specimens submitted to the Royal Ontario Museum for identification by Mr. J. McDermott of Port Credit. The specimens were from a pegmatite "near Nakina" (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 377).

EUDIALYTE

Eudialyte is a silicate of sodium, calcium, iron and zirconium approximating $Na_4(Ca,Fe)_2ZrSi_6O_{17}(OH,Cl)_2$ in composition. The mineral is optically uniaxial and may be either positive or negative. Optically negative varieties have been called eucolite.

Newfoundland

13 K/5 A fine-grained, vitreous, pink mineral in syenite from Seal Lake, Labrador has been identified on the basis of X-ray powder pattern, quantitative spectrographic analysis, and optical study as eudialyte (W.D. Hicks, 1958: Can. Mineralogist, 6, p. 298).

Quebec

31 H/11 Eudialyte (eucolite) occurs in pegmatites within the Monteregian alkaline intrusive of Mont St-Hilaire (Jean Boissonnault and Guy Perrault, 1965: Can. Mineralogist, 8, p. 393). Chemical analysis by T.A. Capitonova: SiO_2 47.55, ZrO_2 12.50, TiO_2 0.14, Nb_2O_5 1.20, Ta_2O_5 0.04, RE oxides 6.30, Fe_2O_3 1.11, FeO 3.50, MnO 5.44, CaO 6.15, Na_2O 11.39, K_2O 2.70, H_2O 1.56, Cl 0.68, total 100.26, less O for Cl 0.15 = 100.11 (Guy Perrault, E.I. Semenov, A.V. Bikova and T.A. Capitonova, 1969: Can. Mineralogist, 9, p. 593).

31 L/15 Eucolite has been identified, using X-ray and optical methods, in a sample found in Pontiac County near the Ontario-Quebec border. The mineral forms pink granular aggregates in a syenite rock (W.D. Hicks, 1958: Can. Mineralogist, 6, p. 297).

31 L/16 Eudialyte occurs as pink granular aggregates in alkaline syenite exposed along the Kipawa River close to Lake Sairs in Temiscamingue County. Chemical analysis: SiO_2 50.35, Al_2O_3 0.44, Fe_2O_3 0.19, FeO 2.41, MgO 0.13, CaO 9.74, Na_2O 12.53, K_2O 0.43, H_2O 1.64, TiO_2 0.38, ZrO_2 11.80, P_2O_5 0.03, Cl 1.47, F 0.23, MnO 1.34, SrO 0.11, Nb_2O_5 0.69, RE 6.40, total 100.31, less O for F, Cl, 0.43, total 99.88 (A.D. Edgar and C.E. Blackburn, 1972: Can. Mineralogist, 11, p. 554-9).

EUDIDYMITE

$NaBeSi_3O_7OH$

Newfoundland

13 K/5 Eudidymite is an accessory mineral in a soda-rich paragneiss at Seal Lake, Labrador. It has been observed macroscopically in only a few samples where it forms relatively coarse-grained segregations up to 2.5 cm in diameter. It appears chiefly as disseminated grains. Specific gravity 1.598. Chemical analysis by Charette and Penner: Na_2O 12.20, K_2O 0.39, BeO 10.15, SiO_2 73.56, H_2O 3.62, total 99.92 (E.H. Nickel, 1963: Can. Mineralogist, 11, p. 554).

EULYTITE

$Bi_4(SiO_4)_3$

Quebec

31 G/12 The rare mineral eulytite is associated with bismuth minerals at the Evans-Lou Mine near St-Pierre-de-Wakefield; it forms yellow transparent sugary aggregates and white to light green translucent botryoidal encrustations on quartz (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 35).

EUXENITE-POLYCRASE

Members of this series have compositions of the type AB_2O_6 where A is Y, Ce, Ca, U, Th; and B is Ti, Nb, Ta, Fe^{+++}. Members having Nb+Ta >Ti are called euxenite, and the Ti rich members are called polycrase. The mineral named lyndochite (after Lyndoch Township, Ontario) is included in this series.

Manitoba

52 L/6 Greenish-black grains of metamict euxenite-polycrase are rare constituents of the central of three small pegmatites exposed on the southeastern shore of Shatford Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 561).

Ontario

31 C/7 Euxenite occurs associated with gadolinite in a pegmatite deposit in Loughborough Township, lot 11, conc. IX (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 146).

31 C/15 A considerable amount of euxenite has been found in a pegmatite dyke on the Maberly property on lot 13, conc. V, South Sherbrooke Township, about 4.8 km south of Maberly. Chemical analysis by H.V. Ellsworth: SiO_2 1.08, TiO_2 25.04, BeO 0.05, Al_2O_3 0.45, Fe_2O_3 2.16, FeO 0.14, CaO 2.03, MgO 0.07, MnO 0.19, SnO_2 0.14, Nb_2O_5 22.28, Ta_2O_5 5.32, PbO 1.01, UO_2 7.25, UO_3 1.51, ThO_2 2.64, $(Ce,La,Di)_2O_3$ 0.87, $(Y,Er)_2O_3$ 24.95, H_2O^- 0.08, H_2O^+ 2.29, total 99.55. S.G. 4.983 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 262).

31 C/15 The mineral collection of the Royal Ontario Museum includes a specimen of euxenite from lot 3, conc. IV, South Sherbrooke Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 147).

31 C/16 Euxenite is present in the dump at a pegmatite mine on lot 22, conc. IX, Bathurst Township (A.H. Lang 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 137).

31 D/16 Euxenite occurs with allanite and uranothorite in granitic pegmatite dykes on the property of Cassiar Rainbow Gold Mines Limited on lots 2 to 4, conc. IV, and lots 3 to 5, conc. III, Monmouth Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 270).

31 E/1 Euxenite-polycrase has been identified at the X-ray Laboratory, Geol. Surv. Can., in specimens from the following mining properties: Silver Crater Mines Ltd., Hastings County, Faraday Township, conc. XV, lot 31; Centre Lake property (Bicroft Uranium Mines Ltd.), Haliburton County, Cardiff Township, conc. XI, lots 26 and 27; Fission Mines Limited, Haliburton County, Cardiff Township, conc. XXI, lot 5; W.A. Patterson property, Hastings County, Herschel Township, conc. XVI, lots 17 and 18.

Euxenite-polycrase has been found on lot 40, Herschel Township, Hastings County (D.F. Hewitt, 1960: private communication).

31 E/4 D.F. Hewitt (private communication) reports an occurrence of euxenite-polycrase in granite pegmatite on lot 7, conc. X, near Brignall, in Conger Township.

31 E/8 Masses of euxenite up to 10 cm in diameter occur in a pegmatite dyke on lot 28, conc. I, Sabine Township. Chemical analysis by H.V. Ellsworth: SiO_2 0.09, TiO_2 22.96, $BeO+Al_2O_3$ 0.26, Fe_2O_3 2.07, CaO 1.92, MgO 0.03, MnO 0.28, K_2O 0.04, Na_2O 0.17, ZrO_2 0.05, SnO_2 0.07, Nb_2O_5 28.62, Ta_2O_5 2.65, PbO 1.35, UO_2 8.61, UO_3 0.20, ThO_2 3.94, $(Ce,La,Di)_2O_3$ 0.44, $(Y,Er)_2O_3$ 24.31, H_2O^- 0.08, H_2O^+ 2.15, total 100.29. S.G. 5.002 (H.V. Ellsworth, 1928: Am. Mineralogist, 13, p. 484; also 1932: Geol. Surv. Can., Econ. Geol. Sr., 11, p. 195).

31 E/8 Euxenite occurs in granite pegmatite on the south half of lot 32, conc. XV, Sabine Township (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Min. Rept., 21, p. 65).

31 E/9 Allanite and euxenite have been found in pegmatite on the Cameron property, lot 22, conc. VIII of Murchison Township (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 138).

31 E/11 A specimen of euxenite in the mineral collection of the Royal Ontario Museum is from the D'Eldona (Rivers) occurrence on lot 5, conc. IX, Butt Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 147).

31 E/12 Dark reddish brown glassy grains of euxenite are present in a pegmatite quarry in Cecebe village near the top of a steep ridge on the north side

of Cecebe Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 77).

31 F/4 Euxenite is present in a pegmatite dyke on lot 14, conc. VII of Monteagle Township. This property was formerly worked by the Genesee Feldspar Corp. and was known as Genesee No. 2 (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 145).

31 F/5 A specimen of euxenite collected near Lake St. Peter, Wicklow Township, is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 147).

31 F/6 A variety of euxenite-polycrase, originally named lyndochite by H.V. Ellsworth was found in a pegmatite dyke on lot 23, conc. XV, Lyndoch Township. The mineral was associated with beryl, columbite, cyrtolite, and monazite. Chemical analysis by H.V. Ellsworth: SiO_2 0.07, TiO_2 16.39, $BeO+Al_2O_3$ 0.13, Fe_2O_3 1.32, FeO 0.77, CaO 4.86, MgO 0.13, MnO 0.59, ZrO_2 0.04, SnO_2 0.12, Nb_2O_5 41.43, Ta_2O_5 3.84, PbO 0.37, UO_2 0.67, UO_3 0.04, ThO_2 4.95, $(Ce, La, Di)_2O_3$ 4.34, $(Y,Er)_2O_3$ 18.22, H_2O^- 0.06, H_2O^+ 1.90, loss on ignition (1.76), total 100.24, S.G. 4.909 (H.V. Ellsworth, 1927: Am. Mineralogist, 12, p. 212; also 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 229).

Subsequent analysis of type material by Butler confirmed the low uranium content and similar value for total rare earths (21.05%) but gave a higher ThO_2 content of 10.77%. Chemical analysis of rare earth plus thorium fraction separated from lyndochite, by Butler: Yt_2O_3 13.1, La_2O_3 1.50, CeO_2 13.5, Pr_6O_{11} 1.69, Nd_2O_3 17.0, Sm_2O_3 4.40, Gd_2O_3 5.41, Tb_4O_7 0.50, Dy_2O_3 2.94, Er_2O_3 1.09, Tm_2O_3 0.48, Yb_2O_3 1.20, Lu_2O_3 0.2, ThO_2 33.80, total 96.81 (J.R. Butler, 1957: Am Mineralogist, 42, p. 671).

31 F/6 Euxenite has been found with beryl, columbite and fergusonite in a second pegmatite occurrence near Quadeville. The pegmatite outcrops on lot 30, concession XV, Lyndoch Township, about 2.1 km by mine road north of Eneas Lake on Highway 515 west of Quadeville (E.R. Rose, 1960: Geol. Surv. Can., Paper 59-10, p. 25).

31 F/12 Euxenite is present with ellsworthite and a little monazite in a pegmatite sill worked in 1943 for feldspar and mica and located in Dickens Township, on lot 27, conc. V (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 142).

31 F/14 An occurrence of euxenite-polycrase in granite pegmatite is reported in lot 13, conc. XV, Alice Township (D.F. Hewitt, 1960: private communication).

31 K/4 Dark amber to brown glassy patches of euxenite are reported to occur in a pegmatite quarry on the road to Deep River, 3.2 km north of Mackey (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 64).

31 L/7 Euxenite occurs in granite pegmatite on lot 22, conc. IV, Calvin Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 250).

31 L/7 The X-ray powder pattern of heated euxenite from lot 29, conc. III, Mattawan Township has five strongest lines at 3.66 (3), 2.98 (10), 1.823 (4), 1.723 (4) and 1.487 (4) (R.J. Arnott, 1950: Am. Mineralogist, 35, p. 386).

Chemical analysis of euxenite from the above locality by Ellsworth: SiO_2 0.03, TiO_2 26.17, $BeO+Al_2O_3$ 0.28, Fe_2O_3 1.40, FeO 0.29, CaO 1.08, MgO 0.05, MnO 0.03, ZrO_2 0.03, SnO_2 0.09, Nb_2O_5 18.49, Ta_2O_5 12.12, PbO 1.06, UO_2 6.42, UO_3 0.43, ThO_2 0.97, $(Ce, La, Di)_2O_3$ 0.20, $(Y,Er)_2O_3$ 28.07, H_2O^- 0.04, H_2O^+ 2.83, loss on ignition (2.99), total 100.08, S.G. 4.918 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 191).

Euxenite-polycrase has been found in granite pegmatite on lot 20, conc. IX, Calvin Township, about 1.6 km northwest of Eau Claire station (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 14R) (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 189). Also found in a zoned pegmatite on the property of Bobjo Mines Ltd., in Calvin Township (D.F. Hewitt, 1960: private communication).

Euxenite is reported to have been found on the No. 2 workings claim S 36274, on the property of the Mica Company of Canada in the Mattawan-Olrig area (W.D. Harding, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. VI, p. 21).

41 H/15 A pegmatite dyke 7.5 m wide and 45 m long on lot 4, conc. A, Henvey Township is reported to contain euxenite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 146).

41 I/2 Granite pegmatite on lot 6, conc. VI, Servos Township is reported to contain euxenite-polycrase (D.F. Hewitt: private communication).

41 I/7 Euxenite has been found in a feldspar quarry on lot 2, conc. II, in Dill Township near Wanup (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 142).

52 E/16 A radioactive pegmatite occurrence has been reported in MacNicol Township north of Hawk Lake village. The main showing is 240 m south of Highway 17, and 200 m east of the boundary between MacNicol and Jackman townships. Euxenite, uraninite, uranophane and beta-uranophane have been identified (A.P. Pryslak, 1976: Ont. Div. Mines, GR 130, p. 42).

Quebec

31 F/15 Platy crystals of euxenite up to 5 cm across are found embedded in the rock at a quarry on lot 2, range V of West Portland Township. Monazite is an associated mineral (H.S. Spence, 1935: Am. Mineralogist, 20, p. 728).

31 G/11 Black euxenite grains up to 12 mm in diameter with a yellowish halo surrounding the grains, occur at the Glen Almond Mine located north of Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 27).

31 G/12 Euxenite occurs in a pegmatite dyke on lot 20, range XII, Templeton Township (A.H. Lang, 1952: Geol. Surv. Can. Econ. Geol. Ser., 16, p. 153).

Metamict euxenite occurs in a feldspar pit on lots 23 and 24, range IX, Wakefield Township. The pit is in a pegmatite dyke being worked by Mr. R. Lachaine for pale green microcline. Near the centre of the dyke is a zone of pink albite with interstitial microcline, containing purple fluorite associated with euxenite. The latter occurs in rounded subhedral crystals up to 2.5 cm in diameter (S.C. Robinson, W.D. Loveridge, J. Rimsaite, and J. VanPeteghem, 1963: Can. Mineralogist, 7, p. 533)

31 G/12 A pegmatite containing uraninite and a mineral of the euxenite-polycrase series has been trenched on lots 24 and 25, range III, Wakefield Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 293).

31 G/13 Dark brown resinous euxenite occurs as small patches in quartz at the Evans-Lou Mine near Notre-Dame-de-la-Salette (Ann P. Sabina, 1969): Geol. Surv. Can., Paper 68-51, p. 37).

31 J/5 Euxenite and a number of other radioactive minerals are present in a pegmatite sill on the property of Opawica Explorers Ltd., in Kensington Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 42).

31 J/16 At the Maisonneuve Mine, near St-Michel-des-Saints, euxenite occurs as nodules or grains (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 78).

31 K/16 Euxenite, with monazite, allanite, uraninite and uranothorite, occurs in pegmatite in Briand Township about 8 km northwest of Lépine Depot (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 293).

32 C/5 Euxenite-polycrase has been identified in specimens from the pegmatite mined for spodumene, feldspar and mica by the Quebec Lithium Corporation and located about 10 km south from a point 27 km east of Amos on Highway 45, Lacorne Township (X-ray Laboratory, Geol. Surv. Can.).

EWALDITE

$Ba(Ce,Y,Na,Ca)(CO_3)_2$

Quebec

31 H/11 Ewaldite has been identified from Mont St-Halaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

FAIRCHILDITE

$K_2CO_3 \cdot CaCO_3$

Ontario

31 C/3 Mottled grey and white stony material found in and near the trunk of a burned hickory tree near Deseronto was identified as a mixture of fairchildite and buetschliite (K.R. Dawson and A. Sabina, 1958: Can. Mineralogist, 6, p. 290).

31 F/11 Fairchildite, and bütschliite have been identified at the Royal Ontario Museum from he trunk of a burned birch tree near Eganville, Grattan Township (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 380).

FAMATINITE

$Cu_3(Sb,As)S_4$

Northwest Territories

86 F/13 Small amounts of famatinite are reported to occur with arsenopyrite and bismuthinite at the B.E.A.R. silver deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol. 34, p. 754).

FAUJASITE

$(Na_2,Ca)Al_2Si_4O_{12} \cdot 8H_2O$

Quebec

31 G/11 The rare zeolite mineral faujasite is reported to have been found with datolite at the Daisy Mica Mine on lot 9, range I, Derry Township. Chemical analysis by Johnston: SiO_2 48.7, Al_2O_3 17.0, CaO 4.6, Na_2O 3.2, H_2O (ign.) 26.0, total 99.5, S.G. 2.07 (G.C. Hoffmann, 1900: Geol. Surv. Can., Ann. Rept. XII, p. 12, 13 R).

fayalite

(see OLIVINE)

femaghastingsite

(see HORNBLENDE)

FERGUSONITE-FORMANITE

$(Y,Er)(Nb,Ta)O_4$

The fergusonite series has been subdivided on the basis of the Nb:Ta ratio into predominantly Nb fergusonite, and Ta-rich formanite.

British Columbia

82 E/14 Fergusonite has been reported in a pegmatite 24 km east of Kelowna (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 45).

82 F/5 Fergusonite, thorite, samarskite and monazite are reported in pegmatite 1.6 km south of the Slocan River and 0.8 km west of Crescent Valley radio station (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 234).

82 F/11 Brownish black fergusonite with a subconchoidal fracture and a highly vitreous lustre has been found on the Tryagain claim, 4 km above the Nelson-Nakusp highway bridge on Lemon Creek. Some admixed red feldspar is present. The fergusonite was found to be metamict. Upon ignition, however, the crystalline structure was restored and the X-ray powder pattern of fergusonite was obtained (R.M. Thompson, 1953: Am. Mineralogist, 58, p. 546).

Northwest Territories

85 N/1 Fergusonite occurs in fractures in granite at the Vic No. 4 claim of Yellowknife Uranium Corporation in the Marion River area (R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 18, p. 89).

Ontario

Brownish-black massive fergusonite with resinous lustre occurs in feldspar in a pegmatite dyke on the north side of Sand Road about 3.2 km west of Verona (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 11).

31 C/16 Fergusonite, euxenite and cyrtolite are reported in pegmatite at an old feldspar mine in lot 22, conc. IX, Bathurst Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 248).

31 D/9 A leucogranite pegmatite on the Windover property contains black grains and prisms of fergusonite. The property is situated in conc.

III, lot 3, Cavendish Township (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 23).

31 D/16 Black, resinous, grains and crystals of fergusonite have been identified in specimens from a pegmatite occurring in Monmouth Township, conc. V and VI, lots 18, 19, 20 (X-ray Laboratory, Geol. Surv. Can.).

31 D/16 An occurrence of fergusonite is reported on lot 15, conc. VIII and IX, Cavendish Township (R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 18, p. 92).

31 E/9 Tapering crystals of fergusonite up to 5 cm long are found in books of biotite in the granite pegmatite at the John G. Gale feldspar Mine on conc. VI, lot 14, Murchison Township (D.F. Hewitt, 1960: private communication).

31 E/9 Dark brown crystals of fergusonite occur at the Cameron and Aleck quarry about 4.8 km northwest of Madawaska (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 55).

31 E/11 The mineral collection of the Royal Ontario Museum includes fergusonite from the Tiffany occurrence on lot 15, conc. VII, Bethune Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 149).

31 F/4 Fergusonite has been found on the property of Greyhawk Uranium Mines Ltd., in Faraday Township, conc. XII, lot 10 (X-ray Laboratory, Geol. Surv. Can.).

31 F/6 Fergusonite has been found with euxenite, beryl and columbite in a pegmatite that outcrops on lot 30, concession XV, Lyndoch Township, about 2.1 km by mine road north of Eneas Lake on Highway 515 west of Quadeville (E.R. Rose, 1960: Geol. Surv. Can., Paper 59-10, p. 25).

31 L/7 Fergusonite was found to be present in samples from lots 11 and 12, conc. I, Calvin Township (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 138).

41 I/7 A specimen of fergusonite in the Royal Ontario Museum mineral collection is from the Industrial Minerals Corporation property on lot 9, conc. II, Dryden Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 150).

Quebec

21 M/16 Fergusonite is present near Lac Pied des Monts in Charlevoix County (J. Obalski, 1907: Mining Operations in the Province of Quebec for 1906, p. 42).

21 N/13 Uraninite, molybdenite, and pyrite are associated with fergusonite in a pegmatite dyke in range I, lot 11, Callières Township (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 152).

Fergusonite is the principle radioactive mineral in pegmatite rocks in ranges II and III, lots 8 and 9, Callières Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 21).

31 G/13 Fergusonite is one of a complex assemblage of yttrum bearing minerals found at the Evans- Lou pegmatite near St-Pierre-de-Wakefield in Portland-West Township (D.D. Hogarth, 1971: Can. Mineralogist, 10, p. 914).

31 J/5 Assays of fergusonite-bearing samples from the Kensington Township property of Opawica Explorers Ltd., graded as high as 3.39 per cent Nb_2O_5 (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 42).

31 J/16 Fergusonite is associated with feldspar, mica, and quartz in the pegmatite dykes at the Maisonneuve Mine in Berthier County (J. Obalski, 1907: Mining Operation in the Province of Quebec for 1906, p. 42).

FERRIERITE

$$(Na,K)_2Mg(Si_{15}Al_3)O_{36}(OH)\ .9H_2O$$

British Columbia

82 L/5 Ferrierite has been found near Monte Lake about 9.6 km west of Westwold along Highway 97 W. It is exposed in a large roadcut east of Monte Lake and along railway cuts 1.6 km south of the lake. Ferrierite also occurs in basalts exposed by logging roads south of Monte Lake. Analcime, chabazite, heulandite, levyne, stilbite and thomsonite are associated. Electron microprobe analysis of the ferrierite: SiO_2 66.33, Al_2O_3 13.18, Fe_2O_3 0.27, MgO 3.41, CaO 1.39, SrO 0.34, BaO 0.41, Na_2O 0.50, K_2O 1.17, total 87.00. An occurrence of ferrierite as cavity linings of calcite-filled nodules is reported in basalt along the shore of Pinaus Lake, 12.8 km southeast of Westwold. Electron microprobe analysis: SiO_2 67.79, Al_2O_3 11.00, Fe_2O_3 1.57, MgO 3.23, CaO 0.51, SrO 0.0, BaO 0.88, Na_2O 0.44, K_2O 1.46, total 86.88 (W.S. Wise and R.W. Tschernich, 1976: Am. Mineralogist, 61, p. 60).

92 I/15 The zeolite mineral ferrierite was described by R.P.D. Graham and named in honour of W.F. Ferrier, former mineralogist at the Geological Survey of Canada. This rare mineral occurs on the north shore of Kamloops Lake. Chemical analysis by Graham: SiO_2 69.13, Al_2O_3 11.44, MgO 2.92, Na_2O 3.97, K_2O 0.36, H_2O 13.05, total 100.87. S.G. 2.15. The mineral occurs as spherical aggregates of radiating blades enclosed in chalcedony filling seams in basalt (R.P.D. Graham, 1918: Trans. Roy. Soc. Can., 12, 3rd Ser., sec. IV, pp. 185-190).

The best collecting locality for ferrierite on the north shore of Kamloops Lake is a rock-cut on the Canadian National Railway line 4.8 km east of Carabine Creek. (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 25). The ferrierite occurs as colourless to red stained blades forming radiating balls up to 15 mm in diameter. Electron microprobe analysis: SiO_2 70.14, Al_2O_3 11.45, Fe_2O_3 0.13, MgO 2.56, CaO 0.15, SrO 0.17, BaO 0.38, Na_2O 1.86, K_2O 0.63, total 87.48. Pale brownish-red clinoptilolite in sparsely associated with the ferrierite (W.S. Wise and R.W. Tschernich, 1976: Am. Mineralogist 61, p. 60).

93 K/4 Ferrierite is associated with collinsite and heulandite in basalt at an occurrence on a farm on Brown Road about 3.2 km northwest of the ferry landing at Francois Lake Electron microprobe analysis: SiO_2 66.11, Al_2O_3 13.20, Fe_2O_3 0.30, MgO 3.34, CaO 1.02, SrO 0.0, BaO 1.97, Na_2O 0.41, K_2O 0.83, total 87.28 (W.S. Wise and R.W. Tschernich, 1976: Am. Mineralogist, 61, p. 60).

FERRIMOLYBDITE

$$Fe_2(MoO_4)_3\ .8H_2O$$

New Brunswick

21 G/7 Ferrimolybdite is reported to be a supergene mineral of frequent occurrence at the Mount

New Brunswick

21 G/7 Ferrimolybdite is reported to be a supergene mineral of frequent occurrence at the Mount Pleasant deposit of Brunswick Tin Mines. (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

Ontario

31 C/12 A yellow secondary mineral at the old Seymour iron mine on lot 11, conc. V, Madoc Township, originally believed to be a secondary uranium mineral has been shown by X-ray diffraction to be ferrimolybdite. The identity was confirmed by semi-quantitative electron microprobe analysis (H.G. Ansell and H.R. Steacy, 1973: Can. Mineralogist, 12, p. 232).

52 F/16 Ferrimolybdite is associated with molybdenite at the G.L. Pidgeon prospect on the south half of lot 8, conc. V, Echo Township. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 151).

53 C/13 The mineral collection at the Royal Ontario Museum includes a specimen of ferrimolybdite associated with molybdenite collected at Setting Net Lake at 52°47'N, 93°36'W, Kenora district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 151).

FERRISYMPLESITE

$Fe_3(AsO_4)_2(OH)_3 .6\ 1/2\ H_2O$

Ontario

31 M/5 A brown fibrous mineral with a resinous lustre found in association with erythrite and annabergite at the Hudson Bay Mine near Cobalt has been named ferrisymplesite. The mineral is a hydrous arsenate of ferric iron. Chemical analysis of ferrisymplesite admixed with erythrite and annabergite: As_2O_5 38.79, CoO 16.86, NiO 5.73, CaO 1.46, MgO 1.05, Fe_2O_3 11.67, Al_2O_3 0.31, H_2O 24.05, insol. 0.88, total 100.80 (T.L. Walker and A.L. Parsons, 1925: Am. Mineralogist, 10, p. 134).

31 M/5 Specimens of ferrisymplesite from the Nipissing Mine on the north half of lot 5, conc. V, and the O'Brien Mine on the south half of lot 4, conc. VI, Coleman Township, are included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 152).

ferri-taramite

(see TARAMITE)

ferrohastingsite

(see HORNBLENDE)

ferrotschermakite

(See HORNBLENDE)

FERSMITE

$(Ca,Ce,Na)(Nb,Ti,Fe,Al)_2(O,OH,F)_6$

Manitoba

52 L/6 The rare mineral fersmite has been found in the Huron Claim pegmatite, located about 800 m inland from a point on the southeast shore of the Winnipeg River, 15 or 16 km above Pointe du Bois (P. Černý and A.C. Turnock, 1971: Can. Mineralogist, 10, p. 765).

FIBROFERRITE

$FeSO_4OH.5H_2O$

Alberta

82 J/15 Fibroferrite is reported to be present in saline encrustations at the Canyon branch of the Elbow River (G.C. Hoffmann, 1896: Geol. Surv. Can. Ann. Rept., IX, p. 12 R).

Subsequent examination of material from this locality in the National Mineral Collection showed copiapite to be present but no fibroferrite could be found (X-ray Laboratory, Geol. Surv. Can.).

British Columbia

82 F/10 Fibroferrite is associated with copiapite at the Bluebell Mine near Riondel (X-ray Laboratory, Geol. Surv. Can.).

92 L/12 Finely divided fibroferrite crystals occur with bog iron near Quatsino. Most are colourless, but if large, or in bundles, they may appear yellowish. An analysis by E.W. Todd is as follows: Fe_2O_3 32.68, FeO 0.28, SO_3 32.48, H_2O 33.20, insol. 1.08, total 99.72. S.G. 1.901 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 87).

Nova Scotia

11 K/8 Fibroferrite has been identified with melanterite and rozenite in the Stubbart coal seam at the Prince Mine, Point Aconi (E.L. Zodrow and K. McCandlish, 1978: Can. Mineralogist, 16, p. 17).

Ontario

31 C/10 At the Enterprise Mine, fibroferrite occurs as silky white, fine fibrous and radiating fibrous aggregates on rozenite and copiapite which in turn form encrustations on pyrite. The mine is located about 42 km north of Kingston and 16 km west of Godfrey (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

FLUOBORITE

$Mg_3BO_3(F,OH)_3$

Ontario

31 D/9 Fluoborite has been found in a road-cut on the south side of the Crystal Lake road 10.7 km east of its junction with Highway 121, 7.1 km south of Kinmount. It occurs as colourless to white hexagonal prisms up to 5 mm long, also as colourless to white granular patches and as silky white friable masses. Norbergite, tremolite, serpentine and fluorite are associated (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 336).

31 D/15 Granular patches of light peach-coloured transparent fluoborite occur sparingly with chondrodite, phlogopite, tremolite, apatite, serpentine, fluorite, zircon, pyrite and magnetite in dolomitic crystalline limestone at road-cuts on Highway 35, 12.4 km south of its junction with Highway 121 at Minden (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 337).

31 E/1 Light peach-coloured transparent crystals of fluoborite occur in crystalline limestone at the Cardiff Uranium Mines Limited property near Wilberforce. Specimens were collected from the mine dump adjacent to the shaft in the south zone. Norbergite, phlogopite, apatite, tremolite, serpentine, talc, tourmaline, fluorite, titanite, diopside, sepiolite, graphite and pyrite are associated. White powdery patches of fluoborite also occur sparingly with chondrodite in crystalline limestone exposed in a road-cut on Highway 648 at a point about 300 m south of the junction of the Dark Lake Road, north of Wilberforce (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 336).

FLUORITE

CaF_2

Fluorite or flourspar is common as a vein minerals associated with metallic ores, particularly those of lead, zinc and silver. Quartz, barite and calcite are common nonmetallic associates. It also occurs as a sublimation product in volcanic rocks and as a minor accessory mineral in acid igneous rocks. Fluorite is valued as a flux and is the only important commercial source of fluorine.

British Columbia

82 E/1 Considerable amounts of fluorite have been mined at the Rock Candy Mine located 24 km north of Grand Forks. The fluorite occurs as a stockwork of veins in syenite. Associated minerals are barite, chert, quartz, calcite, and pyrite (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, 4th ed., p. 375).

82 F/11 A green, cleavable, variety of fluorite occurs near Willow Point on the west arm of the Kootenay River (National Mineral Collection).

82 L/3 Fluorite occurs in veins and fracture fillings up to 60 cm wide at a deposit located 3.2 km southwest of the mouth of Whiteman Creek which empties into Okanagan Lake opposite Okanagan Landing (S. Leaming, 1973: Geol. Surv. Can., Paper 75-53, p. 104).

82 M/12 A large amount of disseminated fluorite is reported to occur near Birch Island at the property of the Rexspar Uranium and Metals Mining Company.

92 P/8
92 P/9 Purple fluorite occurs with rhodonite in Boulder Creek near the North Thompson River (National Mineral Collection).

93 A/10 The Eaglet claims on the east side of Quesnel Lake, 0.8 km north of the mouth of Wasko Creek is reported to be a good collecting locality for fluorite (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 104).

94 M/8 Fluorite occurs near the Liard River Hotsprings in association with witherite (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, 4th ed., p. 375).

104 O/9 A massive body of fluorite occurs in skarn about 0.8 km above the magnetite-pyrite veins of the Blue Light claims at 59°39'N, 130°28'W (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 80).

New Brunswick

21 G/2 An occurrence of fluorite has been reported on Frye Island, Charlotte County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, Ind. and Ed. Publ., Co., Gardenvale, Quebec).

21 G/7 Fluorite occurs with the tin ores at Mount Pleasant, Charlotte County (A.A. Ruitenberg, 1963: M.Sc. Thesis, Univ. New Brunswick).

21 G/8 An association of fluorite with sulphides has been noted at Square Lake, Queen's County (New Brunswick Mines Br., files).

21 G/9 Fluorite occurs at Ferris, Queen's County (G.S. MacKenzie, 1951: Geol. Surv. Can., Paper 51-15).

21 G/11
21 H/16 Fluorite occurs in vugs in acid volcanics at Harvey Station and at Lister Mills, York County. It is associated with chalcocite at Beech Hill, Westmorland County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, Ind. and Ed. Pub. Co., Gardenvale, Quebec).

21 I/2 Barite and fluorite have been found at Memramcook, Westmorland County (New Brunswick Mines Br., Ann. Rept., 1940).

21 J/10 The following occurrences of fluorite with wolframite have been reported; all in York County: Burnt Hill Brook, Snake Brook, Little Dungarvon River, Rocky Brook, Sisters Brook, Fall Brook, McBean Brook and Southwest Miramichi River (W.H. Poole, 1960: Geol. Surv. Can., Paper 60-15).

Newfoundland

1 L/14 Large deposits of fluorite occur in epithermal veins filling fault fissures in the St. Lawrence granite, at St. Lawrence on the Burin Peninsula. The high grade veins average 1.2 to 1.5 m thick while others range from 2.5 cm to over 15 m. Commonly in cubes, the fluorite displays a considerable variety of colours including yellow, red, grey, blue, purple, green, pink and white. It is commonly accompanied by sulphides (C.K. Howse, 1951: Can. Inst. Mining Met., Bull. 471, pp. 478-484) also (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, 4th ed., p. 204).

Northwest Territories

66 A/1 Fluorite is found with quartz and calcite in veins cutting schists at the west end of Baker Lake (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 96).

85 O/13 Purple fluorite is abundant in a body of crystalline limestone at Bigspruce Lake on the Snare River (C.S. Lord, 1951: Geol. Surv. Can., Mem. 261, p. 61).

Nova Scotia

11 K/3 Fluorite has been mined from veins at Lake Ainslie, Cape Breton Island (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, 4th ed., p. 204).

Ontario

30 M/5 Fluorite occurs with galena, marcasite and celestine at the Dundas North quarry, lots 10 and 11, conc. III, West Flamborough Township.

Specimens are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 157).

31 C/6
31 C/11 Alternating bands of fluorite with barite, calcite, and a little celestite occupy a number of northwesterly trending veins of post Ordovician age in the Madoc district. Mining and development work has been carried out in the north part of Huntingdon Township, concs. XIII and XIV, lots 10 and 11, and in Madoc Township. Pale green cubo-octahedrons from the former locality are present in the National Mineral Collection (M.E. Wilson, 1921: Can. Mining J., 42) (W.R. Rogers, 1923: Ont. Dept. Mines, Ann. Rept. vol. 32, Pt. I, p. 23).

31 C/12 Specimens of pale green and transparent blue fluorite have been collected at the Bailey Mine, conc. IV, lot 1, Madoc Township (National Mineral Collection).

Pale sea green fluorite occurs embedded in magnetite, pyrite and calcite in Marmora Township, conc. VIII, lot 6 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., p. 200).

31 C/14 A fluorite-barite-calcite vein is present on lot 23, conc. IX, Barrie Township, east of Marble Lake. Specimens of these minerals are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 153).

31 D/16 A vein composed of apatite, fluorspar, and calcite has been exposed by trenching in conc. XII, lot 9, Cardiff Township (J. Satterly, 1943: Ont. Dept. Mines, Ann. Rept., 52, Pt. II, p. 34).

31 D/16
31 E/1 Fluorite is a common mineral in the uranium deposits of Cardiff Township. The mineral collection of the Royal Ontario Museum includes specimens from: Dyno Mine, lot 12, conc VIII; Bicroft (Centre Lake) Mine, lot 27, conc. XI; Cardiff Uranium Mine, lot A, conc. XVIII; Richardson (Fission) Mine, lot 5, conc. XXI; Tripp (Nu-Age) prospect, lot 8, conc. XXI; W.E. Clark prospect, lot 13, conc. XXII (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 153-4).

31 E/1 Vein material on the property of Cardiff Fluorite Mines, concs. XVII to XIX, Cardiff Township, consists of purple fluorspar and calcite with lesser amounts of uraninite, apatite, hornblende, and biotite (A.H. Lang, 1952: Geol. Surv. Can. Econ. Geol. Ser., 16, p. 138).

A lens of purple fluorite occurs in pegmatite cutting an impure crystalline limestone in conc. XVIII, lot 2, Cardiff Township (J. Sattterly, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. II, p. 25).

31 E/1 Fluorite occurs in veins with calcite, feldspar, apatite, hornblende, mica, magnetite, and occasionally, uraninite, allanite, zircon, titanite, molybdenite, pyrite, and pyrrhotite, near Wilberforce in Cardiff Township. The veins cut gneissic country rock on lots 4 and 5, conc. XXI (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 44).

Deposits similar to the above are present in lot 9, conc. XI, of the same township (J. Satterly, 1943: Ont. Dept. Mines, Ann. Rept. vol. 52, Pt. II, p. 33)

A specimen composed of fluorite, calcite, and apatite, from conc. XXII, lot 7, Cardiff Township has been donated to the National Mineral Collection.

Six northeasterly striking fluorite veins occur in conc. XXII, lot 13, Cardiff Township. They have been trenched and found to contain a deep purple or smoky amethystine type of fluorspar. The veins cut a complex pegmatitic rock (J. Satterly, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. II, p. 34).

31 F/4 A dark purple variety of fluorite known as antozonite occurs with ellsworthite, quartz, zircon, and calcite in the MacDonald quarry on lot 18, conc. VII, Monteagle Township. The order of crystallization appears to be zircon, quartz, fluorite, ellsworthite, and calcite but the fluorite seems to have recrystallized about fractures as well. Although usually opaque, in the recrystallized form it appears as transparent cubic crystals (F.L. Sine, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 22).

31 F/4 Fluorite is present at the Faraday uranium mine on lots 16 and 17, conc. XI, Faraday Township. Specimens are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 154).

31 F/6 Massive purple fluorite occurs in beryl-bearing pegmatites in Lyndoch Township, lots 23,30,31, conc. XV (D.F. Hewitt, 1953: Ont. Dept. Mines, 62, pt. 5, p. 41, 45).

31 F/10 Purple fluorite has been noted in Ross Township, conc. III, lots 13 and 14, and conc. VI, lot 13 (C.W. Willimott, 1882-4: Geol. Surv. Can., Rept. Prog. 6 L).

Salmon-pink calcite and purple fluorite are present in a pit on conc. V, lot 14, Ross Township. Accessory minerals are dark green pyroxene and scapolite (J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. III, p. 40).

31 F/10 Colourless and purple fluorite occurs at Elliott's Mine in Ross Township, lot 6, conc. IX, about 800 m north of Foresters Falls (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 61).

31 F/12 Fluorite from a locality near Cobden, in Renfrew County is present in the National Mineral Collection.

31 L/1 Massive, blue, cleavable fluorite has been found in Cameron Township, conc. A, lot 6, and donated to the National Mineral Collection.

31 L/5 Purple fluorite is reported at the Nova Beaucage Mine on the east end of Newman Island, 10.4 km southwest of the wharf at North Bay (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 83).

41 K/16 Closely-spaced stringers of manganite, psilomelane, manganese carbonates, quartz, calcite and fluorite occur in a reddish volcanic rock at a manganese deposit in Ley Township, Batchawana Bay (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 29).

41 P/15 Small masses of purple fluorite are present in quartz veins and the adjacent rock in Cairo Township in the Matachewan area.

A quartz vein 18 cm wide and several hundred m long, cuts syenite on claim 18285 west of Fox Rapids. It contains masses of fluorite up to 5 cm across (A.G. Burrows, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 235).

42 A/2 Fluorite appears as a deep purple mineral in a quartz vein and the adjacent wall rock in Alma Township (A.G. Burrows, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 235).

42 D/13 Crystals of purple fluorite, amethyst, colourless quartz and salmon-pink barite are found in fractures in pink granite at rock cuts along the Trans-Canada Highway 10.9 to 13.3 km west of the western turn-off to Rossport (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 23).

42 D/14 A fluorite-bearing vein outcrops at the 27 m falls near the mouth of the Black River in the Schreiber-Duck Lake area. Silver, assaying at 68 gm per tonne is associated with the fluorite (P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. IV, p. 7).

42 D
52 A Fluorite has been recorded as occurring at the following localities in the Thunder Bay district by R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 97: in veins in syenite on the mainland opposite Pic Island (42 D/10); near Terrace Bay (42 D/14); at Prince's Mine (52 A/3); with calcite, quartz, pyrite and sphalerite at the Star Mine, Strange Township (52 A/5); the deep purple variety at Blueberry Lake (52 A/7); near Black Bay (52 A/8); in cubes, 5 cm in diameter with large crystals of amethyst, at the mouth of the Mackenzie River (52 A/9); and on Fluor Island (52 A/9).

Fluorite has also been found at Silver Mountain (52 A/4); Badger Mine in Gillies Township, Beaver Mine in Connor Township and Federal Mine in Paipoonge Township (52 A/5); and Silver Islet (52 A/7) (A.L. Parsons, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. IV, p. 32).

52 A/5 Purple and green fluorite occurs with amethyst, smoky and rose quartz, barite and fluorescent calcite at a number of old silver deposits that are accessible from the Silver Mountain Highway (588) southwest of Stanley village at the following distances: Victoria Mine - 30 m north of the highway at km 2.7, Beaver Junior Mine - about 360 m southwest of the highway at km 7.9; West Beaver - 45 m south of the highway at km 9.2; Climax Mine - 800 m by road south from the highway at km 10.1, Badger Mine - 1.2 km by road west from the highway at km 10.8 (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 33).

52 A/10 Deep purple fluorite is exposed in a vein on the north shore of the west end of Silver Lake. Galena, specularite and amethyst are also found in pits around the west end and south shore of the lake. The road to Silver Lake leaves Highway 17 at a point 6.1 km south of Pearl (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 24).

Quebec

12 L/7 A small amount of clear green fluorite occurs in a group of veins on the north shore of the St. Lawrence River, 1.6 km southwest of Johan Beetz Bay (W.W. Longley, 1944: Que. Dept. Mines, Prelim. Rept., 184, p. 15).

21 M/7 Apple-green massive fluorite is the most common mineral present in a lead and zinc bearing calcite vein that is exposed between the upper and lower falls of du Moulin River near Baie-St-Paul (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 94).

21 M/8 Green fluorite occurs with calcite and sphalerite on the east side of Baie St. Paul in Charlevoix County. Specimens collected by R.L. Broadhurst in 1908 are included in the National Mineral Collection.

31 F/9 Purple fluorite is a constituent of the Moss molybdenite deposit located about 5.6 km north of Quyon (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 89).

31 F/15 Coarse-grained purple fluorite occurs in areas of high radioactivity on the property of Calumet Contract Uranium Mines Ltd., range VIII, lot 31, Grand Calumet Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 30).

31 F/15 Coarse aggregates of deep purple fluorite are associated with apatite and phlogopite in salmon-pink calcite at the Yates uranium deposit about 4.8 km west of Sandy Creek. Purple fluorite has also been observed in pegmatites in a road-cut on the south side of the Campbells Bay to Otter Lake road at a point 6.4 km east of Highway 8 opposite Lawless Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 95, 104).

31 G/5 Fluorite occurs as colourless, light green, and purple crystals generally associated with pyrite at the Laurentide Mine, north of Aylmer (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 9).

31 G/11 Fluorite has been reported with pyroxene and apatite at the Pedneaud quarry and Daisy Mine, near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can. Paper 68-51, p. 21).

31 G/12 Deep green fluorite is found in massive yellowish apatite at the Rainville (Dugas) Mine, near Perkins Mills. Purple fluorite is associated with orange allanite at the Little Rapids (Watts) Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 11, 30).

31 G/12 Fluorite is associated with jasper in gneiss at the Scott Mine near Old Chelsea. Purple fluorite occurs in red pegmatite at the Sweeney Mine, near Meach Lake and at the Coté quarry, north of Hull. White massive barite forms a vein with light green fluorite, calcite and dolomite at the Foley Mine, north of Hull. Near St-Pierre-de-Wakefield, fluorite has been reported in pyroxenite at the Breckin Mine, and purple fluorite is common in pegmatite at the Leduc Mine (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 17, 27, 32, 38, 40).

31 G/12 Fluorite from Wakefield Township, Gatineau County was donated by C.W. Willimott to the National Mineral Collection in 1901.

A specimen consisting of pale green fluorite and barite from Hull Township, range X, lot 7 was donated to the same collection in 1901 by R.L. Broadbent.

31 G/13 Purple fluorite occurs at the Villeneuve Mine near Notre-Dame-de-la-Salette (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 40).

31 H/11 Fluorite occurs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont

St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 H/12 Fluorite occurs as colourless tiny cubes and as small black masses in cavities at the Francon quarry on Montreal Island (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 67).

31 J/3 A fluorite specimen from the Villeneuve Mica Mine in Labelle County was presented to the National Mineral Collection in 1909.

31 J/4 Colourless to light green octahedrons of fluorite occur in limestone on the south bank of the Lièvre River downstream from des Cèdres dam (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 47).

31 J/12 A violet coloured variety of fluorite occurs as disseminated small crystals in an aplite body in Aumond Township, range IV, lot 49 (E. Aubert de la Rue, 1948: Que. Dept. Mines, Geol. Rept. 23, p. 50).

32 C/5 Purple, pink and white fluorite has been reported at the Lacorne Mine on the east side of Highway 60, 30.6 km east of Val d'Or. Fluorite is also reported as an accesory mineral at the Quebec Lithium Mine on lot 54, Range IX, Lacorne Township, about 0.8 km south of Lac Lortie (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 104, 107).

32 D/1 Purple fluorite is a constituent of gold-bearing veins at the East Malartic Mine on the south side of Highway 59, 1.8 km east of Malarctic. Fluorite is also reported at the Camflo Mine located 2.5 km north of Highway 59, 7.1 km east of Malartic (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 92, 94).

32 D/8 Pegmatites mined for molybdenum by Cadillac Moly Mines Limited on the eastern shore of Indian peninsula on Lac Preissac and by Preissac Molybdenite Mines Limited (Indian molybdenum mine) in the same area also contain purple fluorite (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 69-70).

Yukon

105 B/1 Pale green and pale purple fluorite occurs in quartz veins with wolframite, scheelite, cassiterite, and galena at the Fiddler (Yukon Tungsten) property at 60°08'N., 130°26'W. The property lies on a ridge north of Boulder Creek at an elevation of 1,550 m and may be reached by a secondary road about 9 km long that leaves the Alaska Highway just west of the Boulder Creek bridge at km 1129 (L.H. Green, 1966; Geol. Surv. Can., Paper 66-31, p. 80).

105 B/3 Light green fluorite is associated with topaz, tourmaline and columbite in pegmatite on the north face of a 1800 m mountain on the east side of Seagull Creek about 7.2 km north of mile 733 (1179 km) on the Alaska Highway (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 33).

105 H/16 Fluorite is a constituent of quartz veins cutting skarn at the Canada Tungsten Mine at 61°57'N, 128°15'W (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 22).

folgerite

(see PENTLANDITE)

FOURMARIERITE

$PbU_4O_{13} \cdot nH_2O$

Northwest Territories

86 L/1 Fourmarierite occurs as thin crusts on uraninite at the Eldorado Mine, Great Bear Lake (C. Frondel, 1956: Am. Mineralogist, 41, p. 553).

Quebec

31 G/13 Fourmarierite has been reported with uraninite in a pegmatite deposit held by C.D. Salkeld and others of Montreal. The property is on lots 30 to 35, 37 and 38, range I, and lots 30 to 35, range II, Villeneuve Township; and in lots 29 to 32, range X, Portland Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd Ed., p. 293).

Saskatchewan

74 N/7 Fourmarierite has been identified with uranophane and pitchblende at the Dick claims of Big Jackpot Mines Limited on Crackingstone Point (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd Ed., p. 299).

FRANCEVILLITE

$Ba(UO_2)_2(VO_4)_2 \cdot 5H_2O$

Prince Edward Island

21 I/16 Greenish yellow films of francevillite occur on a sample collected from an outcrop 1.6 km north of Little Miminegash Pond. Rauvite is associated (V.K. Prest, H.R. Steacy and T.J. Bottrill, 1969: Geol. Surv. Can., Paper 68-74, p. 5).

FRANCKEITE

$Pb_5Sn_3Sb_2S_{14}$

Yukon

95 E/8 This rare sulphosalt has been found in a calcite vein on the headwaters of the east branch of the Coal River at about 61°25'N, 127°21'W. Associated minerals include stannite, geocronite, sphalerite, galena and pyrite (A.N. Evans, 1957: Can. Mineralogist, 6, pp. 119-127).

FRANKLINITE

$(Zn,Mn,Fe)(Fe,Mn)_2O_4$

Ontario

31 C/6 Franklinite is reported to occur on Tenney's farm located about 3.2 km from Madoc in Madoc Township (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 198).

freibergite

(see TETRAHEDRITE)

FREIESLEBENITE

$Ag_5Pb_3Sb_5S_{12}$

Northwest Territories

85 J/8 Freieslebenite is one of the less abundant members of a suite of sulphosalts that have a widespread distribution in the highly mineralized parts of the shear zones in the Con, Negus-Rycon, Giant-Campbell and Crestaurum systems in the Yellowknife camp (R.W. Boyle, 1961: Geol. Surv. Can., Memoir 310, p. 55).

Ontario

31 M/5 A tiny veinlet of freieslebenite was found in a large skutterudite grain in a sample from the Cobalt camp (ROM, M-21270). Identification was by X-ray diffraction (W. Petruk et al., 1971: Can. Mineralogist 11, p. 209).

Yukon

115 I/3 This rare sulphosalt mineral has been identified (Mineral Sciences Division, Mines Branch) with other silver-bearing minerals, acanthite, native silver, andorite and argentian tetrahedrite at the Webber property of Mount Nansen Mines Limited at 62°03.5'N., 137°10'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 36).

FROHBERGITE

$FeTe_2$

British Columbia

93 F/6 Frohbergite has been found with sylvanite and stützite in a specimen from Lindquist Lake. Electron probe microanalysis gave: Fe 17.1, Te 80.4, total 97.5 (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 709-715).

Quebec

32 C/6 This rare telluride mineral found in microscopic amounts at the Robb-Montbray Mine, Montbray Township, was named in honour of Dr. Hans Frohberg, mining geologist and ardent mineralogist. The mineral is associated with altaite, tellurbismuth, montbrayite, chalcocite, covellite and free gold (R.M. Thompson, 1947: Univ. Toronto Stud., Geol. Ser., 51, pp. 35-40).

32 D/6 Electron probe microanalysis of frohbergite from the Robb Montbray deposit gave Fe 18.1, Te 82.7, total 100.8; very close to the theoretical formula composition. A thin band of melonite is frequently present between the frohbergite and chalcopyrite (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 709-716).

32 D/6 Frohbergite has been found in a specimen from Noranda. It forms a rim around petzite. Electron probe microanalysis: Fe 18.3, Te 82.5, total 100.8 (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 709-716).

FROODITE

$PdBi_2$

Ontario

41 I/6 Froodite and michenerite have been identified in a polished section of a sample from the surface dump outside the Vermilion Mine on lot 6, conc. IV, Denison Township. The sample also contained visible gold and hauchecornite (L.J. Cabri, D.C. Harris and R.I. Gait, 1973: Can. Mineralogist, 11, p. 903).

41 I/7 The rare palladium mineral, froodite, was found originally in mill concentrates from the Frood Mine by C.E. Michener. It was subsequently redescribed and named by J.E. Hawley and L.G. Berry, 1958, in Can. Mineralogist, 6, p. 200.

fuchsite

(see MUSCOVITE)

GADOLINITE

$Be_2FeY_2Si_2O_{10}$

Manitoba

52 L/6 Gadolinite has been identified by X-ray diffraction pattern in pegmatite from Shatford Lake. (X-ray Laboratory, Geol. Surv. Can.)

Ontario

31 C/7 Chemical analysis by H.V. Ellsworth of gadolinite from a pegmatite on lot 11, conc. IX, Loughborough Township: SiO_2 25.97, BeO 10.29, Al_2O_3 0.32, Fe_2O_3 2.34, FeO 5.82, CaO 2.36, MgO 0.55, MnO 1.17, K_2O+Na_2O 0.09, ThO_2 0.14, $(Ce, La, Di)_2O_3$ 2.85, $(Y,Er)_2O_3$ 46.47, H_2O 1.23, total 99.60. S.G. 4.101. Only one crystal of gadolinite, weighing about 100 gm, was found in the dyke. A minor amount of euxenite was also recovered (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 232).

GAHNITE

$ZnAl_2O_4$

British Columbia

114 P/10 Blue gahnite has been identified as a constituent of skarn deposits on Mineral Mountain and Copper Butte located northwest and north, respectively, of the hairpin turn at Mile 52 (83.5 km) Haines Road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

Manitoba

52 L/6 Greenish-black distorted octahedra of gahnite up to 15 mm long have been found in pegmatites around Greer Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

63 J/13 Bluish green transparent gahnite occurs with quartz in association with the sulphide minerals at the Stall Lake Mine beneath Stall Lake at about 54°51.5'N, 99°56'W, and at the property of Stall Lake Mines Limited about 1.6 km to the east (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 61, 62).

63 K/16 Gahnite from the Chisel Lake area has been identified by X-ray diffraction pattern at the X-ray Laboratory, Geol. Surv. Can. Subsequent optical and spectrographic analyses have confirmed this identification.

63 K/16 Small nodules of bluish-green gahnite, 2 to 3 mm in diameter, occur in sericite schist at the Anderson Lake Mine, and deep green octahedrons and nodules of gahnite are reported at the Chisel Lake Mine (Ann P. Sabina, 1972: Geol. Surv. Can. Paper 71-27, p. 63,65).

Ontario

31 D/16 Gahnite is present as small green grains in grey blue scapolite associated with biotite, zircon, calcite, muscovite, nepheline and albite at the Fraser quarry (Madill property), south of

Gooderham, near Trooper Lake, in Glamorgan Township, Haliburton County. (J. Rimsaite: private communication.)

31 F/5 Disseminated crystals of dark green gahnite are present on the property of Monteagle Minerals on the east bank of the York River in Monteagle Township, 16 km northeast of Bancroft (L. Moyd, P. Moyd and H.L. Noblitt, 1961: Paper presented Can. Inst. Mining Met. - Soc. Mining Eng., joint meeting, Ottawa, Ont.).
Dark green crystals of gahnite are found lining cavities in brown corundum in Renfrew County, Raglan Township, conc. XVIII, lot 2 (G.C. Hoffmann, 1896: Geol. Surv. Can. Ann. Rept., IX, p. 15 R).

42 F/4 The mineral collection of the Royal Ontario Museum includes a specimen of gahnite from the Geco Mine in south-central Gemmell Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 160).

GAIDONNAYITE

$Na_2ZrSi_3O_9.2H_2O$

Quebec

31 H/11 Gaidonnayite, an orthorhombic dimorph of catapleiite, has been discovered in vugs in nepheline syenite on Mont St. Hilaire. It occurs as small crystals on analcime and natrolite. Chemical analysis: SiO_2 42.51, ZrO_2 30.21, Nb_2O_5 3.00, TiO_2 0.42, Na_2O 13.11, K_2O 2.20, H_2O 9.25, total 100.70 (G.Y. Chao and D.H. Watkinson, 1974: Can. Mineralogist, 12, p. 316).

GALENA

PbS

Galena is the most important ore mineral of lead. It is commonly associated with sphalerite and most lead mines produce zinc as well. Argentiferous galena is a valuable source of silver. Galena is one of the most common sulphide minerals and is distributed widely throughout Canada; accordingly, no attempt is made here to catalogue all of the known occurrences.

British Columbia

82 E/6 Galena is present in veins ranging from a few cm to several m thick at the Highland Bell Mine near Beaverdell, 37 km east of Penticton. It is generally coarsely crystalline and is associated with pyrite and sphalerite. The results of an analysis by Williams are as follows: Pb 85.69, Fe 0.52, Sb 0.45, S 13.04, insol. 0.20, total 99.90. S.G. 7.50± 0.04 (A.B. Staples and H.V. Warren, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 28).

82 F/4 Lead-zinc-silver ore has been mined from the Bluebird vein at 49°04'N, 117°48'W. The property is located astride Trail Creek at 880 m elevation and 800 m south of the Rossland municipal boundary. Minerals present include galena, sphalerite, pyrite, arsenopyrite, stibnite and pyrrhotite in a quartz gangue (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 70).

82 F/9 The Sullivan Mine near Kimberley is the largest lead-zinc-silver mine in Canada. The ore consists of pyrite, pyrrhotite, sphalerite, and argentiferous galena. Associated minerals are garnet, cassiterite, and tourmaline. The deposit is of the replacement type and is of high temperature origin (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8, p. 323).

82 F/10 Coarse-grained galena occurs at the Highland Group on Cedar Creek 2.4 km from Ainsworth (S.J. Schofield, 1920: Geol. Surv. Can., Mem. 117, p. 37).

82 F/10 Galena is a major ore mineral at the Bluebell Mine on the east shore of Kootenay Lake. Fine specimens of euhedral crystals have been collected (J.D. Grice and R.A. Gault, 1977: Mineralogical Record, 8, p. 33).

82 F/14 The Slocan camp, centred about 24 km west-northwest of Kaslo, is noted for its large number of rich silver-lead-zinc deposits (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., No. 1, 4th ed., p. 371).

82 F/15 Galena occurs on the Florence Silver Mining Company property in the Ainsworth mining camp as a replacement mineral and as a fissure filling (S.J. Schofield, 1920: Geol. Surv. Can., Mem. 117, p. 40).

82 G/5 The St. Eugene Mine at Moyie, 24 km south of Cranbrook was at one time the largest lead producer in Canada. The mine has been inactive since 1923 (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., No. 1, 4th ed., p. 371).

82 K/7 Galena, sphalerite, and pyrite occur with a quartz-barite gangue in the Mineral King Mine, 45 km southwest of Invermere in the Purcell range (J.F. Walker, 1926: Geol. Surv. Can., Mem. 148, p. 49).

82 M/1
82 M/7
82 M/8
82 M/15
82 M/16 Lead-zinc deposits, generally low in silver, are the predominant type in the Big Bend map-area, and are commonly associated with limestones of the Badshot Formation and lower part of the Lardeau Group, and with impure marbles surrounding the core of the gneiss dome that features the Shuswap Complex. The following deposits are known: 82 M/1 - River Jordan property, 19 km northwest of Revelstoke between elevations of 1770 m and 2410 m on the northern slopes of Mount Copeland. Mastodon Mine at an elevation of 1500 m on the ridge between La Forme and Carnes Creeks. Lead King showings about 3.2 km east of the Mastodon mill. Little Slide showings, northeast of the east fork of La Forme Creek about 4.8 km east of the Mastodon mill.
82 M/7 - The Cottonbelt property lies between elevations of 1500 and 1800 m on the hills south of Blais Creek. It is accessible by road and trail, 29 km from the head of Seymour Arm.
82 M/8 - J and L group, on the shoulder between the east and south forks of Carnes Creek about 13 km by trail from the Big Bend highway. A and E showings on the northeastern slopes of the hill south of Burke Creek between 1800 and 2200 m elevation. The Keystone claim at the head of Keystone Creek is accessible by logging road and trail from the Big Bend highway.
82 M/15 - The Ruddock Creek property extends from the head of Ruddock Creek at an elevation of 2290 m northwesterly around the summit mass of the peak, 10 km west of Gordon Horne peak, and westerly into Oliver Creek Valley.
82 M/16 - The Kinbasket property lies 90 to 120 m above the southwestern shore of Kinbasket Lake between Trident and Windy Creeks (J.O. Wheeler, 1965: Geol. Surv. Can., Paper 64-32, p. 27-32).

82 M/3
82 M/4 Ore consisting of galena, sphalerite and pyrrhotite has been mined at a property at 51°03.6'N, 119°32.3'W, at elevations between 1500 m and 1800 m on Adams Plateau, east of Adams Lake and north of Scotch Creek (B.C. Dept. Mines and Pet Res., Geol., Exp. and Mining in B.C., 1972, p. 85).

92 F/12 Massive sulphide ore consisting mainly of galena, chalcopyrite, sphalerite and pyrite occurs at the Lynx Mine on Myra Creek, 1.6 km west of the south end of Buttle Lake (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1972, p. 271).

92 I/2 A galena-barite vein occurs in a strong shear zone at 1700 m elevation on Iron Mountain, 8 km south-southeast of Merritt (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 142).

92 P/9 The Queen Bess property is located on the east side of the North Thompson River valley 300 m above the valley bottom and 4.8 km south of the railway station at Black Pool. The property was prospected in 1895 and worked from 1917 to 1927. Galena, sphalerite and minor tetrahedrite occur in fissure veins (R.B. Campbell and H.W. Tipper, 1971: Geol. Surv. Can., Memoir 363, p. 85).

93 E/11 Sphalerite and galena with minor chalcopyrite occur in a gangue of quartz and calcite on the south side of Sweeney Mountain, 9.6 km from the Tahtsa River, in the Whitesail Lake area. A picked sample of ore from the Captain Group in this district graded Pb 12.40, Zn 5.42, Ag 63.07 ounces, and Au trace (S. Duffell, 1952: Geol. Surv. Can., Paper 52-21).

93 L/15 Galena and sphalerite have been mined at the Cronin Mine on the east slope of Mount Cronin at 54°55.3'N, 126°48.5'W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 420).

93 M/5 Parallel veins containing galena are present in the rocks of the Hazelton series at the American Boy property on the southwest slope of Nine Mile Mountain, 9.6 km from New Hazelton. Silver-bearing lead sulphide occurs in fissure replacement veins on the northwest side of Glen Mountain at the Silver Standard Mine (J.J. O'Neill, 1919: Geol. Surv. Can., Mem. 110, pp. 27, 32).

94 C/11 A quartz-siderite rock in the Aiken Lake area, 1.6 km south of the Ingenika River has been replaced by pyrite, sphalerite, galena and some sulphides of copper and silver. Four mineralized zones which have undergone some supergene enrichment occur at the Ferguson property at this locality about 26 km west of the junction of the Ingenika and Finlay Rivers. At the Onward Group, about 2.5 km south of the above locality, galena, sphalerite, and pyrite form discontinuous lenses in a breccia (E.F. Roots, 1957: Geol. Surv. Can., Mem. 274, p. 204).

103 I/9 The mineral association at the Mr. K copper property, 24 km up Legate Creek from the Skeena River, consists of bornite, galena, and chalcopyrite forming solid masses in the basins of drag folds in Jurassic lavas and tuffs (W.L. Uglow, 1922: Am. Mineralogist, 7, p. 1).

103 P/13 Argentian galena and tetrahedrite occur in quartz-calcite-barite veins at 55°57'N, 129°53'W, near the head of Glacier Creek between 1100 m and 1400 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 510).

104 K/11 Massive sulphide replacement of limestone has been explored on the Ericksen-Ashby property at 58°39'N, 133°28'W. The minerals are pyrite, sphalerite, galena and freibergite (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 55).

104 K/12 The Tulsequah Chief Mine at 58°44'N, 133°35'W, and the Big Bull (Manville) Mine at 58°40'N, 133°33'W, produced copper, lead, zinc, gold, silver and cadmium ore from 1951 to 1957. The ore consisted of massive fine-grained pyrite and chalcopyrite in lenses, and sphalerite, pyrite and galena in quartz-carbonate-barite gangue (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 54-55).

104 N/12 Galena, sphalerite and arsenopyrite occur in a gangue of quartz, ankerite and calcite at the Atlin-Ruffner Mine. The mine is located at the 1190 m level on the northwestern slope of Leonard Mountain overlooking Fourth of July Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 39).

104 O/16 Several silver-lead-zinc showings occur northeast of the Cassiar batholith near Tootsie River. They include the Silvertip Group about 6.4 km northeast of Tootsie Lake and the Amy claims 3.2 km northwest of the north end of Tootsie Lake. Sphalerite and argentian tetrahedrite are associated with galena (H. Gabrielse, 1969: Geol. Surv. Can., Paper 68-55, p. 34).

104 P/3 Galena, sphalerite, chalcopyrite, scheelite, and hydrozincite are present in a shear zone in limestone at the McDame Belle property, on McDame Creek about 1.6 km east of Centreville (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 114).

114 P/10 Lead-zinc and copper-silver mineralization occurs on Mineral Mountain and on Copper Butte northwest and north, respectively, of the hairpin turn at Mile 52 (83.5 km) Haines Road. Galena, sphalerite, bornite, chalcocite and chalcopyrite are the ore minerals (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

Manitoba

63 I/6 X-ray powder patterns have identified galena from specimens found near the Echimamish River in Manitoba (E.W. Nuffield and D.H. Gorman, 1960: private communication).

New Brunswick

21 O
21 P Galena is an important constituent of the sulphide bodies of the Bathurst area. It is associated with sphalerite and chalcopyrite, commonly in massive pyrite bodies, and is frequently argentiferous. A report of the New Brunswick Research and Productivity Council entitled The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, Record 2, Part B, 1965, lists 120 occurrences of galena. A list of those occurrences where large ore reserves have been reported is as follows.

21 O/1 Chesterville Mines, Clearwater, Northumberland County.

21 O/7 Restigouche Exploration, Portage Lakes, Restigouche County.

21 O/8 Devils Elbow, Northumberland County; Halfmile Lake, Northumberland County; Golden West Mines, Great Sweet Grass, Northumberland County; Bay Copper, Little Bald Mountain, Northumberland County; United Montanban, Little River Lake, Northumberland County; Heath Steele Mines, Northumberland County; Stratmat 61, Northumberland County; Nepisiguit River A and B, Northumberland County; Smith Group, Ninemile Brook, Gloucester County; Wedge Mine, Northumberland County; Canoe Landing Lake, Northumberland County.

21 O/9 Kennco Limited, Murray Brook, Restigouche County; Caribou-Chaleur Bay Mines, Restigouche County; Tetagouche Exploration, Orvan Brook, Restigouche County; Rocky Turn, Gloucester County; Anaconda Limited, Armstrong Brook, Gloucester County.

21 O/10 Group D, Portage Lakes, Restigouche County.

21 P/5 Brunswick No. 12, Gloucester County; Quebec S and R, Pabineau River, Gloucester County; Headway Limited, Pabineau River, Gloucester County; Brunswick No. 6, Gloucester County; Captain Yellowknife, Portage River, Gloucester County; Drummond Iron Mine, Gloucester County; Fab Metals, Pabineau River, Gloucester County; Key Anacon Limited, Nepisiguit River, Gloucester County.

21 P/12 Nigadoo River Mines Limited, Gloucester County; Nicholas Denys, Sturgeon River, Gloucester County; Beresford Mines, Gloucester County.

21 P/13 Keymet Mines, Elmtree River, Gloucester County; Nigadoo Mines (Anthonian Group), Gloucester County.

Newfoundland

1 N/5 A mixture of galena, sphalerite, and pyrite is present with a small amount of gangue, in veins which occupy fault zones near the east side of Placentia Bay. Three sets of sulphide-bearing faults cut the sedimentary rocks of the area at a locality about 550 m up Broad Cove Creek Ravine, near the junction of Argentia Harbour with Placentia Sound (N.E. Chute: Geol. Surv. Can., Unpublished File, 21-C-28, p. 55).

1 N/12 Galena forms in short lenticular bodies near the centre of the La Manche vein near La Manche Cove, on the northeast side of Placentia Bay. It also occurs as irregular mushroom shaped masses which appear to be syngenetic with the enclosing calcite gangue material (N.E. Chute: Geol. Surv. Can., Unpublished File, 21-C-28, p. 6).

12 A/15 The Buchans orebody on the northwest shore of Red Indian Lake contains a large tonnage of massive sulphides consisting of an intimate mixture of fine-grained sphalerite, galena, pyrite, chalcopyrite and a very little tetrahedrite. A large amount of barite is present as a gangue mineral (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., No. 1, 4th ed., p. 182).

12 B/10 Small cubo-octahedrons of galena have been found at Port-a-Port Bay (National Mineral Collection).

14 L/14 A vein of argentian galena is reported on the north shore of Ramah Bay. Minor amounts of chalcopyrite, sphalerite and pyrrhotite are also present (W.C. Morgan, 1975: Geol. Surv. Can., Paper 74-54, p. 37).

Northwest Territories

48 A/2, 48 A/6, 48 A/7, 48 A/11, 48 A/13 Detailed surveys have been made in six areas of the Borden Peninsula. About 19 km north-northeast of the icefield east of Magda Plateau (72°31'28"N, 82°07'42"W) galena occurs as isolated crystals and crystal masses in calcite and dolomite filled fractures associated with a major northeast-trending fault. Chalcopyrite, chalcocite, malachite and azurite are also present. Occurrences of galena and sphalerite were also noted along two northeast-flowing creeks 12 km south-southeast of the head of Strathcona Sound (72°52'43"N, 83°31'36"W). Veinlets and disseminated grains of galena occur in dolomite on a northwest-trending mesa at 72°13'26"N, 81°33'17"W, between the head of Tremblay Sound and Robertson River. An area north of Magda Plateau (72°26'16"N, 82°45'54"W) is underlain by ferruginous dolomite containing disseminated galena. In another area 6.4 km northeast of Bellevue Mountain and south of the Alfa River (72°26'36"N, 81°38'48"W) two occurrences of galena and minor sphalerite, fluorite and barite were noted in talus of brecciated dolomite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 148; Dept. Indian and Northern Affairs).

48 C/1 A flat-lying ore body 90 m wide, 3.2 km long, and 9 to 15 m thick has been found on the south shore of Strathcona Sound. The body is nearly massive pyrite with varying amounts of sphalerite, galena and minor marcasite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 152; Dept. Indian and Northern Affairs).

55 K/6 A granodiorite body north of Whiterock Lake is cut by narrow quartz veins containing chalcopyrite, chalcocite, galena and molybdenite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 30; Dept. Indian and Northern Affairs).

55 L/6 Quartz veins containing pyrite, chalcopyrite, arsenopyrite and galena cut tonalite intrusions about 12.8 km southeast of O'Neil Lake at 62°19'30"N, 95°08'15"W. Assay results showed gold and silver values (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970. Vol. 2 p. 36; Dept. Indian and Northern Affairs).

58 G/6 Fractures 2.5 to 5 cm wide filled with galena are exposed at 75°21'15"N, 94°09'W, about 2.4 km southeast of Eleanor Lake in northeastern Cornwallis Island (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 162; Dept. Indian and Northern Affairs).

68 H/8, 68 H/9 Galena, sphalerite and smithsonite are the principal minerals on the properties of Bankeno Mines Limited on Little Cornwallis Island. The main showing is in the southwest corner of the island at about 75°22'N., 96°55'W. The East (Eclipse) showing is 26 km northeast of the Main showing. Some barite and pyrite are also present (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 58).

75 M/2 A large number of claims have been staked in the Indian Mountain Lake - Benjamin Lake area in the search for lead-zinc-silver ore. A deposit of about one million tonnes has been outlined just south of BB Lake on the property of Indian Mountain Metal Mines Ltd (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 21).

85 B/16 Galena, sphalerite, and marcasite occur as disseminated grains, masses and veinlets

replacing dolomite or calcite in the Pine Point area, south of Great Slave Lake (Western Miner and Oil Review, 1963: Vol. 36, No. 8, p. 26).

106 A/12 Coarsely crystalline galena and sphalerite ocur in vugs and veins scattered through dolomites at 64°32'N, 129°53'W, 5 km north of Mountain River (M.P. Cecile and D.W. Morrow, 1978: Geol. Surv. Can., Paper 78-1A, p. 472).

Nova Scotia

11 D/4 Galena occurs in the Deenbrock Mine located between Musquodoboit Harbour and Meagher's Grant in Halifax County (National Mineral Collection: A.O. Hayes, 1917).

11 E/6 Lead-zinc sulphide mineralization occurs in Colchester and Hants Counties at the Smithfield lead deposit, 21 km east of Brookfield Station. The ore is in brecciated Windsor limestone near its contact with the Horton Group (I.M. Stevenson, 1958: Geol. Surv. Can., Mem. 297, p. 93).

11 F/15 Massive intergrown galena and sphalerite occur in Windsor limestone near Jubilee (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., No. 1, 4th ed., p. 184).

Ontario

31 C/7 Disseminated grains and clusters of galena in calcite comprise the ore at the Frontenac Lead mine in Loughborough Township, 29 km north of Kingston. The galena occurs in a fissure vein which was first worked in 1866. Small amounts of pyrite and sphalerite accompany the galena, and marcasite and celestite are present in vugs and openings in the vein material. Silver content in the galena is usually less than 43 gm to the tonne (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8, pp. 142-145).

31 C/10 Large cubic crystals of galena have been obtained from a vein in Bedford Township, conc. VIII, lot 18 (National Mineral Collection: E. Smith, 1900).
A number of other veins in the vicinity have been examined for economic possibilities. They are located on conc. VIII, lots 19 and 21; conc. VII, lot 19; conc. VI, lots 16, 17 and 18; conc. V, lot 13 (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8, p. 152).

31 C/10 Cubes of galena up to 12 mm across occur in pink to white calcite at the Hickey-Murphy lead mine. Two old shafts and several pits are present on the Hickey and Murphy farms located along the Westport road 15.2 km from Godfrey (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 17).

31 C/12 Galena occurs with negligible amounts of sphalerite and pyrite in a vein at the Hollandia Lead mine, 3.2 km northeast of Bannockburn in Madoc Township. Gangue minerals in the vein are calcite and barite (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8 p. 155).

31 F/8 Galena is the chief ore mineral at the now inoperative Kingdom Mine on Chats Island in the Ottawa River 8 km east of Arnprior and about 64 km west of Ottawa. It occurs in two fissure veins cutting both the Precambrian and Paleozoic rocks of the area (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8, p. 136).

31 F/8 Calcite veins which contain lenses and masses of galena occur in McNab Township, conc. XI, lot 9, in the Renfrew area. The occurrence has been trenched and a number of diamond-drill holes have been put down (J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. III, p. 61).

31 M/5 Several large crystals of galena have been obtained from the O'Brien Mine near Cobalt. They range up to 6 cm in diameter, are octahedral in habit and are remarkably pure. A chemical analysis is as follows: Pb 86.56, Fe 0.05, S 13.45, total 100.06 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 208).

32 D/4 Argentiferous galena occurs in Skead Township in lot 12, conc. V, and in lot 12, conc. VI. At the latter locality the galena assayed 137 gm of silver to the tonne and was found in a calcite vein with sphalerite, pyrite and erythrite (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8, pp. 177-178).

41 K/9 The Jardun Mine in Jarvis and Duncan Townships, about 29 km northeast of Sault Ste Marie, was mined as early as 1878. The ore minerals, argentiferous galena and sphalerite, occur with pyrite and chalcopyrite in a band of greenstone schist bounded by granite (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, 4th ed., p. 91).

42 D/14 A quartz vein near the mouth of the Aquasabon River (formerly the Black River) east of Schreiber on the north shore of Lake Superior, is reported to contain galena and pyrite. A trace of selenium has been detected in the galena which also contains some silver (W.E. Logan, 1863; Geol. Surv. Can., Geology of Canada, pp. 689-690) (W.L. Uglow, 1916: Ont. Dept. Mines, Ann. Rept., vol. 25, Pt. II, p. 12).

52 A/10 Small amounts of galena occur in the silver ores at Silver Islet in Lake Superior. It is present both as a primary and a secondary mineral and is associated with a wide variety of other sulphide minerals (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8, p. 187).

52 A/10 Cubes of galena up to 12 mm across occur with amethyst, colourless and smoky quartz crystals, barite and fluorescent calcite at the Enterprise Mine located about 1.1 km east of Highway 17, along Road 69-13, from a point 2.4 km north of Pearl (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 23).

52 A/10 Galena cubes measuring up to 5 cm across have been found in a vein on the west side of the peninsula on the south side of Silver Lake. Amethyst, specularite, fluorite, pyrite and sphalerite are associated minerals found in a number of pits around the western end of the lake. The road to Silver Lake leaves Highway 17 at a point 6.1 km south of Pearl (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 24).

52 G/15 The massive sulphide orebody at the Mattabi Mine consists of sphalerite, chalcopyrite, pyrite, galena, tetrahedrite-tennantite, arsenopyrite, minor pyrrhotite and rare boulangerite and bournonite. The mine is located between Sturgeon Lake and Bell Lake about 80 km north of Ignace (J.M. Franklin, J. Kasarda and K.H. Poulsen, 1975: Econ. Geol., 70, p. 63).

Quebec

21 N
22 C The massive Silurian sandstones in the Temiscouata, Rivière du Loup, and Rimouski

districts contain in places as much as 40 per cent pyrite and sheared galena (P.J. Lesperance, 1959: Que. Dept. Mines, P.R. 385, p. 9).

22 B/2 Argentiferous galena occurs with sphalerite and pitchblende in a vein located about 800 m north of the highway and 3.2 km east of Cross Point, a village on the south coast of the Gaspé Peninsula near Restigouche. The vein cuts prophyritic volcanic rock, is about 35 cm wide, and is reported to have been exposed at one time for a length of about 8 m (A.H. Lang, 1950: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 154).

31 F/10 Crystals of auriferous galena are reported to occur in calcite-tremolite rock at the New Calumet Mine on Calumet Island in the Ottawa River (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, 4th ed., p. 90).

31 M/6 Galena-bearing ore from the property of Villa Lead Mines in Duhamel Township assayed 6.08 per cent lead and 43 gm of silver per tonne (J. Calveau, W.N. Ingham, W.G. Robinson, 1957: Que. Dept. Mines, P.R. 256, p. 31).

31 M/6 Argentian galena was associated with sphalerite and some pyrite and quartz at the Wright Mine which is believed to be the first mineral deposit to be found and reported in northern Canada. Discovery of the deposit, although known earlier to the Indians, was reported by Sieur de Troyes in 1686 while on a military expedition to James Bay. The deposit outcrops at the extreme northern tip of the peninsula forming the north side of Joannès Bay on the eastern shore of Lake Timiskaming (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 89).

32 D/3 Pyrite, chalcopyrite, and galena occur in a quartz vein at the Caron Malartic Gold Mine, Beauchastel Township. The vein is in a diorite body near its contact with volcanic rocks (J. Claveau, W.N. Ingham and W.G. Robinson, 1951: Que. Dept. Mines, P.R. 256, p. 3).

Saskatchewan

63 L/10 Massive galena and dark brown sphalerite constitute the main ore zone at the Western Nuclear Mine which lies beneath Hanson Lake, 180 m east of the shore between Bertrum and McIlvenna bays (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 17).

Yukon

95 D/5 Considerable exploration work has been carried out on a lead-zinc showing at 60°30'N., 127°57'W., about 3.2 km southwest of Quartz Lake in the valley of a creek locally known as Mine Creek and tributary to Hyland River, at an elevation of 975 m. The deposit, at the base of a limestone conglomerate, contains sphalerite, galena and pyrite in an ankeritic matrix (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 73).

105 A/2 Galena occurs in lenses with sphalerite and skarn minerals replacing lenses of limestone in phyllite, at a deposit located 56 km north of Watson Lake. The deposit contains economical values in lead, zinc, and silver (- 1962: Western Miner and Oil Review, vol. 35, No. 11, p. 32).

105 B/1 Massive galena and disseminated sphalerite and pyrite are found in shear zones on the Luck Group claims (60°07'N., 130°26'W.) located along Boulder Creek, 8 km from its junction with the Rancheria River and extending north to the headwaters of two small streams flowing north into Spencer Creek (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. of Indian Affairs and Northern Development, p. 134).

105 B/4 Argentian galena, boulangerite, arsenopyrite, pyrite and sphalerite occur in quartz lenses in diorite at the Logjam Creek property at 60°01'N., 131°35'W., about 21 km by tote road from the Alaska Highway near km 1211 (L.H. Green and C.I. Godwin, 1964: Geol. Surv. Can., Paper 64-36, p. 47).

105 D/2 Silver-bearing galena occurs with auriferous arsenopyrite and pyrite at the Venus Mine on the eastern slope of Montana Mountain above Windy Arm (Tagish Lake) (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 45).

105 D/6 Arsenopyrite and galena are the most common minerals at the Union Mine, a former silver-lead mine at the 1070 m level on the east side of Idaho Hill which overlooks Annie Lake (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 43).

105 F/4 Silver-bearing galena occurs in quartz veins on claims on the north side of the Boswell river, in an area between 32 and 39 km from its mouth. In some of the veins, molybdenite is also present. Three selected samples assayed 1,562, 756 and 738 gm of Ag per tonne (E.J. Lees, 1936: Geol. Surv. Can., Mem. 203, p. 24). Quartz veins containing argentiferous galena occur on a ridge between the north fork of the Boswell River and the first creek to the west about 24 km above the Teslin. A selected sample of quartz and galena was assayed and found to grade 3.2 kg of silver per tonne with a trace of gold. The veins, which are up to 3 m wide, cut the sedimentary rocks of the Yukon Group (E.J. Lees, 1936: Geol. Surv. Can., Mem. 203, p. 23).

105 F/6 Large massive pyrite-pyrrhotite-galena-sphalerite deposits occur on the Faro property of Anvil Mining Corporation Limited at 61°21.5'N, 133°02'W., in the Rose Creek area of Anvil Range, about 48 km northwest of Ross River (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 43).

105 F/9 Argentian galena has been exposed at several showings held by Silver Key Mines Limited in the Ketza River area. The main showings are: Silver Ridge at an elevation of 1710 m in a steep draw on the west side of the Ketza River valley at 61°34.5'N, 132°13'W.; Galena Vein at an elevation of 1500 m on the south side of Cache Creek at 61°33'N., 132°10'W.; and South Fault Zone at 1280 m elevation in the valley of the upper Ketza River at 61°32.5'N., 132°08'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 64).

105 H/6 Quartz-carbonate veins carrying heavily disseminated to massive argentian galena, sphalerite and pyrite have been explored on the Matt Berry Mines property at 61°27'N., 129°25'W., near the mouth of Thompson Creek on the east side of East Arm, Frances Lake (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 63).

105 K/6 Two base metal deposits were discovered by drilling on the Faro property at 62°21.5'N., 133°22'W. The No. 1 zone contains much pyrrhotite with pyrite, sphalerite, galena and

minor chalcopyrite. The No. 2 zone lacks pyrrhotite (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 50).

105 K/6 A large base metal deposit containing sphalerite, pyrite, pyrrhotite, galena and chalcopyrite has been outlined by drilling on the Vangorda Creek property at 62°15'N., 133°12'W., extending southward from the southwestern base of Mt. Mye to Shrimp Lake (L.H. Green and C.I. Godwin, 1964: Geol. Surv. Can., Paper 64-36, p. 31).

105 M/13
105 M/14 Most of the Yukon's production of lead-zinc-silver has come from the Keno Hill-Galena Hill area. The principal ore minerals are argentiferous galena, tetrahedrite, and sphalerite. Locally important secondary minerals include cerussite and ruby silvers (R.W. Boyle, 1956, 1957: Geol. Surv. Can., Papers 55-30, 57-1).

105 N/9 Argentian galena with minor tetrahedrite in siderite gangue is exposed at a number of showings at about 63°35'N, 132°02'W, in the Bostock Range of the Hess Mountains roughly halfway between the Rogue and Hess Rivers (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 17).

105 O/8 Fine-grained galena and sphalerite are present in barite rich limestone on the Tom property (63°10'N., 130°09'W.) 9.6 km southwest of the Northwest Territory and Yukon boundary at an elevation of about 1500 m in a cirque valley southeast of the South MacMillan River (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 129).

105 P/11 Coarse-grained galena, yellow sphalerite and white dolomite fill open spaces in an array of stratiform deposits that extends for about 24 km from the ICE and EMILY claims of Geomont at 63°40'N, 129°05'W, to the ARN and TEE claims of Bethlehem at 63°44'N, 129°15'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 239).

105 P/14 Galena, sphalerite and pyrite occur as disseminations and fracture fillings in dolomite at the KEG and TAP claims northwest of Godlin Lakes at 63°58'N, 129°13'W; and at the RAIN-SNOW property at 63°58'N, 129°16'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 A/3 At the BEAR-TWIT property of Cominco, located on the Twitya River at 64°02'N, 129°25'W, galena and sphalerite occur with lesser amounts of barite and tetrahedrite in brecciated dolomite (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 D/2 Pipe-like replacement bodies of sulphides, largely galena with lesser amounts of sphalerite and minor pyrite and chalcopyrite occur in limestone on the Clark claims at 64°08'N., 134°57'W. 29 km northeast of Keno, immediately south of Clark Lakes on the gentle north slope of the Davidson Range (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. of Indian Affairs and Northern Development, p. 20).

106 D/3 Foley Silver Mines Limited have explored a silver-lead prospect on Stand to Hill in Davidson Range, about 11 km north of Keno Hill. A quartz-siderite vein system carrying disseminated to massive galena, sphalerite and minor chalcopyrite has been found (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 27).

106 D/3 Siderite veins containing argentian galena, sphalerite, chalcopyrite and quartz crystals are exposed on the Paul group located on a plateau to the northeast of Mount Cameron at 64°05'N, 135°00'W (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 16).

115 A/3 Massive sulphides consisting of argentian galena, sphalerite and minor chalcopyrite with some stibnite and jamesonite are reported on the MOHAWK, SKY and STE claims at 60°07'N, 137°08'W, about 4.8 km due west of Dalton Post at elevations of 950 to 1060 m (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory, p. 140; Dept. Indian and Northern Affairs).

115 I/3 Galena is a constituent of the silver-gold ores at the Webber and Huestis properties of Mount Nansen Mines limited and the property of Brown-McDade Mines Limited in the Nansen Creek - Webber Creek area at latitude 62°03'N., longitude 137°07' to 137°10'W (L.H. Green, 1966; Geol. Surv. Can., Paper 66-31, p. 34).

115 J/10 Lenses of massive galena and sphalerite occur in quartz-barite veins at the Bomber showing at Casino Silver Mines Limited, located on a tributary of Casino Creek at an elevation of about 1,200 m at 62°43'N., 138°49'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 39).

115 N/15 A vein, up to 81 cm wide, containing argentian galena is exposed at the Per group claims on the right limit of Sixty-mile River about 480 m upstream from Miller Creek, at 64°00'N., 140°47'W. It is reached by a secondary road about 17 km long that leaves the main Sixtymile road to the International boundary at km 77 (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 27).

115 N/15 A showing near the head of the west fork of Mosquito Creek, a tributary of Sixtymile River, at an elevation of about 1,280 m is reported to contain massive galena (L.H. Green, 1965: Geol. Surv. Can., Paper 66-31, p. 28).

GALENOBISMUTITE

$PbBi_2S_4$

British Columbia

93 H/4 Galenobismutite occurs in quartz-filled fissures with cosalite and gold at the Cariboo Gold Quartz Mine near Barkerville (H.V. Warren, 1936: Econ. Geol., 31, pp. 205-211).
An analysis of a sample which contained a little cosalite and pyrite was made by E.W. Johnson with the following results: Pb 30.5, Bi 51.0, S 16.4, Fe 1.5, total 99.4 (H.V. Warren and P. Davies 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 107).
Specimens from this locality have been studied by X-ray methods (M.A. Peacock and L.G. Berry, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 56).

New Brunswick

21 G/7 Galenobismutite has been identified as inclusions in polished sections of galena from

Mount Pleasant, Charlotte County (R.S. Boorman, 1968: New Brunswick Res. Prod. Council, Res. Note 11).

21 P/5 Minute inclusions of galenobismutite are reported to occur in chalcopyrite at the Captain deposit located on the headwaters of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland Counties, about 14 km east of Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can. Paper 66-18, p. 11).

Ontario

32 D/4 Galenobismutite is associated with cosalite at the Mondoux claim in McElroy Township (X-ray Laboratory, Geol. Surv. Can.).

41 P/10 Galenobismutite was found in vein 93, 650 level of the Siscoe Mine, Gowganda. It occurs as a veinlet and as crystals up to 1 cm size. Electron microprobe analysis: Pb 26.4, Bi 55.5, S 17.0, total 98.4 (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 218).

Yukon

106 D/4 Galenobismutite has been found surrounding a small nugget of gold from a placer at Dublin Gulch in the Mayo district (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 452).

garnet

(See ALMANDINE, ANDRADITE, GROSSULAR, PYROPE, SPESSARTINE, UVAROVITE)

GASPEITE

$NiCO_3$

Quebec

22 B/16 This new nickel carbonate mineral was found in a vein enclosed in siliceous dolomite on the New Jersey Zinc Exploration Company property in the NW corner of Lemieux Township, Gaspé Nord County, at about 48°51'N., 66°18'W. The name is given to the nickel carbonate end-member and nickel dominant members of possible series with magnesium and iron carbonates. The particular new mineral is a magnesian gaspeite. It occurs as light green rhombohedral crystals up to 1/2 mm in length. Chemical analysis of a concentrate believed to contain a small amount of serpentine: NiO 35.0, MgO 17.3, FeO 5.7, CO_2 42.0, SiO_2 0.9; insol. 1.8, total 102.7 (D.W. Kohls and J.L. Rodda, 1966: Am. Mineralogist, 51, p. 677-683).

gedrite

(See ANTHOPHYLLITE)

GEIKIELITE

$MgTiO_3$

Quebec

31 G/13 Black grains of geikielite have been found in marble in a small area in the western part of the Maxwell quarry, near a syenite contact. The quarry, near Wakefield, has been mined for brucite. Chemical analysis by Hounslow: TiO_2 60.7, MgO 24.4, FeO 8.4, Fe_2O_3 6.2, MnO 0.91, total 100.6; S.G. 4.05 (A.W. Hounslow and G.Y. Chao, 1967: Can. Mineralogist, 9, p. 95-100).

GENTHELVITE

$(Zn,Fe,Mn)_8Be_6Si_6O_{24}S_2$

Quebec

31 H/11 This rare mineral has been identified by X-ray diffraction in specimens taken from feldspar-aegirine veins cutting nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can Mineralogist, 9, p. 109-123).

GEOCRONITE

Pb_5SbAsS_8

Northwest Territories

95 G/3 Small blebs in a quartz vein found on the southwest slope of Nahanni Butte at about 61°04'20"N., 123°24'00"., have been identified as geocronite (X-ray Laboratory, Geol. Surv. Can., specimen from R. Thorpe).

Ontario

31 C/6 Geocronite has been identified in specimens collected from a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed. Taylor of Madoc (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 212).

Yukon

95 E/8 A mineral tentatively identified as geocronite has been found as a very minor constituent in a calcite vein cutting slates near the headwaters of the east branch of the Coal River at approximately 61°25'N, 127°21'W. The mineral is associated with franckeite, stannite, galena, sphalerite, and pyrite (A.M. Evans, 1957: Can. Mineralogist, 6, pp. 119-127).

GERSDORFFITE

NiAsS

British Columbia

82 E/1 Small octahedral crystals of gersdorffite are found in the sulphide ores of mines in the Rossland district (C.W. Drysdale, 1917: Geol. Surv. Can., Mem. 77, p. 76).

82 F/14 Gersdorffite has been reported by W. Thomlinson on Silverton Creek near Slocan where it is associated with quartz and pyrite (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 125).

82 M/1 Cubo-octahedral crystals of gersdorffite are embedded in sphalerite and galena in ore from the Mastodon Mine near Revelstoke. The crystals are about 1/2 millimetre across and give positive microchemical tests for nickel and arsenic but negative for cobalt (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 546).

Manitoba

63 P/12 The ore at the Thompson Mine consists of pyrrhotite and pentlandite with lesser amounts of pyrite, chalcopyrite, marcasite and gersdorffite in biotite schists (Ann. P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 74).

Newfoundland

2 E/13 Tilt Cove Mines, Newfoundland's oldest copper producers are located at Tilt Cove on the northeast shore of Notre Dame Bay. The West Mine also contained nickel ore consisting of maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Northwest Territories

85 J/8 Antimonial gersdorffite has been found on Easter Island near Yellowknife (X-ray Laboratory, Geol. Surv. Can.).

86 E/9 Gersdorffite is reported to occur in veins on the Elite claims. This group is located on the south bank of the Camsell River, opposite the White Eagle Mine and about 16 km south of Conjuror Bay on McTavish Arm of Great Bear Lake. The veins, which are from 12 mm to 30 cm wide, contain a gangue of quartz and buff coloured carbonate and a variety of metallic minerals in addition to the gersdorffite. Among them are chalcopyrite, safflorite-rammelsbergite, galena, native silver, argentite, covellite, and an undetermined bismuth-lead-copper mineral (D.F. Kidd, 1936: Geol. Surv. Can., Mem. 187, p. 34).

86 E/9 Minor amounts of gersdorffite, pararammelsbergite, cobaltite and niccolite occur with matildite, native silver and bismuth, safflorite, skutterudite and rammelsbergite at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay, at latitude 65°36'14"N., longitude 118°06'45'W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 F/13 Gersdorffite occurs with cobaltite, safflorite-löllingite, glaucodot, niccolite, rammelsbergite and breithauptite at the B.E.A.R. deposit on the north shore of Contact Lake about 14 km southeast of Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 759).

86 K/4 Gersdorffite associated with polydymite and glaucodot is reported to be a minor constituent of the complex uranium-silver-cobalt-nickel deposit at the Eldorado Mine, Labine Point (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 36).

Nova Scotia

21 H/1 The Magnet Cove barium-lead-zinc-silver deposit, 4 km southwest of Walton, contains amounts of the mineral gersdorffite. The sulphide-sulphate ore deposit is located in the brecciated zone at the junction of two faults (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104.)

Ontario

31 M/4 Gersdorffite has been identified by X-ray diffraction in a specimen from the Timagami Copper Mine (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 M/4 At the Keeley Mine in the Cobalt district, gersdorffite occurs in the centre of altered crystals with minor amounts of cobaltite, skutterudite, and loellingite. The outer part of the crystal consists of a rim of cobaltite or a mixture of cobaltite and skutterudite, and a thick coating of erythrite (J. Mackintosh Bell and E. Thomson, 1924: Univ. Toronto Stud., Ser., 17, p. 33).

31 M/5 Veins at the Cross Lake property of M.J. O'Brien Ltd., 3.2 km southeast of Cobalt, contain gersdorffite with rammelsbergite, skutterudite, argentite, niccolite, cobaltite, chloanthite, safflorite, smaltite, chalcopyrite, tetrahedrite, arsenopyrtie, sphalerite, galena, pyrite, pyrargyrite, marcasite, silver, and a little breithauptite and dyscrasite (E. Thomson, 1931: Univ. Toronto Stud., Geol. Ser., 30, P. 41) (E. Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 33).

31 M/5 Fine dendritic intergrowths of gersdorffite occur with niccolite, smaltite-chloanthite and a calcite gangue, in a vein at the Silver Bar Mine near Cobalt. The following are the results of an analysis of vein material, by E.W. Todd: Ni 14.35, Co 13.10, Fe 5.82, As 47.35, Sb 0.30, S 16.82, insol. 2.56, total 100.30. S.G. 6.15 (E. Thomson, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 71).

31 M/5 Electron probe microanalyses of gersdorffite in the Cobalt-Gowganda ores: (1) Ni 33.0, Co 2.7, Fe 0.0, As 47.0, S 17.5, total 100.2; (2) Ni 16.7, Co 14.0, Fe 5.6, As 47.9, S 17.2, total 101.4 (W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 175).

41 I/6 Chemical analysis by Johnston of gersdorffite from the Macdonnell or Gersdorffite Mine, lot 12, conc. III, Denison Township: As 46.96, Ni 26.32, Fe 7.90, Co 2.01, Cu 0.10, S 16.71, total 100.00, S.G. 6.23 (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V. p. 22 R). Chemical analysis of gersdorffite from the Crean Hill Mine, Sudbury district: As 44.33, Sb 0.54, Fe 5.71, Cu 4.20, Ni 23.48, S 17.76, insol. 0.44, total 96.46. S.G. 5.96 (E. Thomson, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 35). The National Mineral collection includes specimens of gersdorffite from the Copper Cliff Mine, Sudbury district.

41 I/7 Massive aggregates and isolated crystals of gersdorffite occur in a quartz chlorite schist at the Denison Mine near Worthington station in the Sudbury district. It is associated with niccolite and chalcopyrite, and minor amounts of pyrrhotite, pentlandite, sphalerite, native silver, and tetrahedrite (E. Thomson, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 72).

41 I/10 In the Sudbury ores, the arsenic-bearing minerals, gersdorffite, niccolite and maucherite are most abundant in offset deposits such as the Worthington and Frood and to a lesser extent are present along the marginal parts of normal types of ore deposits of the south range, particularly Garson and Falconbridge. The chemical composition of gersdorffite is variable and it contains considerable cobalt and iron, as shown by the following partial analyses:

Location	Ni	Co	Fe
Falconbridge	15.90	9.55	6.90
Falconbridge	16.80	9.40	6.70
Falconbridge	18.80	7.40	7.35
Falconbridge	21.80	4.90	7.05
Falconbridge	22.54	4.26	6.99
Falconbridge	18.20	7.50	7.25
Garson	21.20	5.60	6.65
Garson	25.60	2.36	6.35
Garson	25.70	1.98	6.65
Garson	22.80	3.85	6.80

Location	Ni	Co	Fe
Garson	26.03	1.38	6.50
Garson	22.30	6.95	5.95
Garson	21.40	7.20	6.68
Frood	27.70	2.50	5.40
Frood	17.06	12.00	4.96
Frood	18.30	9.10	5.60

(J.E. Hawley, 1962: Can. Mineralogist, 7, p. 76).

41 I/16 Indistinct crystals and massive aggregates of gersdorffite are accompanied by millerite and chalcopyrite at the Timagami Mine on Timagami Island in Timagami Lake. It occurs only in small quantities in quartz veins near the periphery of massive chalcopyrite lenses (M.H. Frohberg, 1960: private communication).

Quebec

21 L/9 A small amount of gersdorffite is associated with millerite and fine-grained masses of pyrite, sphalerite and marcasite at the Eastern Metals Mine, 4.8 km from St-Fabien. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 66).

32 D/8 Gersdorffite was reported to occur at the Marbridge Mine, a former nickel producer located about 8 km west of La Motte. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

GIBBSITE

$Al(OH)_3$

Quebec

31 H/11 Gibbsite has been identified from Mont St-Hilaire. (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

GILLESPITE

$BaFeSi_4O_{10}$

Yukon

105 J/16 Gillespite is reported to occur with pellyite, barite, hedenbergite, quartz, andradite, taramellite, sanbornite, chalcopyrite and witherite at a contact metasomatic deposit near the head waters of Ross and Pelly Rivers and about 3.2 km southwest of Gillespite Lakes (J.H. Montgomery, R.M. Thomspon and E.P. Meagher, 1972: Can. Mineralogist, 11, p. 444.

GINORITE

$Ca_2B_{14}O_{23}.8H_2O$

Nova Scotia

21 A/16 Ginorite occurs with mirabilite in seams between anhydrite and gypsum at the Clifton quarry in Hants County, near Windsor (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., IV, p. 31 T). An analysis by How, of ginorite from the above locality is as follows: B_2O_3 59.10, CaO 15.55, Na_2O 5.61, H_2O 19.72, total 99.98 (H. How, 1861: Am. J. Sci., Ser. 2, vol. 32, p. 9).

GISMONDITE

$CaAl_2Si_2O_8.4H_2O$

Nova Scotia

21 H/8 Gismondite is reported to occur at Two Islands in Cumberland County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 105).

GLADITE

$CuPbBi_5S_9$

Manitoba

52 L/6 A mineral previously identified as "aikinite-bismuthinite" intergrowths in a specimen from the Tanco pegmatite, Bernic Lake, has been re-examined and identified as ex-solved blebs of gladite in a pekoite host. Electron microprobe analysis of the gladite phase: Cu 4.1, Pb 13.7, Bi 60.1, Sb 2.6, S 18.3, total 98.8. (D.C. Harris and T.T. Chen, 1976: Can. Mineralogist, 14, p. 194).

GLAUCODOT

(Co,Fe)AsS

British Columbia

93 M/4 Glaucodot, erythrite, cobaltite, uraninite, scheelite and chalcopyrite occur in veins at the Rocher Déboulé Mine at the head of Juniper Creek about 12.8 km northeast of Skeena Crossing. (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 81).

New Brunswick

21 G/7 Glaucodot is reported to be a constituent of the tin ore at Mount Pleasant, Charlotte County (K.F.G. Hosking, 1963: Precambrian, 36, No. 4, p. 20).

Northwest Territories

86 F/13 Glaucodot is one of an assemblage of cobalt-nickel minerals that is found at the B.E.A.R. silver deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine. The assemblage includes cobaltite, safflorite-lollingite, niccolite, gersdorffite, rammelsbergite and breithauptite. (G.M. Furnival, 1939: Econ. Geol., 34, p. 759).

86 K/4 Glaucodot is reported as a minor constituent of the complex uranium-silver-nickel-cobalt deposit at the Eldorado Mine, Labine Point. (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 36).

Ontario

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16

Glaucodot in the Cobalt-Gowganda ores was found alternating with allocalsite in one sample and as outer layers on arsenopyrite in a number of samples. The composition was found by electron microprobe analyses to vary within the following ranges: Co 14.7-24.7, Fe 8.8-18.8, Ni 0-2.3. (W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 179).

GLAUCONITE

near $K_{1.5}\ (Fe^{+++},Mg,Al,Fe^{++})_{4-6}(Si,Al)_8O_{20}(OH)_4$

Glauconite is of frequent occurrence in marine sediments and is generally found to persist over considerable areas. Typical examples include the Mount Whyte, Ellis and Bearpaw formations in Alberta, the Swan River and Ashville formations in Manitoba and Saskatchewan, the Norfolk Formation in southern Ontario and the Lauzon Formation in Quebec.

Quebec

21 L/14
21 L/15

The sandstone of the Lauzon Formation on the island of Orleans, contains glauconite (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept.,

IV, P. 35 T). An analysis by Hunt, of glauconite from the Island of Orleans, is as follows: SiO_2 50.7, Al_2O_3 19.8, FeO 8.6, MgO 3.7, K_2O 8.2, Na_2O 0.5, H_2O (ign.) 8.5 total 100.00 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 487).

GLOCKERITE

$Fe_4^{+++}SO_4(HO)_{10}.H_2O$

Quebec

31 I/1 Glockerite is reported to occur as a canary yellow powder, coating Utica shale along the south bank of the Bécancour River, 4.8 km below Daveluyville (Mrs. J.S. Stevenson, 1960: private communication).

GMELINITE

near $(Na_2,Ca)Al_2Si_4O_{12}.6H_2O$

British Columbia

82 F/4 Gmelinite has been reported to occur in the War Eagle Mine near Rossland (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 21R).

Nova Scotia

21 H/8 Crystals of salmon-red gmelinite suitable for crystallographic measurements occur at Five Islands. Chemical analysis of specimens from Long Island and Pinnacle Island, respectively, are as follows: SiO_2 51.66, Al_2O_3 17.88, CaO 1.42, Na_2O 1.54, K_2O 11.16, H_2O 15.86, total 99.52; S.G. 2.135; SiO_2 50.24, Al_2O_3 17.93, Fe_2O_3 0.37, CaO 0.41, Na_2O 10.08, K_2O 0.69, H_2O 20.38, total 100.10; S.G. 2.045 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 49).

21 H/8 Chemical analysis of gmelinite from Five Islands, by How: SiO_2 50.45, Al_2O_3 18.27, Fe_2O_3 0.17, CaO 1.12, Na_2O 9.79, K_2O 0.20, H_2O 20.71, total 100.71 (A.B. How, 1876: Am. J. Sci., Ser. 3, XII, p. 272).

21 H/8 Chemical analysis of outer shell (I) and nucleus (II) of crystals from Five Islands, by Pirsson: I, SiO_2 50.35, Al_2O_3 18.33, Fe_2O_3 0.26, CaO 1.01, Na_2O 9.76, K_2O 0.15, H_2O 20.33, total 100.09; S.G. 2.037; II, SiO_2 50.67, Al_2O_3 18.50, Fe_2O_3 0.15, CaO 1.05, Na_2O 9.88, K_2O 0.16, H_2O 20.15, total 100.56; S.G. 2.037 (L.V. Pirsson, 1891: Am. J. Sci., Ser. 3, XLII, p. 62).

21 H/8 Calcium rich gmelinite from Cape Blomidon was described in 1834 under the name ledererite. Chemical analysis by Hayes gave: SiO_2 49.47, Al_2O_3 21.48, Fe_2O_3 0.14, CaO 11.48, Na_2O 3.94, H_2O 8.58, P_2O_5 3.48, insol. 0.03, loss on ignition 1.40, total 100.00 (A.A. Hayes, 1834: Am. J. Sci., XXV, p. 80).

21 H/8 Chemical analysis of gmelinite from the same locality, by Marsh: SiO_2 51.32, Al_2O_3 18.45, CaO 6.40, Na_2O+K_2O 3.48, H_2O 20.35, total 100.00; S.G. 2.099 (O.C. Marsh, 1867: Am. J. Sci., 2, XLIV, p. 365).

21 H/8 Chemical analysis of gmelinite from Two Islands: SiO_2 51.36, Al_2O_3 17.81, Fe_2O_3 0.15, CaO 5.68, Na_2O 3.92, K_2O 0.23, H_2O 20.96, total 100.11 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 106).

21 H/8 Gmelinite has been found in amygdaloidal basalts in the Minas Basin - Bay of Fundy area at the Following localities: Cape Blomidon to Cape Split, with apophyllite, heulandite, natrolite, stilbite, chabazite, analcime, laumontite, mesolite, thomsonite, amethyst, jasper, agate, calcite and celadonite; Pinnacle Island, with analcime, chabazite, natrolite, stilbite, heulandite, thomsonite and calcite; Two Islands (The Brothers), with analcime, chabazite, heulandite, natrolite, calcite and agate; Swan's Creek (Swan Brook), with chabazite, analcime, apophyllite, natrolite, heulandite, calcite, stilbite; Wasson's Bluff, with chabazite, stilbite, heulandite, natrolite, analcime, calcite and copper (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10).

Quebec

31 H/11 Gmelinite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

GODLEVSKITE

Ni_7S_6

Ontario

42 A/3 Godlevskite has been found associated with pentlandite, millerite and heazlewoodite in a drill core sample from the Texmont Mine in Bartlett-Geikie Township about 50 km south of Timmins. Electron microprobe analysis by E. Gasparrini: Fe 3.65, Ni 63.56, Co 0.07, S 32.24, total 99.52 (A.J. Naldrett, E. Gasparrini, R. Buchan and J.E. Muir, 1972: Can. Mineralogist, 11, p. 879).

GOETHITE

FeO.OH

Most of the yellow-brown to brown iron oxides usually referred to as limonite properly belong to the species, goethite.

Newfoundland

2 C/4 Red hematite and goethite occur in large lumps up to 90 cm in diameter with stalactitic and colloform structures near Lower Island Cove, southeast corner of the Bonavista map-area (S.E. Jenness, 1963: Geol. Surv. Can., Mem. 327, p. 137).

Nova Scotia

11 E/5 Radiating and concentric structures appear in goethite from the Black Rock area near the mouth of the Shubenacadie River (National Mineral Collection).

11 E/7 Goethite occurs in the iron mines near Bridgeville on the East River, Pictou County (National Mineral Collection).

Ontario

52 B/13 The ore from Steeprock Lake Mine is a hard, brown, compact material consisting of goethite, limonite, hematite, turgite, and quartz. Proportions of each mineral vary widely resulting in a gradation from nearly pure iron oxide to ferruginous chert. Small vugs have been noted in float ore in the district. These occasionally have surfaces encrusted with minute but brilliant crystals of goethite and quartz (F.G. Smith, 1942: Univ. Toronto Stud., Geol. Ser., 47, p. 71).

Quebec

23 J/15 Goethite occurs as an ore mineral in the Sokoman iron-formation at Knob Lake. Associated with it are chert, hematite, magnetite, minnesotaite, and quartz. It is of secondary origin after the magnetite, silicates, and carbonates (R.D. Westervelt, 1957: Can. Inst. Mining Met., Bull. 50, No. 547, pp. 678-688).

31 J/4 Goethite occurs in a small replacement deposit near the east side of Heney Lake in Hincks Township (T.L. Tanton, 1944: Geol. Surv. Can., Paper 44-21, p. 6).

32 I/14 The carbonate-bearing slaty member of the Temiscamie iron-formation east of Conwest Bay, near Lac Albanel, contains goethite as an alteration product (J.M. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 23).

GOLD

Au

Alberta

83 A/6 The alluvium of the Red Deer River contains gold along with several other heavy metals. Development work has been carried out on placer deposits near Ardley, 39 km east of Red Deer (A. MacS. Stalker, 1960: Geol. Surv. Can. Mem. 306, p. 112).

83 G/12 A dredging operation near Peers has recovered gold from the gravels of the McLeod River (H.C. Cooke and W.A. Johnston, 1933: Geol. Surv. Can., Econ. Geol. Ser., 10, p. 69).

83 H Fine gold is associated with the gravels of the North Saskatchewan River and placer mining has been carried on along the stretch from Battleford to the outcrop of the 'Big Coal Seam', 80 km above Edmonton (H.C. Cooke and W.A. Johnston, 1933: Geol. Surv. Can., Econ. Geol. Ser., 10, p. 69).

British Columbia

82 E/1 A number of gold-bearing veins occur on the lower slopes of Red and Monte Cristo Mountains in the Rossland district. Much of the ore mined from the various properties of the area consists of sulphides with high values but little or no visible gold. The native metal however, occurs in the Giant and Jumbo Mines with sulphide minerals, on the O.K. Group as small flakes in quartz, and in the War Eagle Mine with molybdenite and as disseminated specks in quartz (C.W. Drysdale, 1915: Geol. Surv. Can., Mem. 77, pp. 73-74).

82 E/3
82 E/14 Placer gold has been mined from the gravels of Rock and Mission Creeks as well as from buried tertiary stream gravels in their vicinity, in the west half of the Kettle River area (C.E. Cairnes, 1937: Geol. Surv. Can., Paper 37-21, p. 10).

82 E/3 Small amounts of free gold are reported to occur with galena and sphalerite in the quartz vein which comprises the orebody of the Cariboo-Amelia Mine at Camp McKinney in the Kettle River area. Free gold is said to have been found on the Waterloo Consolidated fraction at Camp McKinney while development work was being carried on in the 1890's. According to old reports it occurred in blue quartz but available information is limited (M.S. Hedley, 1940: British Columbia Dept. Mines, Bull. 6, pp. 20, 24).

82 E/5 Free gold and native silver occur with disseminated pyrite and chalcopyrite in silicified volcanic and sedimentary rocks at a deposit about 1.6 km east of the village of Okanagan Falls at 49°21'N, 119°33'W (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1969, p. 294).

82 F/6 Gold values occur in many of the veins in the Ymir district. The greater part of the gold production in the area comes from zones of sulphide mineralization where the metal is present in close association with galena, pyrite, sphalerite, and possibly tellurides. Native gold occurs as flakes and small specks in many of the quartz veins (C.W. Drysdale, 1917: Geol. Surv. Can., Mem. 94, pp. 55-56).
Among the mines of the Ymir area from which free gold has been reported are the following: (1) The Tamarac-King Solomon Group at the south end of Elise Mountain, about 3.2 km north of Ymir. (2) The Fern Mine on the south side of Hall Creek about 10 km north of Ymir; in small weathered veins near the surface. (3) The Gold King Group on the north side of Hall Creek, in a quartz vein. (4) The Euphrates Group about 10 km north of Ymir in oxidized material. (5) The Granite Poorman Mine about 6 km west of Nelson (W.E. Cockfield, 1936: Geol. Surv. Can. Mem. 191).

82 F/8 Veins in the valley of Perry Creek are reported to contain small amounts of gold both in the native form and in close association with sulphides (C.E. Cairnes, 1932: Geol. Surv. Can., Summ. Rept., A II, p. 85).

82 M/9 Native gold and auriferous pyrite occur in quartz veins in the area of the headwaters of Old Camp, McCulloch and Graham Creeks (J.O. Wheeler, 1965: Geol. Surv. Can., Paper 64-32, p. 33).

92 C/13 Black beach sands northwest of Velvelet at Wreck Bay, Vancouver Island, were staked and worked for gold during the first years of the present century. The gold appears to have been derived from the sediments of the Wreck Bay Formation which, upon analysis showed a trace of the metal (M.F. Bancroft, 1937: Geol. Surv. Can., Mem. 204, p. 31).

92 E/9 A sample from the Baltic Group on the south side of Kings Passage, Muchalat Arm, Vancouver Island, ran 238 gm of gold to the tonne and 241 gm of silver to the tonne. About half of the gold occurred in the free state while the remainder was associated with sulphides (M.F. Bancroft, 1937: Geol. Surv. Can., Mem. 204, p. 18).

92 E/15 Gold in the free state occurs in a vein on the Friend property in the canyon of Friend Creek on the western slope of Beano Mountain (J.W. Hoadley, 1953: Geol. Surv. Can., Mem. 272, p. 52)

92 F/2 Excellent specimens of free gold occur in the workings of Vancouver Island Gold Mines Ltd., near the headwater of Mineral Creek, 16 km from Port Alberni (M.F. Bancroft, 1937: Geol. Surv. Can. Mem. 204, p. 28).

92 F/5 Veins near the head of Herbert Arm on the west coast of Vancouver Island contain gold, both native and linked to sulphide minerals. The native metal has been reported from the Big Boy, Mary McQuilton, and Moyeha claim groups. Placer as well as lode gold occurs in the area. The finding of gold in Cotter Creek which flows

into Herbert Arm, led to the discovery and staking of the lode deposits (M.F. Bancroft, 1937: Geol. Surv. Can., Mem. 204, pp. 20-24).

92 F/5 Veins containing free gold, pyrite, sphalerite, galena and chalcopyrite occur on the Musketeer claims at 49°26'N, 125°42'W, 67 km west-northwest of Port Alberni on the south side of Bedwell River between Blaney Creek and Sam Craig Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 175).

92 F/15 Native gold occurs in limestone on the Bolivar claims at 49°46'N, 124°35'W, on Texada Island 800 m due west of the head of Sturt Bay (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 183).

92 H/6 Small but rich pockets of gold occur in a talcose shear zone in serpentine on the Aurum property 1.6 km north of Jessica (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. ser., 15, p. 21).

92 H/6 Quartz veins carrying native gold, pyrite, arsenopyrite, and minor chalcopyrite are present at the Emancipation deposit at 49°30'N, 121°15'W, 16 km northeast of Hope in the Coquihalla Valley, 3.2 km north of Jessica (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 113).

92 H/7 Platinum occurs with placer gold in the gravels of the Tulameen River and its tributaries, Granite, Cedar, Slate and Lawless (Bear) Creeks (Officers of Dept., 1946: British Columbia Dept. Mines, Bull 21, p. 24).

92 H/7 Gold-bearing quartz veins cut the rocks of the Tulameen Group on the eastern side of Grasshopper Mountain, 8 km from Tulameen. Although mineralization is not abundant, pockets of high grade ore have been found (M.S. Hedley and K.DeP. Watson, 1945: British Columbia Dept. Mines, Bull. 20, Pt. III, p. 23).

92 H/7 A quartz vein carrying variable amounts of pyrite, chalcopyrite and native gold is reported at 49°26'N, 120°41'W, 12.8 km west of Princeton and 8 km south of Coalmont (B.C. Dept. of Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1974, p. 116).

92 I/8 Veins bearing gold and silver cut the greenstones at Stump Lake in the Nicola map-area (W.E. Cockfield, 1944: Geol. Surv. Can., Paper 44-20, p. 5).

92 J/15 Scales of gold are present in the quartz of the Coronation Mine near Cadwaller Creek in the Bridge River district (National Mineral Collection).

92 J/15 Free gold occurs with tellurides, pyrite, and arsenopyrite in the mines of the Bridge River district. High values are most abundant in quartz veins which have been fractured or ribboned by post depositional movement. In the Pioneer Mine slickensided native gold is found with sulphides, sericite, white mica, and gouge, as a film between ribbons of quartz which parallel the strikes and inclinations of many of the quartz veins (J.S. Stevenson, 1944: British Columbia Dept. Mines, Bull. 20, Pt. IV, p. 31) (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, pp. 19-20).

92 L/2 Five quartz veins are reported to occur on the White Star property near Spud Creek south of the Zeballos River. Of these, only two produce ore. They contain a little free gold in addition to sulphide minerals. The ore minerals occurring in the veins of the Privateer Mine on Spud Creek near its confluence with Privateer Creek are, in order of deposition, pyrrhotite, arsenopyrite, pyrite, sphalerite, chalcopyrite, galena, and gold.
Native gold occurs at the Van Isle property just south of the Zeballos River at Van Isle Creek.

92 L/2 Specks of free gold are present in the quartz of some of the veins on the Barnacle Group. These claims are located on the mountainside between Lime and Blacks creeks (J.S. Stevenson, 1950: British Columbia Dept. Mines, Bull. 27).

92 L/2 Quartz veins containing sulphides and native gold occur on the King Midas Group on the Zeballos River, 14.4 km from its mouth (J.W. Hoadley, 1953: Geol. Surv. Can., Mem. 272, p. 59).

92 L/2 Native gold occurs in a vein cutting the Zeballos granodiorite batholith on the Gold Peak Group, south of the Zeballos River and about 8 km from its mouth on Esperanza Inlet, Vancouver Island.
A vein of quartz with visible gold occurs on the Tagore property on the bank of the Zeballos 2.4 km from the Tidewater.
The native metal has been found on the Goldfield claim on the summit between Spud and Gold creeks just south of the Gold Peak Group.
Gold occurs in placer deposits on the Zeballos river and its tributary, Spud Creek (M.F. Bancroft, 1937: Geol. Surv. Can., Mem. 204).

92 O/4
92 O/5 Gold has been discovered in the vicinity of Taseko Lake and Taseko River. It occurs in veins which are related to the Coast Range Intrusions (J.S. Stevenson, 1944: British Columbia Dept. Mines, Bull. 20, p. 35).

92 P/2 In the Vidette Lake area, gold is present in a series of quartz veins which cut the massive greenstones of the Nicola series. Although these veins occur over a considerable area they are only of economic importance in the vicinity of the now closed Vidette Mine near the head of the Deadman River (W.E. Cockfield, 1935: Geol. Surv. Can., Mem. 179, p. 29) (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 19).

92 P/4 A specimen of gold in pegmatite found near Clinton, was donated by I. Elwyn to the National Mineral Collection.

92 P/8 Minor amounts of native gold occur in a quartz vein cutting a sill composed of pyroxenite and pegmatite near Dunn Lake in the North Thompson River district. At the Windpass Mine, 11.2 km northeast of Chu Chua, the vein strikes east-west, dips from 35 to 80 degrees north, and is in a quartz diorite host rock. In addition to the gold it contains pyrite, chalcopyrite, pyrrhotite, cobaltite, bismuthinite, gold tellurides, and native bismuth. Towards its eastern end, however, it loses the vein-like character and passes into a series of gold-bearing magnetite lenses (M.S. Hedley and K.DeP. Watson, 1945: British Columbia Dept. Mines, Bull. 20, Pt. III. p. 26) (H.C. Cooke 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 18).

93 A
93 H Both lode and placer gold occur in the Cariboo district. Veins and replacement bodies cutting the sedimentary rocks of the Cariboo series carry good values in free gold along with considerable amounts of pyrite and a little

arsenopyrite, galena, sphalerite, and a lead-bismuth sulphide (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 17). Important deposits of both types are in the vicinity of Wells, Barkerville, and Keithley Creek. The Cariboo Gold Quartz Mine and the neighbouring Island Mountain Mine are probably the most important lode gold producers.
A list of the creeks in the district from which placer gold has been recovered would be extremely long. A few of the more important ones however are Hixon and Government creeks, Lightning Creek and its tributaries, the Willow River and its tributaries, Grouse, Antler, Cunningham, Keithley, Harvey, and Cedar creeks and the Horsefly, Quesnel, and Cottonwood rivers (Officers of Dept., 1946: British Columbia Dept. Mines, Bull. 21, p. 21) also (A.H. Lang, 1936: Geol. Surv. Can., Paper 36-15, p. 13) (N.F.G. Davis, 1937: Geol. Surv. Can., Paper 37-15, p. 2) (G. Hanson, 1935: Geol. Surv. Can., Mem. 181, pp. 19, 22).

93 J/15 Placer gold occurs in the McLeod Lake area near the Parsnip River (E. Bronlund, 1959: Can. Inst. Mining Met., Bull. 52, No. 565, p. 334).

93 L/2 Native gold has been identified as a minor constituent of a Cu-Pb-Ag-Zn ore sample from a prospect near Owen Lake, northwest of the west end of Francois Lake (D.C. Harris and D.R. Owens, 1973: Can. Mineralogist, 11, p. 1016).

93 M/5 A number of the sulphide bodies in the Hazelton area contain gold though not always in the native form. At the Silver Standard Mine on the northwest side of Glen Mountain, free gold is found associated with arsenopyrite in the sulphide-bearing veins. Other vein minerals are galena, sphalerite, freibergite, pyrrhotite, pyrite, chalcopyrite, and jamesonite. Calcite and quartz are both abundant as gangue (F.J. Alcock, 1930: Geol. Surv. Can., Econ. Geol. Ser., 8, p. 281).

93 N/7 Several quartz-carbonate veins, one of which has been observed to contain free gold, occur near the head of the west fork of the Klawli River.

93 N/9
93 N/10 Both recent and pre-glacial placers occur in the Manson Creek area. On this stream and on the Germansen River many nuggets weighing 68 to 100 gm have been found and one from this district is reported to have weighed 821 gm.

93 N/15 Free gold occurs in a vein of milky quartz on the Farrell property which is located on the east side of the Germansen River about 4.8 kg from its mouth. The vein is 60 cm wide and contains copper minerals in addition to the gold (J.E. Armstrong and J.B. Thurber, 1945: Geol. Surv. Can., Paper 45-9, p. 16).

94 D/9 Visible gold has been reported from the Bruce claims which are located 2 km to the southeast of Goldway Peak in the McConnell Creek map-area. The deposit is a quartz vein cutting the Takla greenstones, and granitic rocks related to the Omineca batholith. Galena and pyrite are associated minerals.

94 D/16 Placer gold occurs in the gravels of the McConnell Creek valley. It occurs as small rounded grains and flattened nuggets accompanied by black sand and a little platinum. Values are rather erratically distributed throughout the gravels (C.S. Lord, 1948: Geol. Surv. Can., Mem. 251, p. 56).

94 E/6 Fine-grained native gold, silver and electrum are reported in silicified breccia on the Lawyers claims at 57°18'N, 127°12'W, 9.6 km southwest of Toodoggone Lake at about 1770 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 312).

94 M/9
94 M/10
94 M/11 Placer gold was mined from the bars of the Liard River near the Hudson's Bay Company former trading post at Fort Halkett at the mouth of the Smith River. It was found in gravels as far as 12.8 km below the mouth of the Coal River (Ann P. Sabina, 1973: Geol. Surv. Can. Paper 72-32, p. 21).

103 C/16 The Early Bird property at Mitchell Inlet on the west coast of Moresby Island in the Queen Charlottes, was the site of the first lode gold discovery, in 1852 (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 27).

103 G/4 Finely disseminated gold and stibnite occur in a quartz vein stockwork at 53°03'N, 131°44'W, on the north side of Cumshewa Inlet on the east side of Moresby Island between 150 and 300 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 322).

103 G/5
103 G/12
103 G/13
103 J/4 Gold is present in black sands on the east coast of Graham Island from Lawn Hill to Rose Spit. Other minerals in the beach placers are magnetite, ilmenite, pink garnet, epidote, and zircon (J.D. Mackenzie, 1916: Geol. Surv. Can., Mem. 88, p. 173).

103 H/14 Native gold and silver were found in the upper workings of a bornite-chalcocite deposit about 1.6 km from the shore of Drumlummon Bay, a small cove on the northwest shore of Douglas Channel beside the outlet of Foch Lagoon (J.A. Roddick, 1970: Geol. Surv. Can., Paper 70-41, p. 53).

103 I/8 Free gold has been found in a quartz vein on the Globe claim, 9.6 km southeast of Terrace on the lower slopes of Thornhill Mountain. Specimens on the dump of the Annie Laurie claim on Thornhill Mountain were found to contain sphalerite, galena, pyrite, and native gold. The latter was present in weathered crevices in quartz. A vein at A claim on Thornhill Mountain, contains visible gold where is cuts a quartz diorite dyke on the south side of a small stream on the southwest slope (E.D. Kindle, 1937: Geol. Surv. Can., Mem. 205).

103 I/9 A little free gold has been obtained from the Cordillera Mine located about 1.6 km southwest of Usk at the Base of Kitselas Mountain. Free gold is associated with chalcocite in the Lucky Lake Mine on the east slope of Kitselas Mountain, 2.4 km southwest of Usk. Specks of visible gold occur in a quartz vein cutting andesitic rock in a stream bed on the Nugget Group. The claims are located on the south slope of Kitselas Mountains, 8 km from Vanarsdol station. Gold placers have been worked on Douglas, Lorne, Fiddler, Chimdemash, Kleanza, and Phillips creeks in the Skeena River area near Terrace (E.D. Kindle, 1937: Geol. Surv. Can., Mem. 205).

104 B/1 Quartz veins of several different ages cut the volcanic rocks of the Salmon River district. The youngest of these contained considerable amounts of gold both free and associated with sulphides. Secondary enrichment appears to have been an important factor in the deposition of much of the ore at two important properties, the Silbak-Premier and the Big Missouri. Both of these mines have now shut down (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 14).

104 B/8 Quartz veins containing hematite, pyrite, galena, sphalerite, and free gold occur at 56°20'N, 130°28'W, between Gracey Creek and the south fork of Unuk River opposite Divelbliss Creek between 1200 m and 1340 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 333).

104 J/9
104 J/16 Gold has been obtained from the gravels of Dease, Thibert, Mosquito and Deloire Creeks on the west side of Dease Lake, and on Goldpan and Wheaton Creeks to the east of the lake (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 29).

104 K/12 The ore minerals at the Polaris-Taku Mine on the Taku River, Atlin district, are pyrite, stibnite, arsenopyrite, and native gold. With carbonate, quartz, and fuchsite, they occupy veins which appear to be related to the Coast Range batholith (J.E. Armstrong, 1946: Geol. Surv. Can., Bull. 5, p. 23).

104 M/8 Native gold is the chief ore mineral at the Engineer Mine near the town of Atlin. Tellurides, pyrite, and antimony are also present. The ore occurs in veins in a shear zone near the eastern edge of the Coast Range Batholith to which the deposits, like those of the Polaris-Taku Mine, may be genetically related (J.E. Armstrong, 1946: Geol. Surv. Can., Bull. 5, p. 22).

104 N/11
104 N/12 A few gold-bearing quartz veins occur near Pine Creek in the Atlin area. Mining has been carried on at the Imperial and Lakeview occurrences but the grade of ore is not high. Placer as well as lode mining is carried on in the district. Among the creeks on which gold placers are known to occur are Pine, Otter, Wright, Gold Run, Birch, Dominion, McKee, Spruce, Ruby, and though values are low, the O'Donnell River (J.D. Aitken, 1959: Geol. Surv. Can., Mem. 307, pp. 73-75).

104 O/13 A shear zone containing chalcopyrite, native gold and tellurides is reported at 59°48.6'N, 131°44.5'W, at an elevation of about 1200 m, about 3.2 km east of Swift Lake, 16 km south of Mile 755 (1215 km) on the Alaska Highway (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 559).

104 P/4 Placer gold has been mined on Walker Creek (1887) in the McDame map-area. Other placer gold in the area has been found in McDame Creek, Rosella Creek, Denis Creek and the Dease River (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 112).

104 P/5 Spectacular visible gold occurs with pyrite in quartz veins exposed in greenstone bluffs on the LEGGS 1 claim on the north side of Snowy Creek 2.4 km upstream from its junction with McDame Creek about 14.4 km east of Cassiar. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 35). Free gold has been found in quartz veins with tetrahedrite on the Cornucopia property at 59°16'N, 129°40'W, 9.6 km east of Cassiar immediately northeast of the confluence of Quartzrock and Trout Creeks (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1974, p. 354).

104 P/5
104 P/6 Placer gold was discovered on McDame Creek in 1874 and a nugget weighing more than 2 kg was found in 1877. Most of the mining took place on the north side of the creek near the mouths of its tributaries (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 28).

Manitoba

52 L/11 Smoky and white quartz on the G.X. Group near the west end of Bud Lake carries free gold.

52 L/12 Free gold was discovered in 1924 near Little Bear Lake in the northeast part of township 18, range 14, east of the principal meridian. It occurs in quartz in a shear zone cutting granite. Associated minerals are galena, pyrite, chalcopyrite, and sphalerite.

52 L/13 Pyrite, chalcopyrite, and native gold are present in quartz on the Moose claim in the Gold Lake area. Quartz veins in shear zones on the Mountcalm, Eva and Tine groups southwest of Red Rice Lake are reported to contain small amounts of free gold (J.F. Wright, 1938: Geol. Surv. Can., Mem. 169, pp. 86, 87).

52 L/14 Visible gold occurs commonly with quartz and to a lesser extent with sulphides in the vein material at the Gunnar Mine at Beresford Lake (C.H. Stockwell and C.S. Lord, 1939: Geol. Surv. Can., Mem. 219, p. 33).

52 L/14 Coarse particles of gold are found in the quartz in the Cryderman deposit between Moore and Bennett Lakes. Small stringers of quartz at the Moore Lake Mines property in the same area carry free gold though not in sufficient quantity for development. Native gold is abundant in three small quartz lenses exposed along a narrow, northwest-trending shear zone in granite on the Eldorado claim near Halfway Lake. It has also been discovered on a number of neighbouring mineral properties. These include the Calumet, Orion, Rockland, Ogama and Blenn claims as well as those comprising the holdings of Kingfisher Gold Mines Ltd. The Mirage Group, east of Bidow Lake, is of special interest for the specimens of crystalline gold which have been found there (J.E. Wright, 1938: Geol. Surv. Can., Mem. 169).

52 L/14 A small amount of visible gold has been reported from the Edna claim on the southwest corner of Tinney Lake. It occurs with pyrite in quartz lenses occupying a shear zone which cuts basic volcanic rocks (C.H. Stockwell and C.S. Lord, 1939: Geol. Surv. Can., Mem. 219, p. 38) (J.F. Wright, 1938: Geol. Surv. Can., Mem. 169, p. 63).

52 L/14 Free gold was discovered in 1923 on what later became the property of Oro Grande Mines Ltd., near Beresford lake. Free gold is present also in some of the quartz in a shear zone on the Midway Group, west of Beresford Lake (J.F. Wright, 1938: Geol. Surv. Can., Mem. 169).

52 L/14 Although gold occurs in the free state at the Central Manitoba Mine in the Halfway Lake district, it is rarely if ever coarse enough to be seen even under the hand lens. It appears to be associated with pyrite and chalcopyrite in a grey quartz gangue. Pyrrhotite is also present but contains no gold (C.H. Stockwell and C.S. Lord, 1939: Geol. Surv. Can., Mem. 219, p. 50).

52 M/4 Pyrite, chalcopyrite, arsenopyrite, and free gold are present with chloritic materials in a quartz body on the Clinton Group in the Saxton Lake area (J.F. Wright, 1938: Geol. Surv. Can., Mem. 169, p. 88).

52 M/4 Visible gold is said to occur in and near the shaft in the No. 1 zone of the Rice Lake Mine near the east end of Rice Lake. Free gold in grains large enough to be seen by the unaided

eye is present in the San Antonio Mine on the north shore of Rice Lake, southern Manitoba. Ore from the underground workings in No. 2 vein of the Normandy Gold Mine at the east end of Rice Lake has been reported to contain native gold (C.H. Stockwell, 1938: Geol. Surve. Can., Mem. 210).

52 M/4 A red surface coating appears on some of the native gold from the San Antonio Mine. X-ray powder patterns for red gold and the ordinary yellow variety are identical but spectrographic studies indicate that while the yellow metal contains silver, copper and iron impurities, the red material contains only silver and copper. The coating appears to be a 'natural electroplate' of copper, or copper-gold alloy (R.B. Ferguson, 1950: Am. Mineralogist, 35, p. 459).

52 M/4
62 P/1 Free gold with pyrite, chalcopyrite and carbonate is present in quartz in the Wannipigow Lake area. Development work has been carried out on the 32 claim property of Roderick Gold Mines Ltd., where the quartz occupies shear zones in granitic and schistose rocks (J.F. Wright, 1938: Geol. Surv. Can., Mem. 169, p. 89).

62 P/12 A specimen of gold-bearing quartz from the Red Rose mining claim in northern Manitoba was donated by H.H. Rowatt to the National Mineral Collection.

63 I/6 Gold-bearing quartz veins occur on the east shore of Birch Lake 3.2 km north of Echimanish River. They cut the altered rocks of the Hayes River group in the vicinity of dykes and small intrusive bodies (T.L. Tanton, 1937: Geol. Surv. Can., Paper 37-18, p. 15).

63 J/13 Gold-bearing veins cut the Precambrian rocks of the Wekusko Lake district of northern Manitoba. They are believed to be related to granitic intrusions and usually contain sulphides and tourmaline in addition to the gold. Free gold has been mined from the Rex vein which is located on the east shore of Wekusko Lake. On the Northern Manitoba Group, 2.4 km south of the Rex Group a vein carrying native gold, sulphides and a telluride, probably petzite, cuts an altered lamprophyre dyke. The Kiski-Wekusko group is 1.6 km south of the preceding property. The gold-bearing veins on these claims were the first to be discovered in the area. Visible gold has also been found in a vein in the Syndicate Group, on a peninsula northwest of Campbell Island, Wekusko Lake (F.J. Alcock, 1920: Geol. Surv. Can., Mem. 119, pp. 32-37).

63 K/10 Free gold is present in a number of pits on Fourmile Island in Reed Lake. It occurs as a constituent of milky white quartz veins and stringers in sheared granite (J.M. Harrison, 1949: Geol. Surv. Can., Mem. 250, p. 82).

63 K/11 Coarse gold has been found in a vein cutting sheared greenstones at Copper Lake, headwater of the Grass River (R.C. Wallace, 1919: Can. Mining J., 40, pp. 731-733).

63 K/13 Gold has been reported from the altered gabbro, rhyolite, and greenstones west of Alberta Lake. Gold, some of which is sufficiently coarse to be visible to the unaided eye, occurs in a mineralized zone on the Ruby Group between Ruby and Tartan lakes. The ore zone consists of quartz veins and stringers in an altered schistose tuff mineralized with pyrite, chalcopyrite, and a little pyrrhotite and arsenopyrite. Tourmaline, ankerite, sericite and green mica are gangue minerals (J.D. Bateman, 1945: Geol. Surv. Can., Paper 45-12).

63 K/13 Native gold is reported with the ore at the Schist Lake Mine on the shore of the Northwest Arm of Schist Lake, and at the Flin Flon Mine (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 39, 41).

63 K/15 Veins at the Elbow Lake property on the west shore of Elbow Lake contain pockets of coarse gold from which small high-grading operations have recovered a small amount of ore. Ore at the Century Mine on an island in the northern part of Elbow Lake, occurs in mineralized shears cutting small bodies of quartz-feldspar porphyry which intrude the basic lavas of the area. The minerals present are pyrite, chalcopyrite, and native gold in a gangue of quartz, the most abundant mineral, and carbonate (J.C. McGlynn, 1959: Geol. Surv. Can., Mem. 305, p. 61).

63 K/16 South of Snow Lake, between Gaspard and Anderson lakes, are a number of small gold-bearing quartz veins cutting basic lavas and fragmental rocks. Coarse gold has been exposed in trenches on the G.M. Group near the southwest end of Corley Lake. At least eleven gold occurrences have been found on the property of Koona Lake Mines Ltd., near Snow Lake. Sulphides are commonly present with the gold. Native gold may be seen in polished sections of ore from the Nor-Acme Gold Mine on the northeastern shore of Snow Lake east of the narrows. The gold appears to be closely associated with arsenopyrite, the most abundant metallic mineral in the sections studied. A reef near the west shore of Threehouse Lake is made up of buff-coloured quartz rubble which is sparsely mineralized with pyrite, magnetite, and coarse gold. No outcrop is visible at the occurrence but eight drillholes have been put down. They intersect narrow quartz veins, some of which contain good gold values (J.M. Harrison, 1949: Geol. Surv. Can., Mem. 250).

64 C/14 At the Sherritt Gordon Mine in the McVeigh Lake area, gold occurs in a fractured albitite dyke cutting tuffaceous sediments. Associated minerals are galena, pyrite, and sphalerite (J.D. Bateman, 1945: Geol. Surv. Can., Paper 45-14, p. 30).

New Brunswick

21 G/2 Chalcopyrite, copper, bismuth and gold occur in quartz veins at the Oliver Lode, Letite, Charlotte County (New Brunswick, Mines Br. files).

21 G/6 Quartz veins containing gold in association with arsenopyrite have been noted at Rolling Dam, Charlotte County (L.W. Bailey, 1864: Rept. on Mines and Minerals of New Brunswick).

21 J/4 Native gold occurs in quartz veins at the Cobbler Sexton Mine in Carleton County. It is associated with silver, pyrite, chalcopyrite, sphalerite and galena (R.A.A. Johnston, 1908: Geol. Surv. Can., Summ. Rept., p. 166).

21 J/6 Veins containing pyrite, pyrrhotite, arsenopyrite and gold have been reported at the Gaugus Stream, Northumberland County (E.W. Shaw, 1936: Geol. Surv. Can., Mem. 197).

21 O/1 Gold is found with chalcopyrite in rhyolite at Burchil Camp, Northumberland County (J.R.A. McNutt, 1962: M.Sc. thesis, Univ. New Brunswick).

21 O/2 An occurrence of gold with pyrite in a quartz vein has been reported at Gough, Northumberland County (New Brunswick, Mines Br. files).

21 O/3 Placer gold has been found at Blue Mountain, Victoria County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, Industrial and Educational Publishing Company, Gardenvale, Quebec).

Newfoundland

11 O/9 Native gold occurs with pyrite, bornite, and two unidentified sulphide minerals at the Chetwynd main shaft on the south side of Cinq Cerf Brook, 4 km from its mouth (J.R. Cooper, 1954: Geol. Surv. Can., Mem. 276, p. 53).

12 H/15 Gold-bearing quartz occurs in a talcose schist at White Bay (J.W. McGrath, 1915: Can. Mining J., 36, p. 568).

Northwest Territories

65 D/16 Visible gold is associated with galena, sphalerite, chalcopyrite and fluorite in quartz veins on the COP claims, 11 km east of the north end of Snowbird Lake (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 14).

65 G/6 A showing of visible gold and associated massive sulphides has been examined just northeast of Watterson Lake at 61°21'N., 99°06'W (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 62).

76 B/13 Coarse visible gold with associated tellurbismuth has been found at the number 2 claim of the Ruby group located at 64°55'12"N., 107°39'27"W (D.C. Harris, private communication).

76 D/3 Visible gold occurs in a vein on the property of Salmita Consolidated Gold Mines, Ltd., on the east side of Mathews Lake, District of Mackenzie. Quartz veins containing sulphides, scheelite, tourmaline and visible gold are present on the fifty-four claim property of Bulldog Yellowknife Gold Mines Ltd., at the south end of Mathews Lake.
Gold has been observed in veins at the Kennedy showings about 3.2 km east of Courageous Lake; on the TMK Group in the northern part of the Courageous-Mathews Lake district; near Courageous Lake on the Payne Yellowknife property; and on the Newnorth property in the northern part of the area (J.C.G. Moore, 1956: Geol. Surv. Can., Mem. 283).

76 D/3 Tundra Gold Mines is located a few miles south of Matthews Lake at 64°02'N., 111°11'W., 240 km northeast of Yellowknife. The main vein contains free gold in lenses up to 1 mm wide in white and black banded glassy quartz. Metallic minerals, present in amounts up to 5 per cent are: arsenopyrite, galena, pyrite, pyrrhotite, scheelite and traces of sphalerite and chalcopyrite (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 51).

76 E/11 Mineralized amphibolites in the Contwoyto Lake area contain gold, commonly associated with arsenopyrite, pyrrhotite, and pyrite, lollingite and traces of chalcopyrite. The main showings are on the northwest side of the lake at about 65°45'N., 111°15'W (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 12).

76 M/11
76 M/12 A gold discovery in 1963 in the Coronation Gulf area along the Arctic coast led to the staking of more than 1000 claims by the end of 1964. The claims lie south of a bay locally referred to as Caribou Bay about 19 km southwest of Hepburn Island. The centre of the claim block is at 67°38'N., 111°35'W. Gold values are most commonly associated with pyrite; visible gold is rare (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 16).

76 N/2 Gold showings have been investigated at Turner Lake (67°12'N., 108°45'W.) and on the Hood River near Pistol Lake (67°03'N., 108°47'W.) in the Bathurst Inlet area (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 43).

85 I/11 At the Garskie Gold Mine property on the south shore of Little Sproule Lake, free gold is mined from open pits where it occurs in spectacular amounts in quartz veins (E.A. Schiller and E.H. Hornbrook, 1964: Geol. Surv. Can., Paper 64-11, p. 19).

85 I/14 At the Camlaren Mine, gold is present as a fine powder in white quartz usually closely associated with sulphide minerals. The property is located on the southern tip of an island in Gordon Lake (J.F. Henderson, 1938: Geol. Surv. Can., Paper 38-1, p. 14).

85 J/8 Near Yellowknife on the northern shore of Great Slave Lake, gold is concentrated in a number of shear zones cutting the greenstones and granodiorites of the district. These zones are occupied by systems of quartz veins and lenses, some of which are mineralized in economic quantities.
High gold assays occur in the Kam Point system but no orebody has yet been found.
A similar situation exists for the A.E.S. system which outcrops just north of the Yellowknife townsite.
The Con system contains several ore zones which are highly mineralized with sulphides, sulphosalts, and gold. The Negus-Rycon system may be traced from Negus Point at Rat Lake beneath which it presumably joins the Con system. It is made up of several narrow interlacing shear zones which are mineralized with sulphides, sulphosalts, and gold. The known orebodies have been worked out.
The most extensive and economically important shear zone system in the area is the Giant-Campbell. The metallic minerals include pyrite, arsenopyrite, chalcopyrite, stibnite, sulphosalts, and gold. Ore from this system is mined at the Giant, Con, and Negus mines near Yellowknife.
Gold has been found in the Crestaurum system east of Ryan Lake and although a shaft has been sunk, mining operations were never begun (R.W. Boyle, 1961: Geol. Surv. Can., Mem. 310, pp. 15-30, 58, 59).

85 J/16 Trenches and drill core containing visible gold are reported from the NOSE Group claims located 1.6 km east of the southeast arm of Clan Lake (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 14).

85 N/8 Visible gold was observed in drill core on the IO and CJ groups claims located on the Snare River about 11 km south-west of the lower powerhouse, at 63°21'N., 116°18'W (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 6).

85 O/1 Native gold occurs in irregular quartz bodies in a sill of altered diorite on the Morris Lake property of Viking Yellowknife Gold Mines. Some native gold is present in stringers and

irregular masses of quartz on the Greenlee Mines property north of Morris Lake (L.P. Tremblay, 1952: Geol. Surv. Can., Mem. 266).

85 P/4 Gold is the most important ore mineral at the Discovery Yellowknife Mine near the western shore of Giauque Lake. It is often quite coarse and is believed not to be closely associated with sulphide. Grey and black quartz in veins on the Lasalle Yellownife property, northeast of Narrow Lake, contain gold values (L.P. Tremblay, 1952: Geol. Surv. Can., Mem. 266).

86 B/3 A number of gold occurrences are known in the Ranji Lake area. They consist of black to milky white quartz veins mineralized with sulphides and free gold. The most important property is that of Snowdon Yellowknife Mines Ltd. (L.P. Tremblay, 1948: Geol. Surv. Can., Paper 48-10, p. 5).

86 B/5 Gold has been found in several quartz veins on the MON group of claims staked on behalf of Consolidated Mining and Smelting Company Limited at Discovery Lake 48 km north of Yellowknife. Metallic minerals make up less than 5 per cent of the vein material and include pyrrhotite, arsenopyrite, pyrite, chalcopyrite, galena, sphalerite and a small amount of copper (E.A. Schiller and E.H. Hornbrook, 1964: Geol. Surv. Can., Paper 64-22, p. 29).

86 B/5 Gold-bearing veins have been staked by the HID and MW Groups on a point of ground at the north end of Norris Lake. Sphalerite, galena and silver values are associated (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 9).

86 B/6 Glassy white quartz at the Central Mining Services property in the Chalco Lake area has a gold content averaging 2 to 3 dollars per ton (1947). Visible gold is present in association with pyrite, pyrrhotite, arsenopyrite, and sphalerite.
Visible gold is present in a mottled grey and white variety of quartz on the Arseno No. 1 claim on the isthmus of North Inca Peninsula in Leta Arm, Indin Lake. Free gold has also been reported from the Arseno No. 3 claim located 335 m south of the Arseno No. 1.
Metallic minerals, on the property of North Inca Gold Mines Ltd., at Indin Lake, include pyrite, arsenopyrite, pyrrhotite, and native gold.
Small amounts of gold have been obtained from the Lex Group at Lex Lake.
Gold is reported to have been obtained by panning rusty material associated with quartz veins on the Leta Group at Leta Arm, Indin Lake (M.S. Stanton, 1947: Geol. Surv. Can., Paper 47-18).

Nova Scotia

Gold-bearing veins cut the sedimentary rocks of the Goldenville and Halifax formations which, with a number of granitic intrusive bodies, underlie much of eastern Nova Scotia. Mining in the province began in earnest during the eighteen-sixties with the opening of the Mooseland and Tangier gold districts. The gold occurs both in the native form and in intimate association or combination with sulphides. It has been found at the following localities many of which were actually producing districts at one time (W. Malcolm and E.R. Fairbault, 1929: Geol. Surv. Can., Mem. 156, pp. 56-232).

11 D/10 Gold occurs in the Clam Harbour mining district, near Clam Bay, Halifax County.

11 D/11 Gold has been mined in the Salmon River, Lake Catcha, Lawrencetown, and Cow Bay districts of Halifax County. A vein carrying visible gold and sulphides was found in the city of Halifax between Lockman and Upper Water streets, south of North Street.

11 D/12 Mining for gold has been carried out in the Montague district, 8 km from Dartmouth, Halifax County, and the South Uniake district of Halifax and Hants counties. The metal has been found in prospects near Birch Cove and Prince Lodge.

11 D/13 Specimens of gold-bearing ore from both the Mount Uniake district, Hants County, and the Waverly district, Halifax County are present in the National Mineral Collection. Gold also occurs in the Ardoise district of Hants County.

11 D/14 Gold mining has taken place in the Oldham district of northern Halifax County and native gold has been reported from a prospect on the west side of O'Brien Lake, south of Oldham.

11 D/15 Gold was mined from the Halifax County districts of Tangier, Mooseland, and Moose River. A specimen from the Mooseland area is present in the National Mineral Collection.

11 D/16 The Harrigan cove district in Halifax County was once a gold producing area.

11 E/1 Native gold occurs near Liscomb Mills and Little Liscomb Lake, Guysborough County, and has been mined at Cochrane Hill and Miller Lake in the same county, and in the Fifteen Mile Stream district in eastern Halifax County.

11 E/2 Veins of the Goldville Formation at Beaver Dam in Halifax County are the source of gold production in that district.

11 E/3 Placer gold has been reported from the head of the St. Andrews River and from Gays River in the southwestern part of Colchester County. At Gays River the gold is present in the conglomerate of a fossil placer.

11 E/4 Hants County gold-producing districts include Central Rawdon, Renfrew, and West Gore. At the latter locality free gold is reported to occur with stibnite which was the original ore mineral. Placer gold occurs in the Ninemile and Little Ninemile rivers.

11 F/4 Gold has been found in drift at Gegogan, and mined at the following localities in Guysborough County: Country Harbour, Isaac Harbour, Seal Harbour, Sherbrooke, and Wine Harbour.

11 F/5 Native gold occurs in the Forest Hill mining district, Guysborough County.

11 K/2 Both placer and lode gold occur in the Middle River district of Cape Breton Island.

11 K/10 At Cheticamp, Cape Breton Island, a little gold occurs with sulphides in some of the L'Abime Brook deposits.

21 A/2 Auriferous boulders have been found at Somerset on the Canadian National Railways line south of Italy Cross. Gold was mined at Voglers Cove in Lunenburg County and at Mill Village in southern Queens County.

21 A/4 In Yarmouth County, gold-quartz has been mined in the Kemptville and Carleton Districts.

21 A/6 A gold occurrence has been reported at West Caledonia, and mining has been carried out in the districts of Westfield and Whiteburn in Queens County.

21 A/7 Gold has been found in the Malaga and Brookfield district of Queens County. In Lunenburg County, the mineral was mined in the Leipsigate and Pleasant River districts.

21 A/8 Float containing free gold was discovered at Centry, 4.8 km from Lunenburg. Native gold also occurs at Ovens on the west side of Lunenburg Bay, at Indian Path, and at Blockhouse, all in Lunenburg County.

21 A/9 Lode gold is present in the Gold River district of Lunenburg County.

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20 O/16 Native gold was discovered in 1868 in a vein cutting greenish grey slate at Cranberry Head, about 9.6 km north of Yarmouth. A mine known as the Cream Pot Gold Mine operated until 1902 (F.C. Taylor, 1967: Geol. Surv. Can., Memoir 349, p. 70).

Ontario

31 C/11 Visible gold and arsenopyrite are the ore minerals at the Diamond (or Sophia) Mine in lots 4 and 5, conc. X, of Madoc Township (E.D. Kindle, 1936: Geol. Surv. Can., Mem. 192, p. 114).
A low grade gold occurrence from which native gold has been obtained is the Golden Fleece property on lot 25, conc. VI of Kaladar Township (W.G. Miller, 1901): Ont. Dept. Mines, Ann. Rept., vol. II, p. 201).

31 C/12 The Richardson Mine near the village of Eldorado in Madoc Township is the site of the first gold discovery in Ontario. The gold formed leaves and nuggets in solution cavities along the contact between a chlorite and epidotic gneiss and a bed of siliceous dolomite (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 38). A specimen from this mine is present in the National mineral collection. Rich gold-bearing specimens are reported to have been found at the Bannockburn Mine in Madoc Township. Most of the gold occurring at the Deloro Mine in southeastern Marmora Township, is finely divided throughout arsenopyrite. Some, however, occurs as visible scales and grains in quartz.
Free gold and gold-bearing sulphides comprised the ore at the now abandoned Cordova Mine on lot 20, conc. I, Belmont Township (W.G. Miller, 1901: Ont. Dept. Mines, Ann. Rept. vol. 11).

31 C/12 The mineral collection of the Royal Ontario Museum includes specimens from the Ackerman Mine, lot 6, conc. VIII, and the Gladstone Mine, west half of lot 17, conc. XI, Marmora Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 178).

31 C/15 A specimen in the mineral collection of the Royal Ontario Museum is from the Weber Mine, lot 28, conc. IX, Clarendon Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 178).

31 M/4 Free gold from Bear Lake, southwest of Cobalt, is present in the National Mineral Collection.

31 M/4 A gold-bearing quartz vein mineralized predominantly with pyrite and chalcopyrite occurs on the Strathy Township property of Manitoba and Eastern Mines Ltd. (W.S. Savage, 1935: Ont. Dept. Mines, Ann. Rept., vol. 44, Pt. VII, p. 53).

31 M/5 Specimens of bluish-white quartz containing native gold were found on the mine dumps of the Agaunico Mine on the steep western shore of Lake Timiskaming. The mine is near the Bucke Township park (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 60).

31 M/5
31 M/13 The Royal Ontario Museum mineral collection includes specimens of native gold from: O'Brien Mine on lot 4, conc. VI, Coleman Township; Miller-Independence Mine, south half of lot 1, conc. VI, Pacaud Township; Barry-Hollinger Mine, claim L17930, northwest quarter of north half of lot 3, conc. VI, Pacaud Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, pp. 183-185).

32 D/4 Fine gold is disseminated throughout sulphide and gangue minerals at the Upper Canada Mine in Gauthier Township (J.E. Thomson and A.T. Griffis, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. VIII, pp. 23-25).

32 D/4 Veins on the property of LaFond Gold Mines Ltd., in Skead Township, lot 10, concs. V and VI, contain pyrite, molybdenite, gold and tellurides. A considerable amount of native gold was found in 1919 along the contact between a quartz porphyry and a band of greenish carbonate on the property of Manor Gold Mines, formerly the Manley-O'Reilly claim, lot 6, conc. VI, Skead Township. A stockwork of porphyry and quartz on the Sampson claims, lot 10, conc. VI, Skead Township, contains pyrite, molybdenite, telluride, and free gold (D.F. Hewitt, 1949: Ont. Dept. Mines, Ann. Rept., vol. 58, Pt. VI).

32 D/4 Scattered gold-bearing sulphide bodies replace volcanic and brecciated rocks on the property of Barber-Larder-Gold Mines Ltd., in McGarry Township.
The highest gold values in the Fernland Mine, McVittie Township, are in zones of coarse-grained pyrite. The ore tends to follow bands of tuff and altered volcanic rocks.
Native gold is irregularly distributed throughout the quartz of the Kerr-Addison Mine in McGarry Township. Concentrations occasionally occur along vein margins and in fractures containing green mica.
Visible gold occurs in quartz veins and to a lesser extent in the sulphide zones of the Omega Gold Mine in McGarry Township (J.E. Thomson, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. VII).

32 D/4 Narrow veins carrying chalcopyrite, magnetite, and pyrite comprise the ore at Beaverhouse Lake Gold Mines in Gauthier Township. Visible gold is present in small quantities with these minerals but it makes up only a part of the total production (J.E. Thomson, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. VIII, p. 15).

32 D/4 Pyrite, arsenopyrite, and gold occur on the Costello property at Pancake Lake, 2.4 km north of Larder Village (P.E. Hopkins, 1925: Can. Mining J., 46, pp. 601-604).

32 D/4 The first gold occurrence found in the Boston Creek area was the Kenzie vein which is 1.5 m wide and extends from the property of the R.A.P. Company to that of the Boston Creek Mining Company in Boston Township. Minerals present are gold, pyrite, chalcopyrite, molybdenite, and galena (P.E. Hopkins, 1921: Ont. Dept. Mines,

Ann. Rept., vol. 30, Pt. II, p. 21) (K.D. Lawton, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. IV, p. 25).

32 D/4 Gold deposits represented in the mineral collection of the Royal Ontario Museum include: Mondoux occurrence, claim L5266, southwest part of McElroy Township; Gold King occurrence, claim HF141, north central part of Hearst Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 184).

32 D/5 Visible gold is reported to have been found in a vein on claim L 12,739 in southeastern Garrison Township. The occurrence is on the property of Bambi Mines Ltd. (J. Satterly, 1949: Ont. Dept. Mines, Ann Rept., vol. 58, Pt. IV, p. 17).

32 D/12 The original gold discovery in the Lightning River district consisted of a quartz vein bearing calcite, chlorite, feldspar, pyrite, sphalerite, galena, and visible gold. The vein, which is located in Holloway Township was explored by a 21 m inclined shaft but values were found to decrease at depth (P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. II, p. 29).

32 D/12 The Teddy Bear prospect, a quartz vein well-mineralized with native gold has been explored in the northwest part of Holloway Township 400 m north of Highway 101, 53 km east of Matheson (S.A. Ferguson, H.A. Green and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 77).

41 I/3 The orebodies of the St. Anthony Mine at Sturgeon Lake consist of three gold-bearing quartz lenses cutting the contact between granitic rocks and the Keewatin schists of the area (P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. II, p. 41).

41 I/4 High gold values have been obtained from the quartz vein which is the source of the ore for the Bousquet Mine at the eastern end of Charlton Lake in Curtin Township (H.C. Rickaby, 1935: Ont. Dept. Mines, Ann. Rept., vol. 44, Pt. VI, pp. 60-61).

41 I/4 Arsenopyrite and free gold are the chief metallic constituents of quartz-ankerite veins at Howry Creek, a tributary of the Whitefish river, Curtin Township (1921: Can. Mining J., 42, pp. 226-227).

41 I/6 Native gold is associated with michenerite, froodite and sperrylite at the Vermilion Mine, lot 6, conc. IV, Denison Township. Specimens are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 182).

41 I/7 The National Mineral Collection includes a specimen of free gold from the Mountain Mine and small fragments of gold from the Crystal Mine, in the Wahnapitae district. The Crystal deposit occurs near the contact between Cobalt sediments and the Keweenawan diabase and consists of narrow veins mineralized with pyrite, gold, chalcopyrite, and pyrrhotite (P.E. Hopkins, 1922: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. II, p. 17).

41 I/10 Native gold is found in the Frood Mine, Sudbury. It occurs typically as irregularly shaped, rounded particles, scattered through the sulphides. Average grain size is 0.03 to 0.05 millimetre (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, vol. 7, p. 97).

41 I/16 A specimen of gold with altaite in quartz in the mineral collection of the Royal Ontario Museum is from the New Golden Rose (Afton) Mine on the east side of the northern part of Emerald Lake in Afton Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 181).

41 J/6 Both free and combined gold have been obtained from the Ophir or Havilah Mine, lot 12, conc. III, Galbraith township (Archibald Blue, 1893: Ont. Dept. Mines, Ann. Rept., vol. 3, pp. 37-45).

41 J/8 Quartz veins containing native gold, pyrite, arsenopyrite and chalcopyrite have been exposed on the west shore of Whiskey Lake opposite Beer Point, 24 km northeast of Elliot Lake, Township 137 (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 40).

41 N/15 Gold-bearing veins are distributed throughout much of the Michipicoten region. The following are localities from which gold has been reported. Parkhill Mine, township 29, range 23; Minto Mine, township 29, range 23, at Minto Lake, 3.2 km southeast of Wawa; Darwin Mine, formerly the Grace Mine, 6.4 km southeast of Wawa (E.S. Moore, 1931: Ont. Dept. Mines, Ann. Rept., vol. 40, Pt. IV, pp. 51-54) (E.D. Kindle, 1936: Geol. Surv. Can., Mem. 192, p. 81).

41 N/15 Native gold has been reported at the Deep Lake Mine 4.8 km southeast of Wawa, at Mackey Point on the southeast shore of Wawa Lake, and at the Stanley prospect 4 km east of Wawa, in Township 29, Range 23. Quartz veins containing native gold occur on the Coutu prospect about 43 km south of Wawa in the northeast part of Township 30, Range 19 (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 27-35).

41 O/9 Native gold and sulphides comprise the ore in the complex mineralized zone at the Jerome Mine in Osway Township (W.W. Moorhouse, 1949: Ont. Dept. Mines, Ann. Rept., vol. 58, Pt. V, p. 16). Narrow quartz stringers carrying visible gold occur in the Horwood Lake area (E.D. Kindle, 1936: Geol. Surv. Can., Mem. 192, p. 34).

41 O/15 Native gold from the Kenty Mine in the northeast part of Swayze Township is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 182).

41 P/11 At the Canyon Creek Gold Mines Ltd. holdings in Asquith Township, 1.6 km south of Shiningtree, quartz is reported to be mineralized with pyrite, pyrrhotite, chalcopyrite, galena, sphalerite and a little visible gold (H.C. Laird, 1935: Ont. Dept. Mines, Ann. Rept., vol. 44, Pt. VII, p. 44).

41 P/11 Visible gold is reported to occur at the Wasapika or Ribble property in the West Shiningtree area, MacMurchy and Churchill Townships. Small amounts of silver are sometimes present in the native gold from the West Tree, Saville, Atlas, McIntyre-McDonald and Bennet properties in western MacMurchy township. The gold occurs in fractured quartz with sericite, talc, chlorite, and pyrite. Coarse gold is present in quartz stringers on the Clark claim in northeastern Asquith Township (P.E. Hopkins, 1922: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. II, p. 37).

41 P/11 Coarse native gold was obtained from quartz-carbonate veins containing auriferous pyrite at the Tyranite Mine, a former gold producer.

Access to the mine site is via a rough road 2.8 km long that leads northwest from Highway 560 2.2 km west of the bridge over Duncan Lake. Native gold was also discovered by Matona Gold Mines Limited at a deposit on the east side of Hydro Creek just south of Highway 560 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 81-82).

41 P/15 Quartz stringers cutting the schist at the Matachewan Consolidated Mine in the Matachewan area are often found to contain native gold. Gold often coats pyrite on the Young-Davidson property in Powell and Cairo townships. The pyrite is auriferous but much of the gold is found in the free state (W.S. Dyer, 1935: Ont. Dept. Mines, Rept., vol. 44, Pt. II, p. 33).

41 P/15 Auriferous pyrite and native gold are present at the Davidson and the Mattachewan (formerly Otisse) properties (H.C. Cooke, 1919: Can. Mining J. 40, pp. 519-524).

42 A/1 The principal ore minerals in the mines at Kirkland Lake are gold and gold tellurides. Gold deposits occur in Timiskaming sediments which have been intruded by dioritic and syenitic rocks, then cut by a fault. Along this break, the main gold producers are: Macassa, Teck-Hughes, Kirkland Lake, Sylvanite, Lake Shore, Wright-Hargreaves and Toburn mines in Teck township and the Bidgood Kirkland Mine in Lebel Township (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, pp. 57-58).

42 A/1 A number of other important gold mines are found in the Kirkland Lake district. Among those from which the native metal has been reported are the Kirkland Golden Gate, Kirkland Gateway, Hudson Rand, Baldwin Consolidated, Black, and Amalgamated Kirkland Gold mines (J.E. Thomson, 1948: Ont. Dept. Mines, Ann. Rept., vol. 57, Pt. V).

42 A/1 Native gold and tellurides comprise the ore minerals at the Tough-Oakes Gold Mine near Kirkland Lake. Gold tends to be found in association with molybdenite (R.E. Hose, 1914: Can. Mining J., 35, pp. 259-263)

42 A/1 Prospecting in Maisonville Township revealed the presence of native gold at several small deposits on lots 9 and 10, conc. II, and lots 9 and 12, conc. III (H.L. Lovell, 1971: Ont. Dept. Mines, GR92, p. 26-32).

42 A/2 At the Ashley Mine, fine particles of native gold were associated with pyrite and altaite in fractures in quartz. The mine is a short distance south of Highway 566 just off the road leading to Rahn Lake (Ann P. Sabina, 1974: Geol. Surv. Can. Paper 73-13, p. 106).

42 A/6 Many of the mines in the Porcupine district contain free gold, occasionally in fairly coarse grains. Gold producers in the area are as follows: McIntyre Porcupine, Hollinger Consolidated, Moneta Porcupine, Coniaurum, Paymaster, Dome, Mace(Vipond), and Preston East Dome in Tisdale Township; Delnite, Aunor, Buffalo Ankerite and Faymar in Deloro Township; DeSantis and Naybob in Ogden Township; and Pamour, Broulan, Hayle, and Hallnor in Whitney Township (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 46).

42 A/6 Visible gold is found with pyrite and arsenopyrite at the Orpit prospect 19.3 km southwest of Timmins in the southwestern part of Bristol Township. Wire gold has been reported in quartz-carbonate veinlets on the Jowsey prospect 24 km southwest of Timmins in the southeast part of Carscallen Township. Quartz veins contain visible gold at the Powell prospect, 9.6 km southeast of Timmins in the northeastern part of Deloro Township (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 50, 67).

42 A/7
42 A/10 Quartz veins containing native gold have been mined in the Night Hawk Lake area at the following localities: Night Hawk Peninsula Mine on the shore of a peninsula at the northern end of Night Hawk Lake; Goldhawk Mine on the eastern tip of the south end of the peninsula at the north end of Night Hawk Lake; and at the Gold Island Mine on an adjacent island (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 123-124).

42 A/7
42 A/10 In 1907, two Finnish prospectors, Victor Manson and Harry Benella discovered native gold on a small island (Gold Island) off the eastern tip of the northern peninsula. This was the first bona fide gold discovery in the Porcupine area (E.J. Leahy, 1971: Ont. Dept. Mines, GR 96, p. 41).

42 A/8 Free gold in grains large enough to be seen by the unaided eye has been found at the Vimy Gold Mine, conc. II, lot 10 of Hislop Township (E.S. Moore, 1937: Ont. Dept. Mines, Ann. Rept., vol. 45, Pt. VI, pp. 29-30).

42 A/8 Showings of native gold have been reported at a number of small deposits in Benoit Township on lots 1, 2 and 4, conc. I; lot 9, conc. I; lot 9, conc. II; lots 4 and 5, conc. III; and in Black Township west of Woolings Creek and northwest of Meyers Lake (H.L. Lovell, 1971: Ont. Dept. Mines, GR 92, pp. 16-20, 24).

42 A/8 Rich concentrations of native gold in quartz were found during mining operations at the Bourkes Mine. The deposit is 2.1 km by road east of Highway 11 from a point 8.8 km north of the junction with Highway 570 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 110).

42 A/8 At the Ross Mine, native gold occurs in quartz and quartz-carbonate veins with auriferous pyrite. The mine is located at the community of Holtyre on Highway 572, 8.8 km from Highway 11 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 111).

42 A/9 Native gold with tellurides and sulphides is found near Painkiller Lake where it occurs in a number of small fissure deposits. Gold has been reported from mining properties at the following localities in Beatty Township: lot 9, conc. VI; lot 8, conc. V; lot 11, conc. V; lot 7, conc. VI and lot 9, conc. V (P.E. Hopkins, 1922: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. II, p. 28).

42 A/9 Specimens of coarse, dark yellow gold in white quartz collected at the Croesus Mine from 1914 to 1918 were considered to be the richest gold-bearing quartz specimens in the world. One pocket alone is said to have yielded 71 kg of gold from 344 kg of quartz. An eggshaped nugget measuring 5 cm by 3 cm was found during early mining operations. The deposit may be reached via a trail 2 km long from the left side of Highway 101 East, 16.5 km from Matheson (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 114).

42 A/11 Quartz-carbonate veinlets containing native gold have been exposed on the McIntyre prospect in

the southwest part of Tully Township 30 km northeast of Timmins (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, P. 109).

42 B/13 A system of parallel veins containing visible native gold is reported in Walls Township about 2.4 km south from a point on the Canadian National railway 1.6 km west of Neswabin (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 109).

42 C/2 Two localities in township 28 from which native gold has been reported are the Reid property, claim A.C. 2301, range 24 and the Goudreau Mine on the north side of Murphy Lake, range 26 (E.S. Moore, 1932: Ont. Dept. Mines, Ann. Rept., vol. 40, Pt. IV, pp. 20-25, 41).

42 C/2 Vein quartz containing native gold accompanied by sulphides occurs in Township 28, Range 24, at the Murray-Algoma prospect 3.2 km west of Hawk Junction and the Reed-Booth prospect 9.6 km west of Hawk Junction. Visible gold has also been reported in Township 28, Range 26, at 48°14'N, 84°34'W, at the Banville-Page occurrence (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC13, p. 21,22,42).

42 C/7 A quartz vein with visible gold, known as the McMahon occurrence, is reported at 48°16'N, 84°31'W, in Township 27, Range 26, northwest of Goudreau Station (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC13, p. 42).

42 C/8 Visible gold is reported to occur in a rusty weathering mineralized zone on the property of Bankfield Consolidated Mining Ltd., in the east central part of township 47. Small particles of gold have been found with pyrite and chalcopyrite in quartz veins and lenses on the Camex property on the west side of Dog Lake, Township 47 (E.L. Bruce, 1945: Ont. Dept. Mines, Ann. Rept., vol. 54, Pt. IV, p. 19).

42 C/8 Native gold is reported to occur on the property of the Michael Syndicate, Townships 48 and 49, near Maskinonge Lake, and on the Kremzar claims between Goudreau and Miller lakes in Township 49, range 27 (E.S. Moore, 1932: Ont. Dept. Mines, Ann. Rept., vol. 40, Pt. IV, pp. 26-32).

42 C/8 Occurrences of visible gold are known in Township 48 at 48°18'N, 84°21'W, south of the Cline property, and at the Reid occurrence at 48°17'N, 84°17'W (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 43, 44).

42 D/14 Visible gold has been found in coarse pyrite cubes in quartz-carbonate veins at old gold mines near Schreiber (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 21).

42 E/10 The mineral collection at the Royal Ontario Museum includes a specimen of native gold from the Hard Rock Mine, No. 1 shaft, in the southwest part of Ashmore Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 182).

42 E/11 Free gold, often in particles large enough to be seen by the unaided eye occurs in quartz and sulphides at the Bankfield property at the south end of Magnet Lake, Little Long Lac area (E.L. Bruce, 1935: Ont. Dept. Mines, Ann. Rept., vol. 44, Pt. III, p. 46).

42 E/11
42 E/14 Spectacular samples of free gold are reported to occur in several of the mines of the Little Long Lac area, notably, the MacLeod-Cockshutt, Little Long Lac, Magnet Consolidated, Bankfield Consolidated, Tombill, and Jellico mines (H.S. Armstrong, 1944: Am. Mineralogist, 29, p. 309).

42 E/15

42 E/12 Quartz and carbonate veins containing visible gold, pyrite and chalcopyrite have been worked by Brenbar Mines Limited and Quebec Sturgeon River Mines Limited in the northeastern corner of Irwin Township (W.O. Mackasey, 1975: Ont. Div. Mines, GR 122, p. 44, 60).

42 E/13 Pyrite, sphalerite, arsenopyrite, chalcopyrite, galena, tetrahedrite, and native gold have been identified in polished sections of ore from the Orphan Mine in the eastern Sturgeon river area. Gold has been observed in fractures in pyrite in quartz veins at the Sturgeon River Mine, in the eastern Sturgeon River area; and in quartz on the property of Agoura Explorations Limited (E.L. Bruce, 1936: Ont. Dept. Mines, Ann. Rept., vol. 45, Pt. II).

42 E/13 Thin flakes of visible gold occur in fractures in quartz on the Macjoe Sturgeon property at Macjoe Landing in the western part of the Sturgeon River area. At least five veins on the property of Casey Contact Gold Mines also in the western Sturgeon river area, are reported to carry visible gold (H.C. Laird, 1936: Ont. Dept. Mines, Ann. Rept., vol. 45, Pt. II).

52 A/11 The quartz occupying a shear zone at Lake Head Gold Mines in Gorham Township is mineralized with pyrite, chalcopyrite, and native gold (H.C. Horwood, 1939: Ont. Dept. Mines, Ann. Rept., vol. 48, Pt. III, p. 12).

52 A/12 Quartz lenses carrying native gold occur at the Birch Bay Gold Mine, 58 km west of Port Arthur on the south side of the Trans-Canada Highway (J.E. Thomson, 1935: Ont. Dept. Mines, Ann. Rept., vol. 44, Pt. IV, pp. 49-52).

52 B/10 Native gold was mined in 1882 at the Huronian (Ardeen) Mine in Moss Township. It occurred in quartz veins with chalcopyrite, galena, sphalerite and pyrite. The mine may be reached by road, 28.2 km south from Highway 11, at a point 4 km west of Kashabowie. This was the first gold mine in western Ontario (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 36).

52 B/13 A specimen of native gold from the Harold Lake Mine, claim X219, on the west side of Harold Lake, Baker Township, is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 181).

52 B/14 Gold-bearing quartz veins occur in the Rainy River district at: Hawk Bay, Marmion Lake, 48°54'N, 91°23'W; Sawbill Mine, east shore of Sawbill Bay, Marmion Lake; Sapawe Mine in the southeast part of McCaul Township. Specimens from these localities are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 181).

52 C/10 The mineral collection at the Royal Ontario Museum includes native gold from the Foley (Wiegand) Mine, claim AL75, on the northwest shore of Shoal Lake, Rainy River district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 181).

52 E/8 A gold-bearing vein of white quartz cuts the schists, granites and greenstones of the Lake of the Woods area at the Horseshoe Mine, formerly the Regina Mine, on Whitefish Bay. The best values are said to occur in the part of the vein

which occurs in the granite (J.E. Thomson, 1935: Ont. Dept. Mines, Ann. Rept., vol. 44, Pt. IV, p. 32).

52 E/9 The following deposits in the Bigstone Bay area at the northeast end of Lake of the Woods were worked for native gold at intervals from 1880 to 1930: Sultana Mine and Ophir Mine on Sultana Island in Bald Indian Bay; Pine Portage Mine about 800 m east of the north end of Pine Portage Bay; Keewatin Mine on the south shore of a bay at the north end of Hay Island about 800 m south of Needle Point; Gold Hill Mine about 200 m north of the northeast end of Islet Lake; Black Jack Mine about 365 m northwest of the Gold Hill Mine; Stella Mine, 595 m southwest of Stella Lake; Wendigo Mine between Lac La Belle and the north shore of Witch Bay (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 48).

52 E/10 The fissure vein which is the main orebody at the Mikado Mine, at the south end of Bag Bay, Shoal Lake, is mineralized with pyrite, chalcopyrite, bismuthinite, molybdenite, malachite, native gold, and tetradymite (P.E. Hopkins, 1922: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. II, p. 52). A specimen of quartz containing disseminated gold from this mine is present in the National Mineral collection.

52 E/10 Native gold occurs in association with pyrrhotite on the property of the Duport Mining Co. Ltd., and quartz veins mineralized with pyrite, chalcopyrite, galena, and native gold occur at the Kenrica property, in the Lake of the Woods area (J.E. Thomson, 1936: Ont. Dept. Mines, Ann. Rept., vol. 45, Pt. III, p. 35).

52 E/11 At the Electrum prospect located about 1.2 km southwest of Electrum Lake and north of High Lake in the west-central part of Ewart Township, visible gold is present in a mass of sheared quartz-feldspar porphyry (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC13, p. 143).

52 E/16 Sulphides and native gold occur on the Champion prospect in the southwest part of Haycock Township. The claims are about 800 m south of Island Lake and 800 m east of Breakneck Lake. Free gold has also been found in Jaffray Township at the Princess occurrence, 49°48'N, 94°23'W; and the Royal occurrence, 49°47'N, 94°22'W, in lot 15, conc. VI (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC13, p. 150, 238).

52 F/4 Abundant native gold has been reported in quartz veins on the Mascotte property at 49°14'N, 94°00'W, 1.2 km west of Young's Bay, Kakagi Lake, Phillips Township. Visible gold is also reported at the Wright occurrence at 49°15'N, 93°59'W (S.A. Ferguson, H.A. Groen, and R. Haynes, 1971: Ont. Dept. Mines, MRC13, p. 239).

52 F/5 A rich pocket containing magnificent specimens of free gold is reported to have been mined between 1898 and 1900 at the Lizzie Mine near the shore of Eliza Lake (J.C. Davies, 1973: Ont. Div. Mines, GR 111, p. 40).

52 F/5 Free gold and gold-bearing pyrite occur in a shear zone at the Caswell-Williams prospect on the south shore of Flint Lake, and also north and west of the northwestern extent of Stephen Lake about 8 km north of Kakagi Lake (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 172).

52 F/7 Gold-bearing quartz veins have been worked at Upper Manitou Lake at the Laurentian Mine on Trafalgar Bay. Specimens are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 179).

52 F/9 Native gold was mined at the turn of the century at the Tabor and Sakoose Mines. The properties may be reached by road south of the junction of Highways 17 and 603. There is a fork in the road 4 km from the junction: follow the west fork 4.8 km to the Tabor Mine; follow the east fork 3.2 km to the Sakoose (Van Houten) Mine (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 36).

52 F/10 Native gold occurs with sphalerite, pyrite and galena in quartz veins cutting Keewatin volcanic rocks at the Bonanza, Redeemer and League mines in the vicinity of Twingrass Lakes just west of the west end of Wabigoon Lake and about 8 km south of Dryden (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 43).

52 F/11 Some spectacular specimens of native gold in quartz were obtained from the Baden-Powell, Grace, Eldorado, Golden Eagle and Fournieri Mines, along the southwest shore of Eagle Lake (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 45).

52 F/16 Coarse native gold has been found with pyrite, chalcopyrite, ilmenite, sphalerite, galena, altaite, scheelite and tourmaline at the Newlund Mines property, located 3.2 km by road west of Highway 72 from a point 28.2 km north of Dinorwic (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 38).

52 F/16 Coarse visible gold occurs with pyrite in quartz-filled fractures at the Conecho prospect in the south-central part of Echo Township to the northwest of the Newlund prospect (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 139).

52 G/13 Patches of coarse gold were encountered in quartz stringers at the Central Manitoba Mine on Neepawa Island in the northeastern part of Minnitaki Lake. The deposit is about 800 m east of the west end of the island (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 39).

52 G/14 Native gold occurs along fracture planes in quartz at the Darkwater Mine at the southwest end of Sturgeon Lake, Kenora District (H.C. Horwood, 1937: Ont. Dept. Mines, Ann. Rept., vol. 46, Pt. VI, p. 32).

52 H/9 Two veins, numbers 1 and 2, on the property of Amarada Gold Mines in the Sturgeon River area, have yielded specimens of visible gold. Quartz veins occupying a shear zone at Leitch Gold Mines in the western part of the Sturgeon River area, contain pyrite, tetrahedrite, sphalerite, and native gold, in order of decreasing abundance. Specks of visible gold are reported to be fairly common in quartz at the property of Sand River Gold Mines in Eva Township (H.C. Laird, 1936: Ont. Dept. Mines, Ann. Rept., vol. 45, Pt. II).

52 J/4 Native gold occurs with sulphides in carbonate at the Alcona Mine in the Superior Junction-Sturgeon Lake area (H.C. Horwood, 1937: Ont. Dept. Mines, Ann. Rept., vol. 46, Pt. VI, p. 18).

52 K/13 Gold is associated with pyrite, pyrrhotite, arsenopyrite, chalcopyrite, sphalerite, and

magnetite in the Madsen Red Lake Mine, near Red Lake. The gold at the Howey Mine in Heyson and Dome Townships is usually in a finely divided state but some specimens containing visible gold have been found (H.C. Horwood, 1940: Ont. Dept. Mines, Ann. Rept., vol. 49, Pt. II).

52 M/1 Small grains of gold are present in quartz at Cole Gold Mines Ltd., in Ball Township, near Red Lake. A massive grey quartz vein containing visible gold occurs on the property of the Gold Frontier Mine, Todd Township (northwest part), Red Lake area (H.C. Horwood, 1940: Ont. Dept. Mines, Ann. Rept., vol. 49, Pt. II).

52 M/1 Grey quartz at the West Red Lake Gold Mine contains coarse pyrite crystals, a little chalcopyrite, sphalerite, galena and native gold. The quartz forms a vein which follows the contact between a quartz porphyry and a greenstone. Fractures in quartz veins at the Red Crest Mine, east of the head of Golden Arm, Red Lake, are occupied by pyrite, molybdenite, tellurides, and native gold (M.E. Hurst, 1935: Ont. Dept. Mines, Ann. Rept., vol. 44, Pt. VI, p. 37).

52 N/2 native gold occurs in several deposits in the Uchi Lake-Birch Lake area, east of the Red Lake camp. Most of the deposits are in acid to intermediate composition volcanic rocks. Associated minerals are pyrite, pyrrhotite, chalcopyrite, galena and sphalerite. The minerals occur in quartz veins. Mines include: Hudson-Patricia, Uchi, J-M Consolidated, Sol d'Or, and Argosy (A.M. Goodwin, 1965: Can. Inst. Mining Met., Bull. 635, p. 304).

52 N/2 Gold-bearing quartz veins are present at the Jackson Manion Mine on the south shore of Rowe Lake in the southwest part of Dent Township, and at the Bobjo Mine in the northwest part of Earngey Township (J. Satterly, 1977; Ont. Geol. Surv. MP70, p. 180).

52 N/4 Native gold has been reported from the following mines and mining properties in the Red Lake area. (1) The Hasaga or Red Lake Gold Shore Mine; associated minerals are tetrahedrite, altaite, or pyrite (H.C. Horwood, 1940). (2) The McKenzie-Red Lake Mine; as minute particles (H.C. Horwood, 1940 and M.E. Hurst, 1935). (3) The McMarmac Red Lake Mine in northeastern Dome Township; with either quartz or arsenopyrite (H.C. Horwood, 1940). (4) The Gold Eagle Mine; associated with sphalerite and pyrite (H.C. Horwood, 1940 and M.E. Hurst, 1935). (5) The Cochenour Willans Mine; gold occurs as small grains associated with arsenopyrite (H.C. Horwood, 1940.) (6) The Bounty Consolidated property in the southwest corner of Dome and northwest corner of Heyson Township. Values are high but erratic (H.C. Horwood, 1940).

52 N/4 Quartz stringers containing native gold are reported at the Leemac occurrence at 51°07'N, 93°43'W, Bateman Township. Visible gold has also been found at the Lewis occurrence at 51°02'N, 93°49'W, in Dome Township (S.A. Ferguson, H.A. Groen and R. Haynes, 1971: Ont. Dept. Mines, MRC 13, p. 244).

52 N/9 Quartz containing some native gold and several sulphide minerals occurs at the Argosy Mine in the Cusummit Lake area (H.C. Horwood, 1937: Ont. Dept. Mines, Ann. Rept., vol. 46, Pt. VII, p. 21).

52 P/5 A quartz vein cutting greenstone and iron-formation at the Pickle Crow Mine at Pickle Lake, is mineralized with pyrite, arsenopyrite, some chalcopyrite, and free gold. The pyrite and arsenopyrite are commonly auriferous (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 43).

53 C/12 Auriferous arsenopyrite and native gold were found in rusty weathering chert exposed by trenches on the east side of Gold Hill about 3 km southeast of South Trout Lake (L.D. Ayres, 1974: Ont. Div. Mines, GR 113, p. 135).

53 J/11 Native gold from the Sachigo River Mine, claim PA2352, at Foster Lake is included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 179).

Quebec

21 L/6 A specimen of free gold in dolomite, collected in range XIV, lot 15, Leeds Township, Megantic County, is in the National Mineral Collection.

22 L/7 Gold occurs in the Tertiary gravels of several tributaries of the Chaudiere River. Among these are the Rivière des Plantes, the Famine River, and the Gilbert River. The native metal has also been reported to occur in a quartz-bearing zone of the Beauceville slate in the vicinity of the placers (Carl Tolman, 1936: Geol. Surv. Can., Mem. 199, p. 17).

31 M/6 Several narrow gold-bearing quartz veins have been discovered in the area between Thibault and Guillet lakes, 16 km east of Cobalt (J.F. Henderson, 1936: Geol. Surv. Can., Mem 201, p. 29).

31 M/7 Free gold is present in the ore of the Lake Expanse Mine in Guillet Township. Associated minerals are pyrite, chalcopyrite, pyrrhotite, galena, and sphalerite. The highest values accompany the latter two minerals (P.E. Auger, 1950: Que. Dept. Mines, Prelim. Rept., 245, p. 5).

31 M/7 At the Belleterre Mine, native gold occurred in quartz veins with pyrite, pyrrhotite, sphalerite, galena and chalcopyrite. The mine site is 3.2 km northeast of the village of Belleterre (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 95).

32 B/13 Some of the sulphide-bearing quartz stringers at the Rouleau Mine in Barry and 118 Townships are reported to carry visible gold (R.L. Milner, 1939: Que. Dept. Mines, Prelim. Rept., 143, pp. 6, 7).

32 C/2 Visible gold is scattered throughout quartz stringers at the Norbenite Malartic Mine in Vassan Township, Abitibi County. Thin plates of native gold are reported to occur with clusters of coarse pyrite crystals in the Buffadison Gold Mine, Louvicourt Township. Gold values occur in quartz cutting sheared granodiorite in the Bevcourt Mine, Louvicourt Township (J. Claveau, W.N. Ingham, and W.R. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256, p. 41).

32 C/4 Tellurides and native gold occur in the Lamaque Mine in Bourlamaque. They are found in faults and in altered wall-rocks. Vein material at the Sigma Mine, which adjoins the Lamaque property to the north, consists of quartz, tourmaline, pyrite, chalcopyrite, and native gold (H.C. Cooke, 1946: Geol. Surv. Can. Econ. Geol. Ser., 15, p. 75).

32 C/4 Free gold in close association with pyrite constitutes ore at the Perron Gold Mine in Abitibi-East County (D.J. McDougal, 1951: Que. Dept. Mines, Prelim. Rept., 258, p. 13).

32 C/4 Pockets containing high values in native gold are irregularly dispersed throughout the quartz at the Siscoe Mine on Siscoe Island in Lake de Montigny, Dubuisson Township (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 74).

32 C/4 Two quartz veins at Paramaque Mines Ltd., have yielded high grade gold (J. Claveau, W.N. Ingham and W.G. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256, p. 13).

32 C/4 Free gold is present in the quartz veins of the Sullivan Mine in Dubuisson Township (S.H. Ross, T. Denis, W.N. Asbury, W.W. Langley and P.E. Auger, 1938: Que. Dept. Mines, Prelim. Rept., 120, p. 14).

32 C/4 Small flakes of native gold are reported to occur in sulphide and tourmaline-bearing quartz veins on the Sullivan claims on the eastern shore of Lake De Montigny (H.C. Cooke, W.F. James, and J.B. Mawdsley, 1931: Geol. Surv. Can., Mem. 166, p. 253).

32 C/4 Many occurrences of native gold have been mined in the Val d'Or area. Mines located west of Val d'Or along Highway 59 include: Norbenite Malartic, Marban, Kiena, Elmac, Shawkey and Gale. The Sullivan and Siscoe mines are located along Highway 60 northwest of Val d'Or. Lamaque, Sigma, Aumaque and Manitou-Barvue are along Highway 59 between Val d'Or and Colombière. Rainville, Louvicourt Goldfield and Akasaba are south of Colombière. Cournor, Perron and Beaufor are north of Highway 59 on the road to Pascalis. The Vicour and Bevcon mines are east of Colombière (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, pp. 94-103, 111-122).

32 C/12 A spectacular occurrence of native gold has been reported from the property of Soma-Duverney Mines Ltd., in Duverny Township (W.W. Weber, 1951: Que. Dept. Mines, Prelim. Rept., 255, p. 22).

32 C/12 Spectacular pockets of native gold were encountered during early exploration of the Fontana Mine. The Fontana and adjacent Claverny mines are located 4.8 and 6.4 km east of St-Maurice-de-Dalquier. Native gold was also mined at the Goldvue (Central Duverny) Mine about 4.8 km north of the Claverny Mine (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 83, 84).

32 D/1 Visible gold occurs in a small quartz vein on the property of Angus Mines Ltd., in Cadillac Township (J. Claveau, W.N. Ingham and W.G. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256, p. 18).

32 D/1 Pegmatite veins carrying gold occur in the Canadian Malartic Mine at Malartic. The ore is finely divided native gold associated with pyrite (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, p. 73).

32 D/1
32 D/2
32 D/8 Native gold occurs in spectacular shoots in the quartz veins associated with the Cadillac break. This vertical fault which has been traced through Bousquet, Cadillac, Malartic, and Joannes townships has resulted in the formation of several important orebodies. Among them are the Mic-Mac, Thompson Cadillac, O'Brien, Central Cadillac, Amm, Lapa-Cadillac, and Pan Canadian mines (H.C. Cooke, 1946: Geol. Surv. Can., Econ. Geol. Ser., 15, pp. 71, 72).

32 D/1 Gold-bearing quartz veins were worked at the Bouscadillac Mine on Highway 59 near the intersection of Highway 395. Native gold has also been mined at the West Malartic, Canadian Malartic, East Malartic, Camflo, Malartic Gold Fields and Malartic Hygrade mines in the Malartic area (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 69, 91-95).

32 D/2 Coarse visible gold is quite common in the ore from the Hosco Gold Mine, and coarse pyrite and fine gold occur in a network of quartz veins at Heva Gold Mines, Joannes Township (J. Claveau, W.N. Ingham and W.G. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256, p. 38).

32 D/2 At the McWatters Mine 8 km east of Rouyn along Highway 59, native gold and hessite occupied fractures in quartz, ankerite and arsenopyrite. Native gold occurred with pyrite, chalcopyrite, pyrrhotite and arsenopyrite at the Rouyn-Merger Mine 0.8 km north of Highway 59, 10.3 km east of Rouyn. Fine native gold occurred with pyrite in quartz at the Heva Mine 1.1 km north of Highway 59, 18.3 km east of Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 63-65).

32 D/3 The main vein at Granada-Rouyn Mines, south of Rouyn, consists of parallel stringers of quartz, cutting conglomerate and carrying coarse gold (H.C. Cooke, W.J. James and J.B. Mawdsley, 1931: Geol. Surv. Can., Mem. 166, p. 235).

32 D/3 Gold occurs in a silicified shear zone on the property of the Lake Wasa Mining Corporation in Beauchastel Township. Coarse seams of gold cut quartz and auriferous pyrite at the Bordulac Mine in Dasserat Township (J. Claveau, W.N. Ingham and W.G. Robinson, 1951: Que. Dept. Mines, Prelim Rept. 256).

32 D/3 Veinlets of quartz and calcite mineralized with native gold and gold tellurides cut two dykes of altered quartz porphyry on the north shore of Lake Renauld in Timiskaming County (M.E. Wilson, 1918: Geol. Surv. Can., Mem. 103, p. 149).

32 D/3 Gold and fine pyrite occur together at Arntfield Gold Mines in Beauchastel Township (S.E. Malouf, 1938: Can. Mining J., 59, pp. 427-434).

32 D/3 Visible gold is reported to occur with pyrite in quartz-carbonate shear zones at Wasamac Mines Limited, about 14 km west of Rouyn (R. Cullen, 1965: Can. Mining Jour., 86, No. 6, p. 65).

32 D/6 The minerals comprising the copper-gold ore of the Noranda Mine at Noranda are pyrrhotite, pyrite, chalcopyrite, magnetite and a little sphalerite. Galena, native gold, tetrahedrite, and gold tellurides are present but not abundant (M.E. Wilson, 1941: Geol. Surv. Can., Mem. 229, p. 97).

32 D/6 Gold occurs with pyrite, chalcopyrite, and black tourmaline in quartz veins at the Anglo Rouyn Mine in Rouyn Township. Free gold occupies fine fractures in bluish quartz at Caron Malartic Gold Mines Ltd., in Beauchastel Township (J. Claveau, W.N. Ingham and W.G. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256).

32 D/7 Quartz veins carrying sulphides and free gold comprise the ore at the Donaldson Mine in Rouyn Township (J. Claveau, W.N. Ingham, W.G. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256, p. 56).

32 D/7 Auriferous pyrite and native gold were mined at the Donalda Mine 5.9 km by road northeast of Rouyn. Spectacular concentrations of native gold in white quart were reported at the Mooshla Mine 4.3 km north of Highway 59 along the road to Cléricy (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 59, 66).

32 D/9 Several veins in the New Goldvue Mine in Dalquier Township are mineralized with visible gold. Chalcopyrite, sphalerite, and galena are associated minerals (W.W. Weber, 1951: Que. Dept. Mines, Prelim. Rept., 257, pp. 12, 13).

32 D/9 Argentiferous gold is associated with pyrite, epidote, tourmaline, scheelite, and tellurides at the Dalquier Township property of the Notrac Mining Company (S.H. Ross, T. Denis, W.N. Asbury, W.W. Langley and P.E. Auger, 1938: Que. Dept. Mines, Prelim. Rept., 120, p. 10).

32 D/11 Native gold is associated with fine-grained pyrite and arsenopyrite at the Beatty Mine at Duparquet (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 54).

32 D/13 Free gold is reported to occur with chalcopyrite at the Barry Lake Mining Company property in Barry Township (R.L. Milner, 1939: Que. Dept. Mines, Prelim Rept., 143, p. 8).

32 F/7 Quartz veins cutting the Keewatin rocks at Madeleine Lake, 9.6 km southwest of Lake Waswanipi, are reported to contain gold as fracture fillings and disseminated through fine-grained quartz (G.S. Mackenzie, 1935: Can. Mining J., 56, pp. 324-326).

32 G/4 Native gold occurs in quartz veins occupying a shear zone on the holdings of Macho River Gold Mines Ltd., in Urban Township, Abitibi County (J. Claveau, W. Ingham, and W.G. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256, p. 64).

32 G/9 Gold is present with sulphides in quartz lenses in sheared basalt at the Chibougamau Explorations property in Dauversiere Township (J.E. Gilbert, 1952: Que. Dept. Mines, Prelim. Rept., 267, p. 8).

32 G/9 A little free gold is found distributed throughout the mineralized zone on the Dauversiere Township property of New Mosher Longlac Mines Ltd. (P.E. Imbault, 1951: Que. Dept. Mines, Prelim. Rept., 250, p. 13).

32 G/13 Quartz veins at the La Ronciere Gold Mines property in La Ronciere Township carry pyrite, arsenopyrite, and spectacular free gold (J. Claveau, W.N. Ingham, W.C. Robinson, 1951: Que. Dept. Mines, Prelim. Rept., 256, p. 39).

32 G/16 Promising gold values have been reported from the A, C, and D veins on the Obalski property, Obalski Township, Abitibi-East County (R.B. Graham, 1956: Que. Dept. Mines, Prelim. Rept., 71, p. 33).

32 G/16 A vein of mottled grey quartz on the Noranda property at Bourbeau Lake, near Chibougamau, carries considerable free gold (J.B. Mawdsley and G.W. H. Norman, 1935: Geol. Surv. Can., Mem. 185, p. 65).

Saskatchewan

63 K/12 Grains and veinlets of native gold are reported in greenish grey cherty quartz at the Henning Maloney Mine about 6.9 km south of Creighton (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 24).

63 L/9 Free gold was discovered in the Amisk Lake area in 1913. Subsequent prospecting resulted in the discovery of numerous gold occurrences in the northern Amisk Lake area. The following properties are accessible by boat from Denare Beach: Amisk Syndicate on the west shore of Comeback Bay at the northeast end of Amisk Lake; Lucky Strike, near the end of a peninsula projecting south from the southeastern end of Missi Island; Graham Mine, north of North Channel at the northern tip of Amisk Lake; Prince Albert Mine on the northwest shore of Amisk Lake and on the east side of a peninsula that projects southward to Tarrington Island; Amisk Gold Syndicate on the west side of a narrow peninsula projecting south into the West Channel at the northwest end of Amisk Lake; Beaver Mine on the east shore of a peninsula projecting north from the west side of Missi Island; Hannay Islands in the West Channel immediately south of Tarrington Island; Waverly Island in the West Channel southwest of Tarrington and Hannay Islands; Ace deposit on the southwestern part of Missi Island. (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 28-35).

73 P/7 Visible gold is present in fracture and shear planes in the vein quartz of the Sulphide Lake Belt in the Lac la Ronge district. Located about 14 km south of Hebden lake, the belt has a northeasterly trend (J.B. Mawdsley, 1940: Precambrian, pp. 47-49).

73 P/7 Native gold has been reported at the Eureka deposit on a ridge forming a peninsula at the southern end of Heyer Bay, Mackay Lake. The deposit was first staked for gold in 1938 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 7).

74 K/6 A small amount of native gold has been found in specimens from the D uranium deposit at 58°21'35"N, 109°00'08"W, east of the northern tip of Cluff Lake (V. Ruzicka, 1975: Geol. Surv. Can., Paper 75-1C, p. 279).

74 N/7 Most of the gold at the Box Mine near Goldfields is intimately associated with pyrite. It has been observed with quartz and chlorite in microscopic fractures in the pyrite. Scattered specks of gold are also reported to occur in vein quartz and granite.
Gold occurs at the Frontier Trust property located near a small lake northwest of Frontier Lake, in a sill of fine-grained granite. It is found associated with pyrite or as flakes coating fracture surfaces in the granite (A.M. Christie, 1953: Geol. Surv. Can., Mem. 269, p. 79).

74 N/8 Native gold at the Athona property southeast of Goldfields occurs in quartz veinlets either alone or with sulphides. It is quite coarse and if present at all can be seen by the unaided eye (A.M Christie, 1953: Geol. Surv. Can., Mem. 269, pp. 76, 77).

74 O/7 Quartz veins carrying gold and arsenopyrite cut the garnetiferous sedimentary rocks at Sucker Bay, Lake Athabasca (G.M. Furnival, 1940: Geol. Surv. Can., Paper 40-10, p. 9).

The following occurrences of placer gold have been reported in a series of Geol. Surv. Can., annual Paper Series reports entitled The Mineral Industry of Yukon Territory and Southwestern District of Mackenzie, by
R. Skinner, 1961; Paper 61-23,
R. Skinner, 1962: Paper 62-27,
L.H. Green and C.I. Goodwin, 1963: Paper 63-38,
L.H. Green and C.I. Goodwin, 1964: Paper 64-36,
L.H. Green, 1965: Paper 65-19,
L.H. Green, 1966: Paper 66-31,
D.C. Findlay, 1967: Paper 67-40,
D.C. Findlay, 1969: Paper 68-68

105 M/11 Davidson Creek, at 63°43'N., 135°24'W., by E. Friesen and S. Mosich. Other heavy minerals include: pyrite, magnetite, hematite, ilmenite, barite, garnet, scheelite and zircon. Claim owned by A. Pelland (Discovery claim).
Davidson Creek at 63°42'N., 135°23'W., by J. Waugh, about 1.6 km above the Discovery claim.

105 M/14 Thunder Gulch, a tributary of Lightning Creek, in turn a tributary of Duncan Creek, at 63°54'N., 135°16'W., by S. Mosich and B. Kelly. Heavy minerals include: abundant specularite, jasper, magnetite, pyrite, garnet, galena, cerussite and a trace of scheelite.
Upper Duncan Creek, at 63°53'N., 135°10'W., by D. Heinz.

106 D/4 Haggart Creek between Dublin Gulch and Fifteen Pup at 64°01'N., 135°51'W., by Spruce Creek Placers Limited.
Dublin Gulch at 64°02'N., 135°50'W., by F. Taylor. Associated heavy minerals include: hematite, scheelite, ferberite, arsenopyrite, jamesonite, garnet and cassiterite.
Dublin Gulch at 64°02'N., 135°49'W., by Double S Placers Limited.

115 G/6 Burwash Creek at 61°23'N., 139°15'W., by Burwash Mining Company Limited. The sluicing plant is 9.3 km from the Alaska Highway along the Burwash Creek road.

115 I/3 East fork of Nansen Creek at 62°06'N., 137°12'W., in the Carmacks area. Operated by T. Wheeler.

115 I/6 Revenue and Mechanic Creeks, tributaries of Big Creek about 6.4 and 8 km upstream from the mouth of Seymour Creek at 62°20'N., 137°16'W., by Seymour Placers.

115 O/3 Kirkman Creek at 63°00'W., 139°15'W., by L.M. Ross, and Thistle Creek at 63°04'30"N., 139°18'00"W., by W.E. Edwards. Both creeks are westerly flowing tributaries of the Yukon River. Brewer Creek, a left limit tributary of Stewart River, about 4.8 km downstream from Barker Creek at 63°11'N., 139°00'W., by K. Djukastein.

115 O/10 The Yukon Consolidated Gold Corporation Limited holds most of the placer claims in the Dawson district and is working Dominion and Sulphur creeks, near Granville. Claims leased from Yukon Consolidated on Gold Run Creek at 63°43'N., 138°39'W., have been worked (1963) by J. Lamontagene and E. Schink.
Eureka Placers Yukon Limited holds claims on Eureka Creek at 63°34'N., 138°51'W., about 19 km from Granville along a good access road.
Northern Yukon Services Limited also operates on Eureka Creek at 63°35'N., 138°51'W.

115 O/14 Eldorado Creek at 63°53'N., 139°16'W., Ballarat Mines Limited.
Bonanza Creek (King Solomon Hill, Boulder Creek and Monte Cristo Creek) at 63°57'N., 139°22'W., by A.T. Fry.
Bonanza Creek (Adams Creek and Adams Hill) at 63°56'N., 139°21'W., by H.C. and D.F. Boutillier.
Bonanza Creek (Victoria Gulch) at 63°55'N., 139°12'W., by E. Lesaux and F. Perret, and at 63°54'N., 130°12'30"W., by W. Christianson.
Lower Last Chance Creek, main tributary of lower Hunker Creek at 64°00'N., 139°07'W., by J. and I.C. Bremner.
Hunker Creek (Paradise Hill) at 63°59'N., 139°04'W., by F. and G. Caley.
Quartz Creek: at 63°50'N., 139°02'W., by A. Sundt; at 63°49'N., 139°04'W., by L.M. Fuhr; at 63°47'N., 139°06'W., by Ballarat Mines Limited and by A. Sailer.
Bonanza Creek at 63°59'N., 139°21'30"W., by F. Chudy.
Nugget Hill at 63°59'N., 139°02'W., by J.A. Gould.

115 O/15 Dominion Creek has been worked extensively by Yukon Consolidated Gold Corporation within a few km of the mouth of Jensen Creek (63°46'N., 138°32'W.); by Ballarat Mines Limited at 63°49'N., 138°40'W.; by J.R. Colbourne at 63°48'30"N., 138°36'30"W.; and by I. Norbeck near the mouth of Nevada Creek, at 63°47.8'N., 138°36.2'W.
Hunker Creek at 63°58'N., 138°58'30"W., about 1.2 km below Gold Bottom Creek, and at Temperance Hill, by I. Norbeck.
Hunker Creek near the mouth of Gold Bottom Creek, Whiskey Hill, and Mint Gulch, a tributary of Hunker Creek (63°56'N., 138°53'30"W.) by P. Brady.
Gold Bottom Creek at 63°55'N., 138°59'W., by O. Lunde and at 63°54'N., 138°59'W., by B. Bratsburg.
Caribou Creek, one of the larger right limit tributaries of Upper Dominion Creek, at 63°49'N., 138°49'W., by A. Burgelman.
All Gold Creek about 800 m upstream from the settlement of Flat Creek on the Dawson-Mayo road, at 63°56'00"N., 138°37'30"W., by K. and S. Placers Limited.
D.M. Strachan holds claims along the south side of the Klondike River Valley just west of the settlement of Flat Creek at 63°56'30"N., 138°37'30"W.

115 P/9 Bear Creek at 63°39'30"N., 136°22'00"W., by J.J. Van Bibber.
McLagan Creek, a small creek flowing into Minto Lake at 63°42'N., 136°14'W., by C.J. and H. Klippert.

115 P/14 Clear Creek, below the main fork, at 63°47'N., 137°17'W. by C. Heitman and C. Janus.
Left Clear Creek, about 5.6 km upstream from the junction with Clear Creek, at 63°51'N., 137°18'W., by F. and G. Caley.

115 P/16 Highet Creek at 63°46'N., 136°11'W., by E.C. Bleiler.
Highet Creek at 63°46'N., 136°12'W., a short distance upstream from the mouth of Rudolph Gulch, by F. Erl.
Highet Creek about 3.2 km above the junction of Highet and Bennett Creeks at 63°44'N. 136°07'30"W., by W. and J. Gordon.
Johnson Creek about 400 m below Sabbath Creek at 63°47'N., 136°22'W., by Barduson Placers Limited.

116 B/2 Germaine Creek at 64°03'N., 138°55'W., by A.R. Lindsay and J. Werbiski.

116 B/3 Yukon Consolidated Gold Corporation is working down Hunker Creek, near Last Chance Creek.

Cripple Creek Mining Company is operating on Bonanza Creek Trail Gulch and Cripple Hill, at 64°00'30"N., 139°21'00"W.

116 C/2 Sixtymile River at 64°00'N., 140°47'W., near the Miller Creek fork, by O. and D. Medby and W. Kaufman.
Miller Creek, at 64°00'N., 140°49'W., about 800 m from the mouth, by D. Murphy and J. Simcox.
Glacier Creek at 64°02'N.,140°53'W., by J. Lynch, and at 64°02.2'N., 140°49'W., by M.G. Grenier, E. Foucher and L. Guimard.

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105 D/2 Gold-bearing quartz veins have been found about 11 km south of Carcross on Montana Mountain (R. Skinner, 1961: Geol. Surv. Can., Paper 61-23, p. 38).

105 D/3 Quartz at the Buffalo Hump Group contains galena, free gold, and sylvanite. The property is located on the western side of Mount Stevens in the Wheaton River area (T.A. MacLean, 1914: Can. Dept. Mines, Mines, Mines Br. Publ., 122, pp. 176, 177).

105 D/11
105 E/8 Specimens of gold from the placers of Reddick Creek in the Whitehorse District are included in the National Mineral Collection.
Streams in the Livingstone Creek area, 82 km northeast of Whitehorse, have been worked for placer gold. Among them are St. Germain, May, Mendocina, Cottoneva, Lake, Little Violet and Summit creeks. Livingstone Creek itself has probably been the most productive. Gold valued at over one million dollars is said to have been recovered from its gravels during the period from 1898 to 1920, after which production ceased (H.S. Bostock, 1952: Geol. Surv. Can., Mem. 284, pp. 623-626).

106 D/4 Gold-bearing quartz veins are widely distributed throughout a fissured belt in the schistose rocks of the Dublin Gulch area in the Duncan Creek mining district (T.A. MacLean, 1914: Can. Dept. Mines Br. Publ., 222, pp. 127-158).
Placer gold in addition to lode gold, occurs at Dublin Gulch. A specimen from this area, now in the National Mineral Collection consists of quartz, scheelite, magnetite and gold.

115 A/3
115 A/6 Gold has been recovered from Tatshenshini River and its tributaries Silver and Squaw Creeks; from Beloud, Victoria, Goat and Shorty Creeks; from Bates River and its tributaries Iron and Wolverine Creeks; and from Mush and Shaft Creeks. (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 58).

115 A/6
115 A/11 The ore at the Lone Star Mine on the eastern side of Victoria Gulch, a tributary of Bonanza Creek, consists for the most part of fine free gold in quartz. Some coarse grains and nuggets have however, been taken from the quartz and small values are reported to occur with sulphides. Gold is present in Victoria Gulch both as a constituent of the gravels and in veins which are related to the Lone Star orebody (T.A. MacLean, 1914: Can. Dept. Mines, Mines Br. Publ., 222, pp. 20-37).

115 B/16 Many of the streams flowing from the St. Elias range in the Kluane mining district are known to carry placer gold. Among these are Bullion, Sheep, Burwash, Kimberley, Telluride, Canyon, Canada and Vulcan creeks (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, pp. 123-126).

115 G/1
115 H/4 Auriferous gravels have been mined from the valleys of Ruby and Fourth of July creeks in the Kluane district (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 114).

115 G/8
115 H/3
115 H/4 Among the streams from which placer gold has been mined in the Ruby range, Kluane district, are Dixie, Marshall, and Gladstone (H.S. Bostock, 1957: Geol. Surv. Can. Mem. 284, p. 114).

115 I/6 Patches of visible gold are scattered through limonite on the Augusta claim at Freegold Mountain between Seymour and Stoddard creeks. These two minerals occur in a contact metamorphic magnetite deposit which appears to be associated with intrusions of syenite porphyry. Both Seymour and Stoddard creeks have yielded placer gold (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, pp. 630, 642).

115 I/14 Colours of gold have been found along the Pelly River between the MacMillan River and Hoole Canyon. Their occurrences coincide with those of quartz veins cutting the older metamorphic rocks of the area (J.R. Johnston, 1936: Geol. Surv. Can., Mem. 200, p. 17).

115 J/4 Detrital gold occurs in the matrix of a conglomerate horizon near MacKinnon Creek about 6 km above its confluence with the Indian River. The deposit is believed to have originated as a beach placer possibly in Tertiary time. A number of claims have been staked in the district the most important of which are the Britannia and Thistle (T.A. MacLean, 1914: Can. Dept. Mines, Mines Br. Publ., 222, pp. 62-72).

115 N/15
116 C/2 Placer gold has been found in the gravels of Miller, Glacier, Big Gold, Matson, and Sixty Mile creeks in the Sixty Mile Creek district (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 635).

115 O/1
115 O/2
115 O/3 Scroggie, Barker, Thistle and Kirkman creeks flowing into the Stewart and Yukon rivers have produced placer gold (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, pp. 384-410).

115 O/10 A small showing of free gold has been noted on the Gold Run Group at the head of Gold Run Creek near Portland Gulch (T.A. MacLean, 1914: Can. Dept. Mines, Mines Br. Publ., 222, pp. 83, 84).

115 O/14 Crystalline gold has been found in quartz and fine disseminated gold in schists at the Eldorado Dome property which occupies the area between Bonanza and Eldorado creeks, and Victoria, Oro Grande, and Gay gulches, and adjoins the holdings of the Lone Star Mine. Colours of gold have been panned from quartz at the Virgin claim on Bear Creek (T.A. MacLean, 1914: Can. Dept. Mines, Mines Br. Publ., 222, pp. 38-44).

115 O/10
115 O/14
115 O/15 The most productive gold placers in Canada are situated in the Klondike gold field in the western Yukon. The area is bounded by the Klondike River to the north, the Yukon River to the west, the Indian River to the south, and Dominion and Flat creeks to the east. It comprises about 2000 km^2 upland dissected by many streams, almost all of which are to some extent auriferous. The most important of these however, are the Klondike River with its tributaries: Bear, Humber, and Bonanza creeks; Eldorado Creek, a tributary of Bonanza; the

Indian River, its tributaries Eureka, Quartz, and Dominion creeks; Gold Run and Sulphur creeks which flow into Dominion, and Allgold Creek which empties into Flat Creek (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 65).

115 P/16 Creeks in the Mayo district from which placer gold has been recovered are the Stewart River and Duncan, Haggart, Minto, Highet and Johnson creeks (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, pp. 384-410).

116 B/3 A triangular-shaped gold-bearing area lies between Eldorado Creek, Upper Bonanaza Creek and Victoria Gulch about 16 km south-southeast of Dawson (R. Skinner, 1961: Geol. Surv. Can., Paper 61-23).

GONNARDITE

$Na_2CaAl_4Si_6O_{20}7H\ O$

Quebec

31 G/8 Gonnardite, one of the rarer members of the zeolite family has been identifed by X-ray diffraction in a specimen from the Oka district (X-ray Laboratory, Geol. Surv. Can.).

GÖTZENITE

$(Ca,Na)_7(Ti,Al)_2(Si_4O_{15}(F,OH)_3$

Quebec

31 H/11 Götzenite has been identified in specimens from the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

GRAPHITE

C

Graphite is of common occurrence in metamorphic rocks such as crystalline limestone, gneiss, schists, quartzite, and metamorphosed coal seams. It has also been found in igneous rocks such as granite, basic volcanics, veins and pegmatites.

British Columbia

104 K/11 Samples of high-grade graphite have been found on a ridge top, 1.6 km northwest of Mount Lester Jones, in the Taku River district (F.A. Kerr, 1948: Geol. Surv. Can., Mem. 248, p. 73).

New Brunswick

21 G/1 Graphite is found at Saint John, Pisarinco Peninsula, Lorneville, Musquash, and Clear Lake, all in Saint John County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, 1st ed., Industrial and Educational Publ. Co., Gardenville, Que.).

21 G/6 Amorphous graphite is found at Dumbarton Station in Charlotte County (H.S. Spence, 1920: Can. Dept. Mines, Mines Br. Publ., 511).

21 G/8 Graphite associated with limestone can be found at Saint John in Saint John County (W.L. Goodwin, 1928).

21 H/5 Graphite in bands up to 1 m thick interbedded in limestone occurs on Golden Grove Mountain in Saint John County (W.J. Wright, 1942: New Brunswick, Mines Br., files).

21 H/11 Graphite occurs at Goose River in Saint John County (H.S. Spence, 1920).

21 H/14 Graphite occurs in the form of graphitic schists at Thorne Brook in Kings County (W.L. Goodwin, 1928).

21 H/15 Graphite occurs at Dorchester in Westmorland County (H.S. Spence, 1920).

Newfoundland

14 C/12 Graphitic gneisses occur on the northern coast of Labrador between Grenville Sound and Port Manvers. Graphite has been found in sheared rocks at Machvah Fiord (A.M. Christie, 1952: Geol. Surv. Can., Paper 52-22, p. 14).

14 L/7 Fine crystalline graphite of high purity occurs in seams and lenses varying in thickness from 2.5 to 25 cm at Saglek Bay, Labrador (G.V. Douglas, 1953: Geol. Surv. Can., Paper 53-1, p. 49).

25 A/7 A specimen of foliated graphite from Cape Chidley, Labrador, was contributed by A.P. Low to the National Mineral collection in 1902.

Northwest Territories

25 K/13 Garnet, mica, and graphite have been mined from a deposit near Lake Harbour on the south coast of Baffin Island (R.B. Blackadar, 1960: Can. Mining J., 81, No. 4, p. 110.

26 G A small amount of graphite was mined prior to World War I from a deposit in the vicinity of Cumberland Sound on Baffin Island (R.B. Blackadar, 1960: Can. Mining J., 81, 4, p. 110).

Ontario

31 C/9 Silicated crystalline limestone at the Timmins mine contains graphite as disseminated flakes in association with small amounts of tourmaline, titanite and pyroxene. The mine is located about 68 km north of Kingston and about 270 m west of the Kingston-Westport-Perth road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 C/10 Tabular grains and foliated patches of graphite are common in crystalline limestone in road-cuts along the Westport Road at about 17 km east of Highway 38. Also present in the crystalline limestone are serpentine, pyrite and minor amounts of titanite. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 17).

31 C/16 The mineral occurs as disseminations in white crystalline limestone at the Globe Graphite Mine which was the first graphite mine in Ontario. Also found here are dark brown wedge-shaped crystals of titanite in a quartz-feldspar matrix, along with brownish-orange tourmaline grains in limestone. The deposit is on the property of Mr. James Coutts, north of Rideau Lake about 6.4 km southeast of Perth (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 38).

31 E/1
31 F/4 Specimens of graphite from the following uranium deposits in the Haliburton-Bancroft area are in the mineral collection at the Royal Ontario Museum: Cardiff Uranium Mines, lot A, conc. XVII, Cardiff Township; Virginia Mine, lots 34 and 35, conc. XVI, Monmouth Township; lot 29, conc. XIII, Dungannon Township; Tonkin-Dupont Mine, lot 23, conc. XIII, Monteagle Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 186).

31 E/4 A specimen of graphite in the Royal Ontario Museum mineral collection was collected along Highway 660, 8 km west of Torrance in Wood Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 186).

31 F/1 Graphite from a deposit in conc. VII, lot 21, of North Elmsley Township, Lanark County, was donated by M.E. Wilson to the National Mineral Collection in 1916.

31 F/2 At the Black Donald Mine, lot 18, conc. III, Brougham Township, a bed of graphite from 3 to 9 m thick was mined from 1895 to 1954. The bed was in the form of a northeasterly plunging syncline, and had an average graphite content of about 60 per cent (C.H. Stockwell, 1957: Geol. Surv. Can., Econ. Geol. Ser., 1, p. 120).

32 D/4 Graphite is associated with disseminated magnetite in cherty quartzite at the Adams Mine in Boston Township. The mine is 10.3 km east of Dane on Highway 650. Graphite has been reported as a constituent of gold deposits in the Kirkland Lake-Larder Lake area at the Wright-Hargreaves, Upper Canada, Kirkland Lake, Teck-Hughes and Omega mines (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 8, 16, 18, 23, 29, 33).

41 I/2 Flakes of graphite averaging 3 mm in diameter occur in bands parallel to the foliation in rocks found on lot 10, concs. I and II, Bigwood Township, French River area (R.H. Pegrum, 1925: Geol. Surv. Can., Unpubl. file, No. 21, p. 1).

Quebec

31 F/15 Small hexagonal crystals of graphite found in the Coulonge River near Fort Coulonge were donated by E. Davis to the National Mineral Collection.

31 F/16 Graphite from Low Township, Gatineau County, was donated by H. Spence in 1923, to the National Mineral Collection.

31 G/10 Large foliated masses of graphite have been found in Grenville Township, range II, lot 3. a sample from this locality was contributed to the National Mineral Collection by R. Bell in 1856.

31 G/10 Massive graphite is associated with coarsely-crystalline wollastonite, green diopside, feldspar, quartz and calcite at the Miller (Keystone) Mine, about 4.8 km north of Grenville Bay. This deposit, first worked in about 1845 was the first graphite mine opened in Canada (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, P. 75).

31 G/11 A graphite specimen from the Walker property in Buckingham Township was donated to the National Mineral Collection by C.W. Willimott. Graphite occurs in Lochaber Township, Papineau County. A specimen from this area is present in the National Mineral Collection.

31 G/11 Flakes and foliated aggregates of graphite occur in gabbro and in crystalline limestone at the Dominion Mine near Buckingham (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 7).

31 G/11 Flake graphite with pyrite, granular masses of garnet, titanite, black amphibole, and pyrrhotite occurs in feldspar gneiss at the Peerless (Diamond) Mine near Buckingham. Crystalline limestone encloses foliated, flakey and nodular graphite and the flaky aggregates form layers about 12 mm thick (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 17).

31 G/12 Columnar graphite has been found in lot 28, range V of Buckingham Township. H.G. Vennor contributed a specimen from the locality to the National Mineral Collection in 1877. Also present in the collection is a specimen found near Tenaga in Hull Township.

31 G/16 Graphite occurs in pegmatites and skarn zones in Wentworth Township, Argenteuil County, about 16 km north of Lachute. The graphite is columnar in the pegmatite dykes and in flake and massive forms in the skarn zones (G.W. Bain, 1929: Econ. Geol., 24, pp. 733-752).

31 J/4 Graphite occurs as columnar and flaky masses in gneiss and limestone at the Canastota Mine near Notre-Dame-du-Laus (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 50).

31 J/7 At the Castor Lake (Clot) Mine, graphite occurs as columnar, foliated and nodular masses measuring several cm across (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 63).

31 J/11 A foliated mass of graphite, found near Mont Laurier, has been donated to the National Mineral Collection by T. Laderoute.

31 L/10 Small flakes and aggregates of graphite are common at the Narco kyanite mine at 46°36'N, 78°59'W, about 4.8 km south southeast of Beauchêne and 19.3 km from Temiskaming (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 82).

Saskatchewan

74 P/4 Flakes of graphite are found disseminated throughout the sedimentary rocks of the Stony Rapids area at the western end of Lake Athabasca (G.M. Furnival, 1940: Geol. Surv. Can., Paper 40-10).

GREENALITE

$$(Fe^{++}, Fe^{+++})_{2-3}Si_2O_5(OH)_4$$

Greenalite is a ferrous iron silicate, possibly isomorphous with serpentine. It is an important constituent of iron ores of the Lake Superior type (J.W. Gruner, 1936: Am. Mineralogist, 21, p. 449).

Quebec

32 I/14 Greenalite has been identified in an iron-silicate slate at Trout Point in the Albanel area (J.N. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 23).

GREENOCKITE

$$CdS$$

Quebec

31 J/4 Powdery coatings of lemon yellow greenockite occur in cracks in a vein of sphalerite on lot 36, range II, of Northfield Township in the Trente-et-Un-Mille Lake area (E. Aubert de la Rue, 1956: Que. Dept. Mines, Geol. Rept., 67, p. 22).

GROSSULAR

$$Ca_3Al_2(SiO_4)_3$$

Grossular, the calcium-aluminium garnet, occurs in a variety of colours including white, colourless, pale green, amber, yellow, cinnamon

brown, red, and in rare instances, emerald green. The calcium and aluminium may be replaced by ferrous and ferric iron respectively. This results in a compositional gradation into almandine, the iron-aluminium garnet, and andradite, the calcium garnet. The names hessonite and cinnamon stone have been applied to varieties of grossular.

British Columbia

92 F/10 large buff-coloured masses of grossular occur in the host rocks away from the ore zones at the Marble Bay Mine on Texada Island. Chemical analysis of grossular: SiO_2 38.40, TiO_2 0.58, Al_2O_3 17.53, Fe_2O_3 4.74, FeO 1.08, MgO 1.62, CaO 34.06, MnO 1.23, Na_2O 0.01, K_2O 0.42, H_2O 0.53, P_2O_5 0.19, total 100.41; S.G. 3.62. Crystals of andradite garnet are commonly found within the ore zone (T.L. Walker, 1930: Univ. Toronto Stud., Geol. Ser., 29, p. 7).

Ontario

31 F/4 Crystals of hessonite occur in considerable numbers embedded in bluish calcite and cancrinite, north of an occurrence of sodalite near Bancroft in Dungannon Township. Chemical analysis by H.C. Rickaby: SiO_2 38.78, TiO_2 0.31, Al_2O_3 20.98, Fe_2O_3 2.94, FeO 1.33, CaO 33.84, MgO 0.62, MnO 0.62, Na_2O 0.40, K_2O 0.34, H_2O 0.20, total 99.74; S.G. 3.596 (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 10).

31 F/4 Orange and brown grossular occurs in the York River tactite zone, a cliff-side exposure on the east side of the York River, 320 m north of Highway 500 at a point 11 km east of Bancroft. (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

Quebec

21 E/13 Crystals of hessonite, the orange-coloured variety of grossular, of exceptional quality occur at the Jeffrey Mine, lots 9-10, ranges II-III, Shipton Township, Richmond County, at 45°46'25"N, 71°57'12"W. White, pink and green grossulars are also present. Electron microprobe analyses: (1) orange grossular, SiO_2 39.29, TiO_2 0.05, Al_2O_3 22.17, Cr_2O_3 0.01, FeO 1.85, MnO 0.57, CaO 36.84, total 100.78; (2) light green grossular, SiO_2 39.25, TiO_2 0.25, Al_2O_3 21.70, Cr_2O_3 0.22, FeO 2.02, MnO 0.43, CaO 36.81, total 100.68; (3) green core of grossular, SiO_2 37.80, TiO_2 1.20, Al_2O_3 17.04, Cr_2O_3 6.97, FeO 0.94, MnO 0.77, MgO 0.03, CaO 35.88, Na_2O 0.01, total 100.64; (4) colourless rim, SiO_2 39.49, TiO_2 0.06, Al_2O_3 21.69, Cr_2O_3 0.00, FeO 0.47, MnO 0.31, CaO 37.74, total 99.76. (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

21 L/3 Grossular has been identified at the following localities in the Black Lake area, Coleraine Township: Hall Chrome pit, Thetford quarry, range A, lot 16; Union pit, block B, lots 27, 28; Southwark pit, block B, lot 28; American Chrome pit, range IV, lot 25; Caribou pit, block A; and Black Lake Chrome and Asbestos pit, block A. Chemical analysis by Graham of colourless grossular from the Southwark pit: SiO_2 39.49, Al_2O_3 22.35, FeO 1.00, CaO 36.62, MgO 0.28, MnO 0.15, total 99.89; S.G. 3.60 (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Musuem Bull., 27, p. 57).

31 F/10 Light blue massive translucent grossular occurs with diopside and brucite in crystalline limestone exposed along a short side road opposite the Carswell quarry leading west from the southernmost turn-off to Bryson from Highway 8. (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 100).

31 F/15 An analysis by Wait of grossular from range I, lot 12 of Litchfield Township is as follows; SiO_2 36.80, Al_2O_3 20.53, Fe_2O_3 2.38, FeO 0.56, MnO 0.50, CaO 37.41, MgO 1.51, H_2O 0.07, total 99.76: S.G. 3.623 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 16R).

31 G/12 Large brownish yellow crystals of grossular from range I, lot 7 of Wakefield Township are represented in the National Mineral Collection. An analysis by Bullman of grossular from this locality is as follows: SiO_2 38.80, Al_2O_3 22.66, Fe_2O_3 1.75, MnO 0.30, CaO 35.00, MgO 0.68, total 99.19; S.G. 3.525 (G.F. Kunz, 1884: Am. J. Sci., Ser., 3, vol. 27, p. 306).

31 H/8 Grossular from lot 16, range 16, Orford Township, Sherbrooke County was analyzed by Hunt with the following results: SiO_2 38.60, Al_2O_3 22.71, Fe_2O_3+MnO 1.60, CaO 34.83, MgO 0.49, H_2O 1.10, Na_2O+K_2O 0.47, total 99.80; S.G. 3.52-3.53 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 496).

Yukon

105 D/11 The following is an analysis by Johnston, of grossular from a locality in the Whitehorse copper belt: SiO_2 38.94, Al_2O_3 15.11, Fe_2O_3 6.30, MnO 0.78, CaO 36.93, MgO 1.62, H_2O 0.35, total 100.03; S.G. 3.603 (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 14R).

GROUTITE

$HMnO_2$

Nova Scotia

21 H/1 Groutite has been identified in specimens from the Walton deposit, Hants County. (H.H. Majmundar, 1969: Can. Mineralogist, 9, p. 718).

Quebec

21 E/13 Groutite, a polymorph of manganite, occurs with manganite as black bundles of shiny fibres up to 3 mm long on vesuvianite at the Jeffrey Mine at 45°46'25"N, 71°57'12"W, lots 9-10, ranges II-III, Shipton Township, Richmond County. (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

GRUNERITE

$(Fe, Mg)_7Si_8O_{22}(OH)_2$

Grunerite and its magnesium dominant analogue, cummingtonite, are members of the amphibole group, typically found in medium-grade, calcium-poor, metamorphic rocks.

Newfoundland

23 B/15 Chemical analyses of grunerites from Wabush iron formation, Labrador City area: Jun Ito, analyst.

SiO_2	49.01	49.33	51.58	51.95	51.79	52.28
TiO_2	0.05	0.02	0.00	0.02	0.02	0.00
Al_2O_3	0.00	0.39	0.10	0.15	0.33	0.07
FeO	44.99	40.94	34.40	33.70	34.38	31.90
MnO	0.37	0.54	0.70	0.99	0.23	0.57
MgO	3.17	6.65	10.33	10.44	10.72	12.35
CaO	0.31	0.18	0.97	0.10	0.14	0.79
Na_2O	0.04	0.12	0.02	0.08	0.09	0.12
K_2O	0.00	0.20	0.05	0.05	0.18	0.08
H_2O^+	1.28	1.54	1.99	2.54	1.97	1.62
H_2O^-	.31	--	--	0.22	0.35	--
F_2	1.00					
P_2O_5	0.1					
Total	100.63	99.91	100.14	100.24	100.20	99.78
F_2 for O	0.42					
Total	100.21					

(C. Klein, 1964: Am. Mineralogist, 49, p. 963-982).

Ontario

52 F/16 Grunerite occurs with coarse sugary quartz and magnetite in the southern part of Echo Township, lot 2, conc. I (H.S. Armstrong, 1950: Ont. Dept. Mines, Ann. Rept., vol. 59, Pt. V, p. 16).

Quebec

32 I/14 A thin section of an iron-silicate slate from Trout Point in the Albanel area was found to contain yellowish laths of grunerite (J.N. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 23).

32 P/2 Grunerite is the dominant mineral above the magnetite zone in a banded iron-formation in the Temiscamie River area, Mistassini territory (W.G. Wahl, 1953: Que. Dept. Mines, Geol. Rept., 54, p. 18).

GUDMUNDITE

FeSbS

Manitoba

63 K/16 Gudmundite is a constituent of the sulphide ore of the Chisel Lake Mine (A.E. Bence and L.C. Coleman, 1963: Can. Mineralogist, 7, p. 663).

Northwest Territories

85 J/8 A fine-grained granular mass of gudmundite has been identified in a sample from the Yellowknife Bay area (L.C. Coleman, 1953: Am. Mineralogist, 38, p. 514).

Ontario

52 L/16 A massive pyrrhotite-sphalerite-chalcopyrite ore deposit in Mulcahy Township, about 32 km west of Red Lake and about 1.2 km south-southwest of the south end of Trout Bay, contains lesser amounts of galena, marcasite, arsenopyrite, cobaltite, pyrargyrite, paracostibite, gudmundite, stannite, argentian tetrahedrite, antimonial silver, allargentum, ilmenite, breithauptite, cassiterite and nisbite. Electron microprobe analysis of the gudmundite: Fe 29.0, Sb 58.5, S 15.4, total 102.9 (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 232).

Quebec

21 E/13 Gudmundite has been found in an old antimony mine in lot 28, range I of South Ham Township, Wolfe County. Identification was made from X-ray powder pattern at the X-ray Laboratory of the Geological Survey of Canada.

GUETTARDITE

$9PbS.\ 8(Sb,As)_2S_3$

Ontario

31 C/6 The new mineral, guettardite, was discovered as isolated grains in polished sections of specimens collected from a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed. Taylor of Madoc. Electron probe microanalysis, average of two grains, by G.R. Lachance: Pb 44.0, Sb 22.0, As 12.55, S 21.0, total 99.25 (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 191-213).

GUNNINGITE

$ZnSO_4.H_2O$

Gunningite is isostructural with kieserite, szomolnokite and szmikite, the sulphate monohydrates of Mg, Fe and Mn, respectively. It was first identified in 1960 and named in honour of H.C. Gunning, a former geologist with the Geological Survey of Canada, and later, Head of the Geology Department of the University of British Columbia.

British Columbia

82 K/2 Gunningite occurs as white, earthy, crumbly aggregates on smithsonite and woodruffite in specimens from the Moonshine claims worked by Willett Mines Limited near Lardeau as a silver-lead-zinc prospect (Ann. P. Sabina, 1978: Geol. Surv. Can. Paper 78-1A, p. 257).

Ontario

30 M/5 Greyish white efflorescences on sulphides in limestone on the west wall of the south end of the Canada Crushed Stone quarry near Dundas have been identified as gunningite (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 337).

Quebec

32 C/12 The secondary sulphate minerals, gunningite and leonhardtite, have been identified as crusts on specimens from the dumps at the Barvue Mine. The mine is at Barville, 70 km from Val d'Or on Highway 64 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 110).

32 D/6 Specimens of sphalerite coated with white gunningite were collected from the dumps of the Powell Rouyn Mine, 4.8 km northwest of Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 50).

Yukon

105 M/14 Gunningite occurs as sparse white efflorescences on sphalerite in several mines in the Keno Hill area. It was originally identified on a specimen from the Comstock-Keno property (J.L. Jambor and R.W. Boyle, 1962: Can. Mineralogist, 7, p. 209).

GUSTAVITE

$Pb_5Ag_3Bi_{11}S_{24}$

Manitoba

52 L/6 Grains of gustavite up to 2 mm in size are associated with aikinite, bismuthinite,

cosalite, native bismuth, chalcopyrite, tetrahedrite, pyrrhotite, stannite and arsenopyrite at the Tanco pegmatite, Bernic Lake. Electron microprobe analyses: (1) Ag 8.9, Pb 18.9, Bi 52.0, Sb 3.3, S 17.7, total 100.8; (2) Ag 7.8, Pb 20.2, Bi 50.3, Sb 3.6, S 17.6, total 99.9. (D.C. Harris and T.T. Chen, 1975: Can. Mineralogist, 13, p. 411).

Northwest Territories

86 E/9
86 F/12 Gustavite has been found as inclusions up to 200 microns in size in the cores of arsenide rosettes associated with bismuthinite, matildite and benjaminite in a specimen of ore from the Terra Mining and Exploration Company property southeast of Great Bear Lake in the Camsell River district. Electron microprobe analysis: Ag 9.4, Pb 19.9, Bi 53.2, S 17.4, total 99.9. (D.C. Harris and T.T. Chen, 1975: Can. Mineralogist, 13, p. 411).

GYPSUM

$CaSO_4.2H_2O$

Gypsum, probably the most common sulphate found in nature, is widely distributed in deposits of sedimentary origin. It has also been found around volcanic fumaroles, as a precipitate from thermal springs, and as a vein-mineral associated with sulphides. The name selenite is often used for coarsely crystalline transparent gypsum, the fibrous variety is known as satin spar, and fine-grained massive gypsum is called alabaster. Gypsum is an important mineral of commerce and is used mainly for making plaster of Paris.

Alberta

72 E/13 Crystals of selenite occur at Fort Kipp. Several specimens from this locality are in the National Mineral Collection.

72 M/8 Rosettes of gypsum from Benton Station were donated to the National Mineral Collection by J. Hall.

74 D/11 Interbedded gypsum and anhydrite, 40 m thick, has been discovered at a depth of 150 m at McMurray (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 13).

74 M/6 On the west side of the Slave River, a few km below La Butte, earthy gypsum is exposed in a bed about 3 m thick. The colour varies from white to grey to bluish (C. Camsell, W. Malcolm, 1921: Geol. Surv. Can., Mem. 108, revised ed., p. 107).

83 E/7 Good quality gypsum outcrops in the Whitehorse Formation at several localities near the north end of De Smet Range and in Starlight Range. (J.A. Allan, 1933: Trans., C.I.M.M., 36, p. 619-635). It has also been observed at 53°20'00"N., 118°47'00"W., on a ridge-crest 9.6 km west of the junction of Blue Creek and Snake Indian River, in Jasper National Park. (E.W. Mountjoy, 1962: Geol. Surv. Can., Paper 61-31, p. 65).

83 E/8 Gypsum was observed in the Whitehorse Formation at the following localities within Jasper National Park.
(1) 4.8 km northeast of Mount Stornoway in a saddle between two ridges (53°19'N., 118°26'W).
(2) 1.6 km east of Mount Stornoway (53°17'N., 118°25'30"W).
(3) 1.2 km up northeast tributary creek of Snake Indian River at Shale Banks (53°15'N., 118°11'W).
(E.W. Mountjoy, 1962: Geol. Surv. Can., Paper 61-31, p. 65).

83 F/5 In Jasper park, granular white gypsum of Triassic age outcrops in the area north of Brûlé Lake (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 13).

84 P/1
84 P/2 Limestone, gypsum, and anhydrite of Silurian age are exposed on the banks of the Peace River between the mouth of the Jackfish River and Peace Point, a few km below Boyer (formerly Little Rapids) (C. Camsell and W. Malcolm, 1921: Geol. Surv. Can., Mem. 108, revised ed., pp. 62, 106).

British Columbia

82 J/4 A fine-grained, bedded deposit of gypsum occurs 12.8 km northeast of Canal Flats. The mineral varies in colour from white to dark grey. The largest exposure forms a series of slopes and bluffs up to 100 m high and extending for a distance of about 500 m (G.B. Leech, 1954: Geol. Surv. Can., Paper 54-7).

82 J/5 An important deposit of gypsum is located 6.4 km northeast of Windermere (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 14).

82 L/11 Gypsum is found near Salmon Arm on Shuswap Lake. It occurs along a fault zone (A.G. Jones, 1948: Geol. Surv. Can., Paper 48-4, p. 7).

92 P/4 Gypsum and anhydrite occur on the steep hillside near the main masses of hydromagnesite just above the wagon road north, at 400 m from the west end of Kelly Lake, Clinton area. Chemical analysis: SiO_2 3.75, Al_2O_3 0.67, Fe_2O_3 0.41, MgO 0.48, CaO 31.48, H_2O^+ 2.18, H_2O^- 18.00, CO_2 2.22, SO_3 41.09; total 100.28 (L. Reinecke, 1920: Geol. Surv. Can., Mem. 118, p. 32).

Manitoba

62 H/3
62 H/14 Beds of gypsum have been encountered in drillholes east of Dominion city, and at Charleswood, near Winnipeg (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 13).

62 J/8 Selenite crystals found at Pembina Mountain are represented in the National Mineral Collection.

62 J/10 At Amaranth, beds of gypsum about 12 m thick occur at a depth of 29 m (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info., Circ. 114, p. 12).

62 O/15 Bedded gypsum deposits over 9 m thick occur as low ridges that rise 6 to 8 m above the surrounding countryside at Gypsumville, northwest of Lake St. Martin. The gypsum beds are usually underlain by anhydrite (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 12).

New Brunswick

The gypsum deposits of New Brunswick mostly occur in the southeastern section of the province in rocks of Carboniferous age. The

following localities are listed in Record 2, Part A, The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, by the New Brunswick Research and Productivity Council, 1965:

21 H/5 Upham, Kings County;
21 H/6 St. Martins Head, Saint John County;
21 H/10 Lockhart Lake and Cape Maringouin, Albert County;
21 H/11 Mount Pisgah and Sussex Corner, Kings County;
21 H/12 Fox Hill, Kings County;
21 H/13 McGregor Brook, Kings County;
21 H/14 Fawcetts Brook, Westmorland County;
21 H/15 Wilson Brook, Curryville, Hopewell Hill, Lower Cape, Edgett Landing, and Hillsborough, Albert County;
21 J/14 Plaster Rock, Victoria County.

21 H/15 Selenite crystals found in anhydrite near Hillsborough in Albert County, were donated to the National Mineral Collection in 1923, by L.H. Cole.

Newfoundland

11 O/4 Tabular selenite crystals up to 30 cm wide occur with massive sugary gypsum along the shoreline cliffs southeast of Codroy between Codroy and Woody Cape (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 161).

11 O/14
12 B/2
12 B/7
12 B/11 Large massive gypsum deposits occur in the St. George's Bay area, mostly at or near surface. Numerous outcrops may be seen in the area south of St. George's Bay between St. George's on the north and Searston on the south. A large deposit has been worked at Flat Bay. Other gypsum localities are: the Boswarlos-Piccadilly area, the mouth of Romaines Brook, along Sheep Brook and Coal Brook, and in the valley of the Crabbs River (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 8).

Northwest Territories

69 E
69 F Large quantities of gypsum, partly massive and partly banded with anhydrite are present in the exposed cores of the following evaporite domes on Ellef Ringnes Island:

69 E/12	Helicopter Dome	78°38'N	99°45'W
69 F/1	Hoodoo Dome	78°10'N	100°05'W
69 F/2	Mallock Dome	78°12'N	101°10'W
69 F/7	Isachsen Dome	78°29'N	101°50'W
69 F/9	Contour Dome	78°31'N	100°25'W
69 F/10	Dumbells Dome	78°35'N	101°10'W
69 F/16	Haakon Dome	78°56'N	100°46'W

(D.F. Stott, 1969: Geol. Surv. Can., Paper 68-16, p. 34).

85 A/1 A bed of gypsum is reported to have been encountered in an excavation at Bell Rock, 11.2 km below Fort Smith on the Slave River (C. Camsell and W. Malcolm 1921: Geol. Surv. Can., Mem. 108, revised ed., p. 107).

85 A/14 A 1.2 m thick band of thin-bedded impure gypsum occurs on the banks of the Slave River immediately below Point Ennuyeux (C. Camsell and W. Malcolm, 1921: Geol. Surv. Can., Mem. 108, revised ed., pp. 27, 107).

85 G/15 Flesh coloured gypsum occurs at Gypsum Point on the north shore of Great Slave Lake and at several other localities on the southwest shore of the north arm of Great Slave Lake (C. Camsell and W. Malcolm, 1921: Geol. Surv. Can. Mem. 108, revised ed., p. 107).

95 J/8 Small selenite crystals occur in outcrops on Ebbutt Hills, south of Willowlake River (R.J.W. Douglas and D.K. Norris, 1961: Geol. Surv. Can., Paper 61-13, p. 24).

96 F/2 Gypsum beds are reported to occur on Mount St. Charles (formerly Mount Charles) on the north side of the Great Bear River and about 64 km above its mouth (C. Camsell and W. Malcolm, 1921: Geol. Surv. Can., Mem. 108, revised ed., p. 107).

120 F/11 Thick beds of Permo-Carboniferous anhydrite and gypsum are widely exposed at the head of Clements Markham Inlet.

340 E/14 A large gypsum body outcrops with andesitic volcanic rocks on the east shore of McClintock Inlet, northeastern Ellesmere Island (R.L. Christie, 1962: Geol. Surv. Can., Paper 62-10, p. 15).

Nova Scotia

11 E
11 F
11 K
21 H Some of the largest gypsum deposits in Canada are located in the central and northern parts of Nova Scotia. The gypsum is found in Windsor Group sediments of Mississippian age, interbedded with limestone, shale and clay. The gypsum is fine-grained and generally white to grey in colour. Alabaster, satin spar and selenite are found in many of the deposits, and in most cases the gypsum is underlain by thick beds of anhydrite. Most deposits are at or near surface. The main gypsum areas are in the counties of Hants, Cumberland, Antigonish, Victoria, Richmond and Inverness. Large quarries are located near Windsor, Walton and Cheverie in Hants County, and at Little Narrows on Cape Breton Island (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 9).

11 K/3 A dense, fine- to medium-grained variety of gypsum occurs at Mabow Mines north of Mabow Inlet on the western coast of Cape Breton, near Lake Ainslie. It varies in colour from white to mottled grey and in places is tinged red. Selenite crystals in the gypsum groundmass give the deposit a porphyritic texture. An analysis by Cole, of gypsum containing a small amount of $CaCO_3$, is as follows: CaO 33.23, MgO 0.05, SO_3 45.90, H_2O 18.55, CO_2 0.77, insol. 0.40, Fe_2O_3 0.04, Al_2O_3 0.02, total 98.96 (G.W.H. Norman, 1935: Geol. Surv. Can., Mem. 177, p. 71).

Ontario

30 L/13
30 M/4
40 I/16
40 P/2 Major deposits of gypsum occur in the Salina Group of Silurian age, associated with anydrite, dolomite and limestone, in the Grand River area, south and west of Hamilton. The lens-shaped deposits measure up to 4.5 m thick, extend laterally for hundreds of feet and usually occur within 60 m of the surface. Underground mining operations have been conducted at Caledonia and Hagersville. Other deposits are known at Cooks, Lythmore and Cayuga in the area to the south and east of Hagersville, and at Princeton, east of Woodstock.

31 C/7 Snow-white, finely granular gypsum occurs with very coarse-grained calcite and platy anhydrite in cavities in limestone. The occurrence is located at a road-cut along Highway 38 about 800 m north of Highway 40 (Ann P. Sabina, 1968; Geol. Surv. Can., Paper 67-51, p. 7).

31 C/8 Gypsum (selenite) as transparent tabular plates about 2.5 cm long is associated with calcite in

cavities at Griffin Brothers Quarry north of Kingston about 1.6 km off Highway 15 (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 41).

42 I/11
42 I/14
42 P/3 Beds of gypsum are well exposed along the banks of the Moose River near the village of Moose River, and along the banks of the Cheepash about 32 km above the point at which it joins Moose River. Large deposits occur on Gypsum Mountain, 19 km southeast of Moose River village (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 11).

Quebec

11 N/4
11 N/5 Gypsum is exposed along the coasts of Grindstone, Alright, Amherst and Entry Islands in the Gulf of St. Lawrence (R.K. Collings, 1959: Can. Dept. Mines, Mines Br., Info. Circ. 114, p. 10).

32 C/3 Selenite has been found in a quartz vein at the Buffadison Mine in Louvicourt Township, Abitibi County. Associated minerals are pyrite, chalcopyrite, scheelite, and tellurbismuth (J. Claveau, W.N. Ingham, W.R. Robinson, 1957: Que. Dept. Mines, Rept., 256, p. 44).

Yukon

115 G/2 A large deposit of gypsum and anhydrite is exposed on a mountain and canyon east of Bullion Creek at about 61°01'N, 138°41'W (J.E. Muller, 1967: Geol. Surv. Can., Memoir 340, p. 115).

GYROLITE

$Ca_2Si_3O_7(OH)_2.H_2O$

Nova Scotia

21 H/2 The name centrallassite was given by How to one of three mineral substances found by him in a nodule picked up in the Triassic trap debris of Black Rock, Kings County. Chemical analysis by How: SiO_2 58.86, Al_2O_3 1.14, CaO 27.91, MgO 0.16, K_2O 0.59, H_2O 11.41, total 100.07; S.G. 2.455 (G.C. Hoffmann, 1888-89; Geol. Surv. Can., Ann. Rept., IV, p. 277) (H. How, 1859: Edin. New Phil. J., vol. X, pp. 84-99). Centrallassite is believed to be identical to gyrolite, which name has precedence.

21 H/3 Gyrolite is found on apophyllite in trap rock at a locality 40 km southwest of Cape Blomidon, between Margaretville and Port George. An analysis by How follows: SiO_2 51.90, Al_2O_3 1.27, CaO 29.95, MgO 0.08, K_2O 1.60, H_2O 15.05, total 99.85 (H. How, 1861: Edin. New Phil. J., vol. XIV, p. 117 and Am. J. Sci., XXXII, p. 13).

HALITE

NaCl

Halite or common salt is abundantly distributed in solution in oceans, salt lakes, and saline springs, and is frequently produced from these solutions by evaporation. It occurs with gypsum, anhydrite and other salts in sedimentary deposits often of very large extent, and has also been found as efflorescence crusts on soils in arid regions, and as a sublimation product near volcanoes.

Alberta

73 E/15 Fine salt, obtained by vacuum-pan evaporation of brine from salt beds 300 to 1,060 m below the surface, is produced at Lindberg (R.K. Collings, 1963: Can. Dept. Mines, Min. Res. Div., Mineral Rept., 7, p. 468).

74 D/11 A deposit of rock salt occurs at depth beneath Fort McMurray at the junction of the Clearwater and Athabasca rivers (L.H. Cole, 1930: Can. Dept. Mines, Mines Br., 716, p. 65).

74 D/11 Efflorescences of halite have been reported to occur at La Saline and at a number of other localities along the Athabasca River (R.G. McConnell, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 35).

82 G/7 Crystals of halite occur in sedimentary rocks in the North Kootenay Pass. Specimens were donated by L.H. Cole to the National Mineral Collection in 1923.

British Columbia

92 G/4 Halite has been reported to occur at Nanaimo (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 112R).

93 B/14 Halite has been found on Saltspring Island in the Victoria mining division (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 112R).

103 I/6 A deposit of halite is reported to cover an area of several hundred acres in a basin near the north shore of the Skeena River, about 64 km from its mouth (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 115).

Manitoba

62 J/3 Fine salt, obtained by vacuum-pan evaporation of brine from salt beds 300 to 1060 m below the surface, is produced at Neepawa (R.K. Collings, 1963: Can. Dept. Mines, Mines Res. Div., Mineral Rept., 7, p. 468).

New Brunswick

21 H/15 A drillhole near the village of Gautreau, 32 km southeast of Moncton, intersected a salt horizon at a depth of 148 m (L.H. Cole, 1930: Can. Dept. Mines, Mines Br., 716, p. 21).
Halite occurs associated with anhydrite at Dorchester in Westmorland County and at Weldon-Gautreau Salt Basin in Albert County (J.B. Hamilton, 1961: New Brunswick Mines Br., Min. Res. Rept., 1).

Northwest Territories

85 A/1 Halite occurs as efflorescences on clay and as small salt deposits in natural evaporating basins near brine springs along the Salt River (R.G. McConnell, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 63 D).

Nova Scotia

11 E/9 Lumps of rock salt weighing from 450 to 900 gm have been found with glauber salt, calcite, aragonite, and iron oxide in the McDonald and Allison quarries near Newport Landing (formerly Avondale), north of Windsor in Hants County (W.F. Jennison, 1911: Can. Dept. Mines, Mines Br., 84, p. 150).

11 E/13 Coarse rock salt for use in ice and dust control on highways, in fisheries, and by the chemical and agricultural industries, is mined at Pugwash in Cumberland County from a bed 192 m below the surface (R.K. Collings, 1963; Can. Dept. Mines, Res. Div., Mineral Rept., 7, p. 468).

11 E/14 Salt beds occur in folded Mississippian rocks near Malagash on the Malagash Peninsula in Cumberland County. Production of halite from this deposit began in 1919 (L.H. Cole, 1930: Can. Dept. Mines, Mines Br., Rept. 716, pp. 11-18).

11 F/12 Halite is reported to occur at Antigonish (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 115).

11 K/3 Salt has been found at Whycocomagh in Inverness County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 115).

21 H/16 Brine for the production of fine salts is obtained from halite horizons buried from 335 to 550 m below the surface at Nappan, near Amherst (R.K. Collings, 1963: Can. Dept. Mines, Min. Res. Div., Mineral Rept., 7, p. 468).

Ontario

40 P/12 The first discovery of halite in southwestern Ontario was made at Goderich where it was found at a depth of about 300 m in a well drilled for oil. In 1960 more than 90 per cent of Canada's salt production was from salt beds 240 to 550 m below the surface in the area between Amherstburg (40 J/3) and Goderich. Salt producing companies are at Amherstburg, Goderich, Ojibway, Sandwich, Sarnia and Watford (L.H. Cole, 1930: Can. Dept. Mines, Mines Br., Rept. 716, pp. 36, 37).

42 E/12 Small veins of salt were found beneath a diabase sill in the Undersill Mine, now the property of Leitch Gold Mines in the Beardmore area, Thunder Bay district. The halite occurs in conjunction with quartz veins. Salt water and methane, both under high pressure are also present in the workings (F.J. Scarles, 1956: Econ. Geol., 51, pp. 192-196).

Saskatchewan

73 C/6 Fine salt, obtained by vacuum-pan evaporation of brine from salt beds 305 to 1,070 m below the surface, is reported at unity (R.K. Collings, 1963: Can. Dept. Mines, Mines Res. Div. Mineral Rept., 7, p. 468).

HALOTRICHITE

$FeAl_2(SO_4)_4.22H_2O$

British Columbia

92 I/11 White fibrous aggregates of halotrichite occur with brochantite, chalcoalumite, rozenite and hexahydrite on specimens from a locality 0.8 km west of Highway 1, 27 km south of Cache Creek. Halotrichite has also been identified with romerite and copiapite on specimens from the Spatsum claim, 17.6 km south of Ashcroft Manor on Highway 1 south of Cache Creek (X-ray Laboratory, Geol. Surv. Can.).

Nova Scotia

11 J/4 Halotrichite has been found in shale heaps at the mines at Glace Bay (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, 37 T). Chemical analysis by Gilpin: Al_2O_3 9.13, FeO 16.57, SO_3 39.71, H_2O 35.10, total 100.51 (Gilpin, 1886: Nova Scotia Inst. Nat. Sci., VI, p. 175).

HARMOTOME

$BaAl_2Si_6O_{16}.6H_2O$

Harmotome is a zeolite mineral having the ideal composition noted above. There is, however, considerable replacement of Si by Al, with corresponding introduction of alkalies into the Ba position. Small amounts of Ca are often present.

British Columbia

92 I/2 Harmotome has been found as a crust on diorite from the 1070 m level of the Craigmont Mine, about 16 km northwest of the town of Merritt (R.M. Thompson, 1960: personal communication).

Ontario

52 A/5 Small crystals of harmotome are implanted on calcite prisms which in turn rest on a layer of crystalline quartz coating a dark grey shale in the Beaver Mine, O'Connor Township, Thunder Bay district. An analysis by Hoffmann is: SiO_2 46.36, Al_2O_3 17.16, BaO 21.18, CaO 2.25, H_2O 14.54, total 101.49; S.G. 2.39 (G.C. Hoffmann, 1889-90: Geol. Surv. Can., Ann. Rept., V, p. 16R).

Quebec

31 H/11 Harmotome has been identified from Mont St-Hilaire (G.Y. Chao and J.Baker, 1979: Mineralogical Record, 10, p. 99).

31 H/12 A specimen of harmotome was found in the upper level of the Francon quarry, Montreal (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 17).

31 H/12 Harmotome is sparsely distributed in vugs and fractures at the Miron quarry, Jarry Street at Papineau Avenue, Montreal (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

Saskatchewan

74 O/13 Harmotome is found with hyalophane in apatite-bearing veins that cut gneisses in the Nissikkatch and Northwest lakes areas, 56 and 64 km northeast of Uranium City (D.D. Hogarth, 1957: Can. Mineralogist, 6, p. 147).

hastingsite

(see HORNBLENDE)

hatchettolite

(see PYROCHLORE)

HAUCHECORNITE

$Ni_9Bi_2S_8$

Ontario

41 I/6
41 I/11 Arsenian hauchecornite occurs at the Vermilion Mine on lot 6, conc. IV, Denison Township. Electron microprobe analysis: Ni 44.9, Fe 1.4, Co 0.3, Bi 26.5, As 4.4, Sb 0.1, S 22.0, total 99.6.
Tellurian haucecornite has been identified in a specimen from the Strathcona Mine on lot 4, conc. IV, Levack Township. Electron microprobe analysis: Ni 44.1, Co 0.9, Fe 0.9, Bi 22.4, Te 8.5, S 21.9, total 98.7 (R.I. Gait and D.C. Harris, 1972: Can. Mineralogist, 11, p. 819).

HAUSMANNITE

$MnMn_2O_4$

New Brunswick

21 H/11 Lenses of hausmannite have been found in limestone at the Upham Mine, Markhamville, King's County. The mineral has also been reported at Jordan Mountain (K.O.J. Sidwell, 1952: New Brunswick Res. Develop. Bd.).

Nova Scotia

11 E/6 Hausmannite occurs with pyrolusite, manganite, limonite, and calcite in veins up to 17 cm wide in dark grey limestone at the Black Rock manganese deposit exposed along the shore of Minas Basin at mid-tide level. Access to the shoreline is through the Edgar Nelson farm located about 16 km southwest of Truro, along the Clifton-Black Rock road (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 40).

11 F/15 Intimate mixtures of hematite, goethite, hausmannite and braunite form dense masses exposed by pits on the John MacKeigan farm (formerly known as the McVicar property) located 13.6 km south of Big Pond along the road to Loch Lomond, Cape Breton Island (Ann P. Sabina, 1965: Geol. Surv. Can., p. 37).

HAWLEYITE

CdS

Yukon

105 M/14 Hawleyite, named in honour of Professor J.E. Hawley, Queen's University, Kingston, Ontario, occurs as a bright yellow, earthy coating on sphalerite and siderite in the Hector-Calumet Mine, Galena Hill, near Mayo. The mineral is dimorphous with greenockite (R.J. Traill and R.W. Boyle, 1955; Am. Mineralogist, 40, pp. 555-559).

HEAZLEWOODITE

Ni_3S_2

British Columbia

104 P/12 Disseminated blebs of heazlewoodite have been identified in regenerated dunite exposed in a cirque that contains the headwaters of Nickel Creek (W.J. Wolfe, 1965: Geol. Surv. Can., Paper 64-48, p. 14).

Ontario

42 A/3 Tiny veinlets of heazlewoodite are associated with godlevskite, millerite and pentlandite in a drill core sample from the Texmont Mine which is located in Bartlett-Geikie Township about 32 km south of Timmins. Electron microprobe analysis: Fe 0.20, Ni 72.92, Co 0.00, S 26.27, total 99.39 (A.J. Naldrett, E. Gasparrini, R. Buchan and J.E. Muir, 1972: Can. Mineralogist, 11, p. 879).

42 A/11 Heazlewoodite has been identified in 6 samples from the serpentinized peridotite hanging wall of the old Alexo nickel mine in Dundonald Township, 40 km northeast of Timmins (A.J. Naldrett, 1966: Can. Mineralogist, 8, p. 383).

Quebec

21 L/3 Specks of bronze-coloured heazlewoodite and black chromite occur in diopside associated with vesuvianite at the Maple Leaf mine of Asbestos Corporation Limited. Access to the property is by a road 1.3 km long, leading east from the Black Lake road at 4.2 km from Highway 1 (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 52).

21 E/13
21 E/14
21 L/3 Heazlewoodite of 30 microns average grain size is a widely distributed minor accessory mineral, closely associated with magnetite, in the serpentines of the Eastern Townships. It has been found in many specimens from the Jeffery Mine at Asbestos, the Continental and Normandie Mines in the Coleraine-Vimy ridge area, and the Beaver and National Asbestos deposits in the Thetford Mines area (J.A. Chamberlain, 1966: Can. Mineralogist, 8, p. 519-522).

32 D/8 Heazlewoodite is reported to have been identified at the Marbridge Mine, a former nickel producer located about 8 km west of LaMotte (Ann P. Sabina, 1974: Geol. Surv. Can. Paper 73-30, p. 79).

Yukon

115 F/15 This rare sulphide mineral has been found with pentlandite and magnetite near the top of Miles Ridge, about 3.2 km west of the Alaska Highway bridge across the White River. The sulphides form short narrow stringers cutting the contact between a serpentinized peridotite dyke and a series of tuffs and limestones. Identification of heazlewoodite was confirmed by X-ray powder pattern by R.M. Thompson (V.S. Papezik, 1955: Am. Mineralogist, 40, p. 692).

HEDENBERGITE

$CaFeSi_2O_6$

Hedenbergite is a monoclinic calcium-iron mineral of the pyroxene group which forms a continuous solid solution series with diopside, the calcium-magnesium end-member. The X-ray powder pattern is not readily distinguishable from that of diopside.

British Columbia

92 H/8 Hedenbergite occurs at the Oregon property between Sixteen Mile and Eighteen Mile creeks, 4.8 km east of Hedley in the Osoyoos mining division. It is associated with garnet, wollastonite, calcite, minor quartz, and sparsely disseminated sulphides (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

Ontario

31 L/7 A rock containing chiefly hedenbergite, fayalite, garnet, magnetite, and apatite, with labradorite porphyroblasts, outcrops on lot 24, conc. V, Calvin township, west of Amable du Fond River and southwest of Smith Lake (E.M. Heinrich, 1962: Can. Mineralogist, 7, p. 314).

Quebec

31 H/11 Hedenbergite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

HEDLEYITE

$Bi_5.Bi_2Te_3$

British Columbia

92 H/8 Hedleyite was first found, and named for the locality, at the Good Hope mineral claim, 6.4 km southeast of the town of Hedley. Chemical analyses: I, Bi 80.60, Te 18.52, S 0.12, total

99.24; II, Bi 81.55, Te 17.60, S 0.04, total 99.19 (H.V. Warren and M.A. Peacock, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 55).

92 H/8 Hedleyite and Joseite II occur together at the Oregon property, 4.8 km east of Hedley. Other associated minerals are native bismuth, molybdenite, and gold. Bornite, chalcopyrite, safflorite, and cobaltite are also present but occur apart from the tellurides. The metallic minerals are sparsely disseminated in a gangue of garnet, hedenbergite, wollastonite, calcite and minor quartz (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

Yukon

115 G/5 Several laths of bismuth telluride were found in a polished section of a nugget of gold and hessite from Upper Burwash Creek in the Kluane Lake district. The laths occurred with the hessite and when examined by X-ray, gave the hedleyite pattern (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 365).

HELLANDITE

$(Ca,Y)_2(Si,B,Al)_3O_8.H_2O$

Quebec

31 G/13 Hellandite has been found on the dumps of the old Evans-Lou quarry about 2.4 km south of Poltimore. The chemical composition determined by a mixture of electron microprobe, wet chemical and emission spectrographic analyses is given as: CaO 9.28, Y_2O_3 26.53, Gd_2O_3 4.48, Dy_2O_3 4.12, Er_2O_3 4.64, Yb_2O_3 5.95, MnO 0.58, TiO_2<0.2, ThO_2 0.57, V_2O_5<0.05, U_3O_8<0.2, SiO_2 24.41, Al_2O_3 4.59, B_2O_3 8.47, FeO 2.06, H_2O^+ 5.3, total 101.0 (D.D. Hogarth, G.Y. Chao and D.C. Harris, 1972: Can. Mineralogist, 11, p. 760).

HELVINE

$(Mn,Fe,Zn)_8Be_6Si_6O_{24}S_2$

Quebec

31 H/11 Helvine has been identified and found occurring in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

HEMATITE

Fe_2O_3

Hematite is the most important ore mineral of iron. It occurs in rocks of all ages as large deposits mainly of sedimentary origin and often subjected to enrichment by subsequent geological processes. It is also found as an accessory mineral in igneous rocks; as a contact metamorphic mineral; as a sublimation product associated with vulcanism; in cracks and crevices in giant quartz veins; and as a product of weathering of iron-bearing minerals. Well-known habit varieties include: rosettes or iron roses, specularite, kidney ore, ochre, and martite.

British Columbia

82 E/2 Specimens of specularite from Phoenix were donated to the National Mineral Collection in 1917 by W. Thomlinson.

92 I/11 Large amounts of specular hematite and tourmaline occur in the quartz-diorite rocks of the Highland Valley copper area, east of Ashcroft (J.S. Stevenson, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 131).

New Brunswick

21 G/1 Veins containing hematite occur in sedimentary rock in Chance Harbour, Saint John County (F.J. Alcock, 1938: Geol. Surv. Can., Mem. 216).

21 G/8 Hematite occurs at Clifton in King's County (L.W. Bailey, 1864: Rept. on the Mines and Minerals of New Brunswick).

21 I/4 Quartz veins carrying hematite have been reported at West Bend, Saint John County (F.J. Alcock, 1938: Geol. Surv. Can., Mem. 216).

21 I/4 Nodules of hematite have been found in slate at Coal Creek, Queen's County (K.O.J. Sidwell, 1951: Iron Ore Occurrences in New Brunswick, New Brunswick Res. Dev. Board, Fredericton).

21 J/6 Bands of hematite occur in manganiferous slate at Coldstream in Carleton County (F.D. Anderson, 1956: Geol. Surv. Can., Paper 55-29).

21 P/5 Hematite occurs at Austin Brook and Drummond Iron Mines in Gloucester County (G.S. McKenzie, 1949: New Brunswick Mines Br., Paper 49-2).

Newfoundland

1 M/10 Platy blue hematite which has been partly altered to limonite occurs in a quartz vein near the Cross Hills fault north of Round Hill (D.A. Bradley, 1962: Geol. Surv. Can., Mem. 321, p. 53).

1 N/10 Five zones of oolitic hematite are exposed in the Ordovician sedimentary rocks on Bell Island in Conception Bay. Three of these zones, known as the Dominion, Scotia, and Little Upper beds comprise the ore of the Wabana Iron Mine. Minerals occurring with the hematite in the ore are chamosite, siderite, calcium phosphate, calcite and quartz (E.R. Rose, 1952: Geol. Surv. Can., Mem. 265, pp. 47-53).

1 N/11 Blebs and seams of hematite occur in a zone about 15 m wide in conglomerate and greywacke near the north end of Snows Pond, 9.6 km southwest of Clarke's Beach (R.D. Hutchinson, 1953: Geol. Surv. Can., Mem. 275, p. 35).

2 C/3 A low-phosphorus, low-silicate, red hematite occurs at the Workington iron prospect, northwest of Lower Island Cove on Bay de Verde Peninsula (A.M. Christie, 1950: Geol. Surv. Can., Paper 50-7, p. 36).

12 B/10 Ore consisting of massive magnetite and specular hematite was mined at the Cliff Mine, Lower Drill Brook Mine and Upper Drill Brook Mine in the vicinity of Gull Pond, east of Stephenville (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 151).

23 B/15 Specular hematite iron-formation is mined at the Wabush Lake Mine located 305 km north of Sept Iles and near the southern end of Wabush Lake (R.B. Elver, 1963: Can. Dept. Mines, Min. Res. Div., Min. Rept., 7, p. 298).

23 G/2 Ore at the Carol Lake Iron Mine near Wabush Lake, 320 km north of Sept Iles, consists of specular hematite and magnetite with a small amount of quartz gangue (C. Mamen, 1962: Can. Mining J., vol. 83, No. 11, pp. 45-57).

Northwest Territories

37 C/9
37 C/15 The Eqe Bay iron deposits at the northeast end of Foxe Basin on west-central Baffin Island extend east-northeast from the southern shore of Grant-Suttie Bay to within 1.6 km of the western shore of Eqe Bay. The deposits consist of bands of magnetite, hematite, jasper and specular hematite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 139; Dept. Indian and Northern Affairs). A band of massive specularite with some magnetite, up to 30 m thick, outcrops on an island in Grant-Suttie Bay at 69°45'30"N, 77°22'06"W (W.C. Morgan, J. Bourne, R.K. Herd, J.W. Pickett and C.R. Tippett, 1975: Geol. Surv. Can., Paper 75-1A, p. 346).

Nova Scotia

11 E/5 Turgite (hydrohematite) a variety of hematite reported to contain 5.51 per cent adsorbed water occurs at Tennycape in Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 63T).

11 E/6 A deposit of red hematite, limonite, red ochre and goethite occurs about 800 m southwest of Clifton Station, 9.6 km west of Truro. The deposit was worked in 1873 and in 1903 but is now abandoned and the two shafts which comprised the workings are caved.
Ore from the Weatherbe Brook deposit on the upper reaches of Weatherbe Brook is reported to consist of limonite, siderite, ankerite and specularite. It was mined from underground workings which are now inaccessible.

The workings at the Upper Kemptown deposit consist of two shafts, both now flooded. Ore from the dumps consists of specular hematite now altered by weathering to limonite, goethite and specular oxide. The deposit is 3.2 km northwest of Kemptown, about 300 m east of the Kemptown-New Annan Road (I.M. Stevenson, 1958: Geol. Surv. Can., Mem. 297, p. 93).

11 E/9 About 1.6 km northeast of Browns Mountain post office is an occurrence of hematite in a bed about 6 m thick and dipping to the south. The hematite impregnates a coarse grit and has been exposed in a number of trenches. East of these is another occurrence, about 1.5 m wide, in which the hematite is more compact and of higher grade than the above. Oolitic hematite, and grit impregnated with hematite, occur in a belt extending for about 6.4 km to the southwest of a point located 1.2 km southwest of Malignant Cove in Antigonish County. The most extensive exposures of ore appear in trenches between the east branch of Doctors Brook and the western brook flowing north from Little Hollow. A bed of hematite from 60 to 90 cm thick outcrops in Arisaig Brook (M.Y. Williams, 1914: Geol. Surv. Can., Mem. 60, pp. 145-148).

11 F/5 A specimen of specular hematite from the Salmon River in Guysborough County was presented to the National Mineral Collection by H. Fletcher in 1883.

11 F/16 Magnetite and hematite are present in two mineralized bands, believed to be of sedimentary origin, in the mid-Cambrian rocks on Gillies Brook at Grand Mira South, Cape Breton Island (L.H. Weeks, 1954: Geol. Surv. Can., Mem. 277, p. 108).

21 A/12 Martite occurs in triassic traps in the North Mountain area, Digby County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 45T).

21 B/8
21 B/9 It has also been reported from Digby Neck in the same county (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 153).

21 H/8 Martite is reported to have been found at Two Islands, in Cumberland County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 153).

Ontario

31 C/6 Specular hematite occurs at the Kane Mine in lot 9, conc. XIV, Huntingdon Township, Hastings County. A specimen from this locality is in the National Mineral Collection.

31 C/12 A hematite specimen in the National Mineral Collection was found in lot 12, conc. V, Madoc Township, Hastings County.

31 C/16 Lenses of hematite occur in Grenville marble at the Playfair (Dalhousie) Mine on the east half of lot 1, conc. I, Dalhousie Township. Specimens are in the mineral collection of the Royal Ontario Museum (J.Satterly, 1977: Ont. Geol. Surv., MP 70, p. 196).

31 D/11
31 D/12 Martite has been found in a gneissoid boulder near Bass Lake about 3.2 km west of Orillia (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 45T).

31 E/8 Nodules of martite 2.5 cm in diameter have been found in lot 28, conc. I, Sabine Township, Nipissing district (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 195).

41 K/15 Specular hematite and jasper occur together at the Batchawana Mine (E.S. Moore, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. II, p. 77).

41 K/15 An iron-formation consisting of hematite and interbanded granular silica occurs on the western shore of the Gross Cap Peninsula near Michipicoten harbour. A similar but smaller formation is exposed on the southeastern shore of the peninsula and a magnetite bearing deposit occurs at its eastern point (W.H. Collins, T.T. Quirke, and E. Thomson, 1926: Geol. Surv. Can., Mem. 147, p. 78).

41 P/15 Hematite occurs as radiating columnar aggregates forming botryoidal masses in quartz lenses enclosed by Cobalt conglomerate and quartzite. Specularite is also present. The deposit, known as the La Brosse claims was exposed by pits about 400 m north of Sisseney Lake and about 6.4 km south of Matachewan (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 1010).

42 A/9 Specularite veins cut variolitic basalt at the Pat gold deposit on lot 1, conc. II, Beatty Township. A specimen from the above locality is in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 195).

42 C/2 A banded quartz-hematite horizon occurs in the Long Lake iron range at Cuthbertson Lake in the Michipicoten district. The orebody of the old Helen Mine was located at the eastern end of Boyer Lake in the Michipicoten district. Exhausted in 1918, it consisted of a large pocket of hematite formed by oxidation of the siderite ore of the new Helen Mine (W.H. Collins, T.T. Quirke, and E. Thompson, 1926: Geol. Surv. Can., Mem. 147).

52 B/13 The ore at the Steep Rock Lake Iron Mine in the Rainy River district is a hard, brown, compact material consisting of goethite, limonite, hematite, turgite, and quartz in varying amounts. The ore ranges in quality from nearly pure iron oxide to ferruginous chert. Other iron-bearing minerals in the deposit are magnetite, magnetic ferric oxide, siderite, and ankerite (F.G. Smith, 1942: Univ. Toronto Stud., Geol. Ser., 47, p. 71).

52 H/7 Martite is reported to occur at Black Sturgeon Lake, south of Lake Nipigon in the Thunder Bay district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 153).

Quebec

23 B/16 Hematite is the principal iron-bearing mineral in the ore mined by the Mount Wright Iron Mines Co., Ltd. The deposit occurs in a well-banded quartzite containing many layers of well-crystallized specular hematite. The mine is located about 270 km northwest of Seven Islands and some 80 km west of the Quebec North Shore and Labrador Railway (T. Koulomzine and R.P. Jaeggin, 1961: Can. Inst. Mining Met., Bull. 54, p. 766).

23 J/15 Specular hematite, with some magnetite, constitutes the iron ore mined at Schefferville (R. Grimond, 1961: Precambrian, vol. 34, p. 39).

23 O Thirteen separate hematite-rich orebodies are reported in the Wakuach Lake map area which contains part of the Labrador Trough. The hematite occurs as earthy, metallic, specular and martite varieties. Hollandite and pyrolusite are locally prominent (W.R.A. Baragar, 1967: Geol. Surv. Can., Memoir 344, p. 159).

31 G/12 Specular hematite occurs in range VI, lot 28, Templeton Township, Papineau County. A specimen is in the National Mineral Collection.

31 G/13 A specimen of hematite from range XI, lot 3, Portland Township, Papineau County, is in the National Mineral Collection.

31 H/2 Hematite is irregularly distributed in Dunham Township, range I, lot 5 (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 3).

31 H/3 A specimen of specularite from lot 15 in the township of St. Armand West is present in the National Mineral Collection.

31 H/7 Specularite has been found in Shefford Township on range III, lot 22 (National Mineral Collection).

31 J/4 Near the south shore of the large bay on the east side of Heney Lake is a small deposit of goethite and hematite. The minerals were originally detected in float on a burned-over hillside and subsequent trenching in the vicinity has exposed a few hundred tonnes of ore grade material (T.L. Tanton, 1944: Geol. Surv. Can., Paper 44-21).

34 C
34 F Hematite and magnetite are reported to occur in the Nastapoka Islands near the eastern coast of Hudson Bay (H.W. McGerrigle and H. Girard, 1950: Que. Dept. Mines, Prelim. Rept., 173, p. 29).

Yukon

105 D/11 A mass of specular hematite about 45 m thick occurs at a contact between granite and sedimentary rocks at the Puebla prospect near Whitehorse. Copper minerals occur scattered throughout the deposit (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 39).

106 B/5 An extensive deposit of hematite-jasper iron formation occurs in the vicinity of the headwaters of the Snake River. Beds up to 60 m thick are reported to range over an area of some 200 square miles (D.K. Norris, 1963: Geol. Surv. Can., Paper 63-1, p. 19).

106 C
106 D
106 E
106 F In 1905, Charles Camsell reported finding iron ore as float in the Bonnet Plume, Snake, Peel, Rackla, and Bear rivers. It consisted of hematite and magnetite and was presumed to have been derived from the mountains in the vicinity of the headwaters of the streams (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 204).

106 O/4
115 O/14
115 O/15
116 B/3 Siliceous hematite, used as a gemstone and known in the trade as "black diamond" occurs as pebbles in the gold placer deposits at Dublin Gulch and in Hunker and Bonanza Creeks. (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 96, 104).

HEMIMORPHITE

$Zn_4Si_2O_7(OH)_2.H_2O$

Hemimorphite is a secondary mineral formed by the action of silica-bearing waters on zinc minerals, and may be a minor ore mineral of zinc, occurring in the oxidized zones of zinc deposits. The mineral was originally known as calamine, which name has also been used for zinc carbonate. The name hemimorphite has been adopted by international agreement.

British Columbia

82 F/3 Hemimorphite occurs in the Hudson Bay Mine, on Sheep Creek in the Nelson mining division (R.A.A. Johnston, 1911: Geol. Surv. Can., Sum. Rept., p. 363).

82 F/10 Small quantities of hemimorphite have been found in the Skyline claim, 3.2 km west-southwest of Ainsworth (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 28R).

Quebec

22 B/16 Hemimorphite forms dull, cream-white crusts on quartz at the Federal zinc-lead mine. The mine is located about 1.6 km west of the Trans Gaspésien Highway from a junction 6.4 km south of the south gate to Parc-de-la-Gaspésie. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 72).

HERCYNITE

$FeAl_2O_4$

Quebec

31 H/7 The spinel mineral, hercynite, occurs locally as small irregular grains in gabbro and yamaskite rocks of the Mount Yamaska igneous complex. (S.S. Gandhi, 1970: Can. Mineralogist, 10, p. 465-6).

HESSITE

Ag_2Te

British Columbia

82 E/2 Hessite occurs at the Long Lake (Jewel Lake) camp, Greenwood mining division, on the Lakeview and North Star claims. At the former, located on the north side of Jewel Lake, hessite is associated with altaite, native gold, native copper, and native tellurium in a segregated quartz vein carrying chalcopyrite, pyrrhotite, and chalcocite. At the latter locality, hessite occurs with native gold, chalcopyrite, pyrite, and galena in a quartz vein. Chemical analysis of hessite from the Lakeview claim by H.A. and J.A. Guess: Te 37.33, Ag 60.68, Au 2.29, total 100.30 (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 12R) (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

82 E/4 A quartz-siderite vein on the Calumet claim, Kruger Mountain, Osoyoos mining division, contains hessite, petzite, and gold (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, pp. 11, 12R).

82 E/4
82 E/5 Hessite occurs in the Hedley Monarch Mine in the Osoyoos mining division. This mine in near Olalla; its holding extend southerly down Keremeos Creek for nearly 3.2 km from Olalla. The hessite was identified in a polished section, and was seen to be in close contact with altaite and petzite (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 356).

82 F/2 The telluride minerals, hessite and petzite, occur with pyrite, galena, sphalerite, chalcopyrite, tetrahedrite and scheelite at the Bayonne Mine at Bayonne Creek, a tributary of Summit Creek (S. Leaming, 1973: Geol. surv. Can., Paper 72-53, p. 101).

92 F/10 Hessite is intimately mixed with wehrlite in massive chalcopyrite and bornite at the Marble Bay and Little Billy mines, near Vananda on Texada Island (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 76).

92 F/14 A minor amount of hessite occurs at the Mount Washington Copper deposit located near the summit and on the northeast slope of Mount Washington about 24.1 km northwest of Courtenay (J.E. Muller and D.J.T. Carson, 1969: Geol. Surv. Can., Paper 68-50, p. 42).

92 O/4 The ore of the Pellaire Mines on Fall Creek, 8 km southwest of Taseko Lake, consists mainly of sphalerite, pyrite and chalcopyrite. Hessite occurs in both pyrite and chalcopyrite, often as veinlets or inclusions in the former (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 76).

92 O/4
92 O/5 Polished sections of material from the Con West property at Taseko Lake, Clinton mining division, have shown small areas of hessite embedded in chalcopyrite (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 355).

93 E/6 Vuggy limonite-stained quartz veins containing altaite, hessite and galena occur in greenstone close to a granite contact on the Hebson property, near the southwest end of Surel Lake, Tweedsmuir Park, Omineca mining division. Hessite was also identified in polished sections from the Harrison Group on Lindquist Lake (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 355).

Manitoba

52 L/13 Electron probe microanalysis of hessite from the San Antonio Mine, Bissett: Au 0.2, Ag 62.6, Te 37.6, total 100.4 (E.F. Stumpfl and J. Rucklidge, 1968: Am. Mineralogist, 53, p. 1516).

Northwest Territories

86 K/4 Hessite is reported to be a minor constituent of the complex uranium-silver deposit at the Eldorado Mine, Labine Point (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 36).

Ontario

41 I/6 Hessite is a common constituent of lead-rich ores at the Frood Mine and has also been detected with massive maucherite (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7, p. 98).

41 I/16 Chalcopyrite from the Temagami copper deposit on Temagami Island in Temagami Lake contains small inclusions of temagamite, merenskyite, stützite and hessite (L.J. Cabri, J.H.G. Laflamme and J.M. Stewart, 1973: Can. Mineralogist, 12, p. 193).

42 A/1 Hessite is associated with native gold in the quartz veins of the Kirkland Lake area (A.G. Burrows, 1923: Ont. Dept. Mines, Ann. Rept., vol. 32, Pt. IV, pp. 10-20).

42 A/1 Hessite is associated with tetradymite, altaite, and calaverite on the Tough-Oakes claim at Kirkland Lake (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 98).

42 A/1 Grains of hessite are associated with small compact masses of coloradoite, chalcopyrite, and tetrahedrite in coarsely crystalline calcite at the Kirkland Lake Mine (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 356).

42 A/6 Hessite has been identified as thin films on cleavage planes of ankerite at the Hollinger Mine in the Porcupine District (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 356).

42 A/6 Hessite has been identified from the Powell claim (M.E. 22), Deloro Township, Porcupine area. It occurs with native gold in a quartz-ankerite deposit (E. Thomson, 1922: Univ. Toronto Stud., Geol, Ser., 14, p. 98).

42 A/1 Electron probe microanalysis of hessite from Tough Oakes Mine, Kirkland Lake: Au 0.0, Ag 61.7, Te 37.2, total 98.9.

42 A/6 Electron probe microanalysis of hessite from Hollinger Mine: Au 0.0, Ag 63.5, Te 36.8, total 100.3 (E.F. Stumpfl and J. Rucklidge, 1968: Am. Mineralogist, 53, p. 1516).

52 B/10 Hessite is found at the Huronian (Moss or Ardeen) Mine in Moss Township, Thunder Bay District. It occurs either in grains with altaite in a gangue of quartz and calcite, or with petzite as a massive black crust, or with gold as a thin bronzy to black film on the surface of a quartz vein (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

52 E/9 Hessite occurs in lead-grey, plate-like masses with quartz, pyrite and chalcopyrite on Gold Creek, east of the head of Pine Portage Bay, Lake of the Woods. An analysis of the hessite from this locality by Lawson gave the following

results: Te 36.72, Ag 63.28, total 100.00; S.G. 7.968 (A.P. Coleman, 1895: Ont. Bur. Mines, Ann. Rept., vol. 5, p. 105).

Quebec

31 M/7 An X-ray powder pattern identification has shown the presence of hessite, as well as petzite, at the Belleterre Mine, in the Mud Lake area, Guillet Township, Temiscamingue County (E.W. Nuffield and D.H. Gorman, 1960: private communication).

32 C/4 Disseminated grains of hessite occur in quartz, along with tourmaline, pyrite, chalcopyrite, and gold, at the Sullivan Mine, Bourlamaque Township, Abitibi County (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 356).

32 C/4 Small amounts of hessite, calaverite, krennerite, tellurbismuth and native gold have been found in the ore at the Lamaque Mine in Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 111).

32 D/2 Hessite in association with pyrite and arsenopyrite is found at the McWatter Mine in Rouyn Township, Abitibi County (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 100).

32 D/6 Hessite is one of a suite of telluride minerals reported to occur with native gold and electrum at the Horne Mine at Noranda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 47).

32 F/12 A telluride zone in the massive sulphide body at the Mattagami Lake Mine contains hessite, altaite, mattagamite and tellurantimony. The mine is 8 km southwest of the town of Matagami (R.I. Thorpe and D.C. Harris, 1973: Can. Mineralogist, 12, p. 55).

Yukon

105 D/3 Sparsely disseminated hessite occurs with galena in quartz at the Buffalo Hump Group on Mount Stevens, in the Wheaton River District (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 355).

105 D/6 A few pockets containing free gold, pyrite, petzite, sylvanite, hessite, and telluric ochre have been found in a quartz vein on the Gold Reef claim on Gold Hill, Wheaton River district (D.D. Cairnes, 1909: Geol. Surv. Can., Sum. Rept., p. 54) (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

115 G/6 A number of small nuggets of gold and hessite have been obtained from placer workings on upper Burwash Creek (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 355).

115 G/6 Electron probe microanalysis of hessite from Burwash Creek: Au 0.0, Ag 62.6, Te 37.6, total 100.6 (E.F. Stumpfl and J. Rucklidge, 1968: Am. Mineralogist, 53, p. 1516).

HETEROGENITE

$CoO.OH$

The name heterogenite has priority over the synonyms: stainierite, transvaalite, mindigite, trieuite, boodtite, heubachite and schulzenite (M.H. Hey, 1962: Min. Mag. 33, p. 253).

Ontario

31 M/5 Small black spheroidal masses of heterogenite occur with vein silver near Cobalt, Ontario (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 158H).

HEULANDITE

$(Na,Ca)_{2-3}Al_3(Al,Si)_2Si_{13}O_{36}.12H_2O$

Heulandite is a common mineral of the zeolite group found in cavities in basaltic rocks. It has also been found as a constituent of metalliferous veins, as an alteration product of acidic volcanic rocks, and as an authigenic mineral in sedimentary rocks.

British Columbia

82 E/5 Abundant zeolites outcrop along the north side of Yellow Lake about 14.4 km west of Okanagan Falls. They occur as nodules up to 7 cm in diameter and include natrolite, heulandite, laumontite, thomsonite and analcime (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 20).

82 F/4 A specimen of heulandite, found near Rossland at the seventh level of the War Eagle Mine, has been donated by R.W. Brock to the National Mineral Collection.

82 F/14 Heulandite occurs near Four Mile (or Silverton) Creek at the Fishermaiden Mine, Slocan division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 121).

82 G/9 A reddish mineral occurring in veins in the Blairmore-Carbondale region has been identified as heulandite (X-ray Laboratory, Geol. Surv. Can.).

92 I/10 Yellowish green heulandite is associated with erionite on opal specimens from a claim on Savona Mountain (X-ray Laboratory, Geol. Surv. Can.).

92 I/15 The National Mineral Collection includes heulandite from a locality about 400 m above the mouth of Criss Creek in the Ashcroft mining division. The specimen was contributed in 1918 by W.F. Ferrier.

93 K/4 Heulandite is associated with collinsite and ferrierite in basalt at an occurrence on a farm on Brown Road about 3.2 km northwest of the ferry landing at Francois Lake. Electron microprobe analysis: SiO_2 60.32, Al_2O_3 14.26, Fe_2O_3 0.07, MgO 0.88, CaO 4.08, BaO 2.84, Na_2O 0.76, K_2O 1.37, total 84.58 (W.S. Wise and R.W. Tschernich, 1976: Am. Mineralogist, 61, p. 60).

New Brunswick

21 B/10
21 B/15 On Grand Manan Island, heulandite occurs with scolecite, laumontite, analcime, natrolite, epistilbite, thomsonite and stilbite as crystal aggregates and radiating fibres in cavities and seams in basalts and as pebbles along the shoreline. The zeolite amygdules are larger and more numerous along the coastline known as Seven Days Work (west side of Whale cove to Ashburton Head) than at any other part of the Island (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 10).

21 O/15 Heulandite is reported to occur at Dalhousie in Restigouche County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74).

22 B/1 Cavities and fractures in volcanic flows and tuffs exposed along the shoreline from Inch Arran to Bon Ami are filled with one or more of stilbite, laumontite, thomsonite, heulandite, chlorite, prehnite, and phillipsite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 104).

Nova Scotia

21 A/12 Heulandite occurs at Waterford on Digby Neck, Digby County (L.W. Bailey, 1892-93: Geol. Surv. Can., Rept., IX, p. 147M) also at Williams Brook, a stream flowing into the head of St. Mary's Bay in Digby County (E. Gilpin: Nova Scotia Inst. Nat. Sci., V, p. 294) and in the North Mountain area of Annapolis County (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 97A).

21 A/12 Chemical analysis of heulandite from Digby Gut by E.W. Todd: SiO_2 57.18, Al_2O_3 17.26, Fe_2O_3 0.22, CaO 7.72, SrO 0.48, Na_2O 1.49, K_2O 0.54, H_2O 15.45, total 100.34, S.G. 2.242 (T.L. Walker and A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser. 14, p. 54).

21 A/14 Crystals of heulandite form incrustations on the surfaces of cavities in an amygdaloidal rock at Ste. Croix Cove, Annapolis County. The cavities are from 1 to 5 cm in diameter and up to 30 cm long. Where crystals project into a cavity they exhibit perfect crystal form (T.L. Walker and A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 7).

21 B/8 An analysis of a specimen of heulandite from Petit Passage at the western end of Digby Neck gave the following results: SiO_2 57.26, Al_2O_3 16.81, Fe_2O_3 0.05, CaO 6.58, SnO 1.26, Na_2O 0.54, K_2O 1.02, H_2O 16.22, total 99.74; S.G. 2.216 (A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 52). The mineral has also been found at Mink Cove, Digby County (E. Gilpin: Nova Scotia Inst. Nat. Sci., V, p. 294).

21 H/1 Heulandite, stilbite, clear quartz, amethyst, agate, and jasper are common as amygdules and coatings in large vesicles in the basalts of the Wolfville map-area (D.G. Crosby, 1962: Geol. Surv. Can., Mem. 325, p. 47).

21 H/2 A flesh coloured variety of heulandite is found at Harbourville on the south shore of Minas Channel in King's County (A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 29, p. 52).

Heulandite occurs at Morden about 13 km southwest along the coast from the above locality (C.W. Willimott, 1882-84: Geol. Surv. Can., Sum. Rept., p. 261).

Three miles northeast of Harbourville, at the settlement of Canada Creek, heulandite occurs as amygdules in basalt (R.A. Wyman, 1960: Can. Dept. Mines, Mines Br., IR 60-63). The mineral also occurs at Hall's Harbour some 10 km farther east along the coast (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 38T).

21 H/3 Heulandite has been found on the Ile Haute in the Bay of Fundy (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 38T).

21 H/7 Occurrences of heulandite are known at Cape D'Or and at Spencer Island on the northern side of Minas Channel (A.R.C. Selwyn, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 55AA).

21 H/8 A number of heulandite occurrences have been reported from the vicinity of Minas Basin. Several attractive specimens have been obtained from Amethyst Cape and a flesh-coloured variety occurs on nearby Cape Blomidon at the eastern end of Minas Basin. On the northern shore, heulandite is found at Wasson Bluff and Clarkes Head where it occurs as honey yellow crystals (A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 52). In the same area are the occurrences at Partridge Island (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 38T) and at Five Islands (A.R.C. Selwyn, 1890-91: Geol. Surv. Can., Ann. Rept., V. p. 55AA). The mineral has also been reported from a locality near Swan Creek, Cumberland County (E. Gilpin: Nova Scotia Inst. Nat. Sci., V, p. 294).

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Heulandite is one of the more common zeolites found in the basalts of the Minas Basin - Bay of Fundy area. The following occurrences are reported by Ann P. Sabina, 1964; Geol. Surv. Can., Paper 64-10.

21 A/12 Deep Cove, 10.3 km from Digby, Digby County; with stilbite and epistilbite in thin veins.

21 A/12 Gulliver Cove, 3.7 km north of Highway 17 at the Rossway turnoff: as colourless platy crystals in irregular veinlets cutting stilbite, or in seams about one inch wide in basalt.

21 B/9 Trout Cove, 1.8 km west of the turn-off from Highway 17 at Centerville, Digby County: sparingly, with stilbite.

21 H/1 Woodworth (Bennett) Bay, 4.8 km east of Baxter's Harbour, Kings County: with thomsonite, analcime, stilbite and rare mordenite in small cavities.

21 H/2 Baxter's Harbour and Long Beach, Kings County: as tiny crystals lining walls of cavities sometimes several cm across, with lesser amounts of analcime, laumontite and stilbite.

21 H/2 Hall's Harbour, Kings County: with stilbite, laumontite, apophyllite, and thomsonite. The zeolites, especially stilbite and heulandite, are more plentiful and occur in larger cavities along the shoreline from here to Black Rock than on any other part of the coast.

21 H/2 Chipman Brook, Canada Creek and Black Rock, Kings County. Heulandite and stilbite are the most common zeolites and are associated with laumontite and mordenite. Spike amygdules, 5 or 7.5 cm in diameter and several m long are numerous.

21 H/2 Harbourville and Ogilvie, Kings County. Stilbite and heulandite are the predominant zeolites, some heulandite occurs as chalk-white dense nodules up to 5 cm across, associated with laumontite and mesolite.

21 H/2 Morden, Kings County: with stilbite, laumontite, mordenite, apophyllite, analcime and mesolite.

21 H/3 Margaretsville, Annapolis County: with laumontite, analcime, apophyllite, gyrolite, mesolite, stilbite, scolecite, and natrolite. Laumontite occurs in large openings up to 30 cm across; the other zeolites occupy small cavities averaging about 1.2 cm across.

21 H/3 Port George, Annapolis County: with stilbite, analcime, mesolite, apophyllite, laumontite, gyrolite, and thomsonite, all sparingly and in small cavities.

21 H/7 Horseshoe Cove - Cape d'Or, Cumberland County: in crystal groups of analcime, stilbite, laumontite, apophyllite, chabazite, thomsonite, mesolite and natrolite in cavities in basalt cliffs along the shore.

21 H/8 Partridge Island, Cumberland County: with stilbite, laumontite, natrolite, chabazite, analcime and apophyllite.

21 H/8 Swan's Creek, Cumberland County: with gmelinite, chabazite, analcime, apophyllite and natrolite.

21 H/8 Wassons's Bluff, Cumberland County: with chabazite, stilbite, gmelinite, natrolite and analcime.

21 H/8 The Islands (The Brothers), Cumberland County: with gmelinite, analcime, chabazite and natrolite.

21 H/8 McKay (McCoy) Head, Cumberland County: with analcime.

21 H/8 Cape Blomidon to Cape Split, Kings County: with apophyllite, natrolite, stilbite, chabazite, analcime, gmelinite, laumontite, mesolite and thomsonite, in cavities in the basalt cliffs and as fragments along the beach.

21 H/8 Pinnacle Island, Cumberland County: with analcime, chabazite, natrolite, stilbite, thomsonite and gmelinite.

21 H/8 Scots Bay, Small Cove and Big Cove, King's County: sparingly with stilbite, mesolite and natrolite.

Ontario

31 M/5 Heulandite forms a colourless drusy crust on chabazite crystals and stilbite exposed on the west side of Cross Lake near Cobalt (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 68).

Quebec

31 F/15 Colourless to peach-coloured blocky crystals of heulandite and sheaf-like aggregates of stilbite line vugs in calcite at the Yates uranium deposit in Huddersfield Township about 16.5 km northwest of Otter Lake village and 4.8 km west of Sandy Creek (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 95).

HEXAHYDRITE

$MgSO_4.6H_2O$

Hexahydrite is a white opaque mineral which crystallizes in the monoclinic system. It has a columnar to fibrous structure and a salty, bitter taste.

British Columbia

92 H/6 Hexahydrite has been identified as white acicular aggregates on a specimen from the Giant Mascot Mine at Hope. Cyanochroite is associated (X-ray Laboratory, Geol. Surv. Can.).

92 I/11 Hexahydrite and rozenite have been identified on specimens collected 0.8 km west of Highway 1, 27 km south of Cache Creek (X-ray Laboratory, Geol. Surv. Can).

92 I/14 Chemical analysis of hexahydrite from a locality near the Bonaparte River, halfway between Scottie and Carquill creeks in the Clinton mining division: MgO 17.48, SO_3 35.19, H_2O 47.33, total 100.00; S.G. 1.757 (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., pp. 256-57).

Ontario

31 C/10 Snow-white hexahydrite occurs in crystalline limestone at the Enterprise Mine about 42 km north of Kingston and 16 km west of Godfrey. It is closely associated with gypsum and forms globular aggregates on pyrite and pyrrhotite (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

42 A/10 Coatings of dull white powdery hexahydrite occur on weathered specimens on the dumps at the Alexo Mine in Clergue Township. Access to the mine is by a single-lane road to the right of Highway 67 at a point 17.8 km from its junction with Highway 101 (Ann P. Sabina,1974: Geol. Surv. Can., Paper 73-13, p. 122).

Quebec

31 I/16 The secondary sulphate hexahydrite occurs as a snow white coating or encrustation on the ore-bearing gneiss at the Montauban Mine near Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 89).

32 D/8 Dull white and light blue crusts of hexahydrite occur on specimens on the mine dumps of the Marbridge Mine about 8 km by road west of La Motte (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

Yukon

115 F/15 Hexahydrite has been identified as one of the secondary minerals present on specimens from the dumps at the Canalask Mine on the east side of the White River overlooking Miners Ridge and the Nutzotin Mountains (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 73).

HILAIRITE

$Na_2ZrSi_3O_9.3H_2O$

Quebec

31 H/11 The new mineral, hilairite, occurs at the Desourdy quarry on the northeast slope of Mont St-Hilaire. It is associated with analcime, natrolite, microcline, catapleiite, elpidite, aegirine and chlorite. Electron microprobe analysis: SiO_2 42.08, Al_2O_3 0.03, ZrO_2 29.72, TiO_2 0.04, CaO 0.20, MgO 0.01, FeO 0.03, MnO 0.02, Na_2O 13.43, K_2O 0.52, H_2O 13.54 (by TGA), total 99.62 (G.Y. Chao, D.H. Watkinson and T.T. Chen, 1974: Can. Mineralogist, 12, p. 237).

HIORTDAHLITE

$(Ca,Na)_3ZrSi_2O_7(O,OH,F)_2$

Quebec

31 H/11 Hiortdahlite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

31 L/16 Hiortdahlite, a member of the wohlerite group, is recorded for the first time in Canada in an alkalic rock complex on the Kipawa River in Villedieu township at 46°47'49"N, 78°29'31"W. It occurs mostly in pyroxenite-amphibolite bodies with other rare minerals including: rinkite, mosandrite, eudialyte, vlasovite, britholite, miserite and agrellite. Chemical analysis: SiO_2 32.2, ZrO_2 18.76, HfO_2 0.27, Nb_2O_5 0.56, Fe_2O_3 0.27, TiO_2 0.30, SnO_2 0.02, U_3O_8 0.09, Y_2O_3 3.50, TR_2O_3 2.08, Al_2O_3 0.07, CaO 29.57, SrO 0.03, MnO 0.30, MgO 0.09, Na_2O 6.85, K_2O 0.02, H_2O^+ 0.42, F 6.69, less O≡F 2.81, total 99.28. Analysis for rare earths: La_2O_3 0.08, Ce_2O_3 0.23, Pr_2O_3 0.04, Nd_2O_3 0.17, Sm_2O_3 0.07, Eu_2O_3 0.01, Gd_2O_3 0.12, Tb_2O_3 0.04, Dy_2O_3 0.31, Ho_2O_3 0.09, Er_2O_3 0.35, Tm_2O_3 0.07, Yb_2O_3 0.44, Lu_2O_3 0.06, total 2.08. (H.M. Aarden and J. Gittins, 1974: Can. Mineralogist, 12, p. 241).

HISINGERITE

$Fe_2Si_2O_5(OH)_4.2H_2O$

Hisingerite is a brownish black to black, amorphous or finely crystalline material of somewhat uncertain composition. The X-ray powder patterns of hisingerites from different localities consist of broad and relatively weak lines that vary in detail. Several patterns are given by J.A. Whelan and S.S. Goldich, 1961: Am. Mineralogist, 46, p. 1412.

Ontario

41 H/1 Hisingerite occurs at the Wilcox Mine in conc. IV, lots 19, 20, 21, 22, Cowper Township, in the Parry Sound district. It is associated with pyrite, chalcopyrite, magnetite, pyrrhotite, cubanite and sphalerite. Chemical analysis by R.J. Leonard: SiO_2 35.57, TiO_2 0.12, Fe_2O_3 39.20, FeO 4.80, Al_2O_3 0.38, CaO 0.85, MgO 1.60, H_2O (above 110°C) 11.60; H_2O (below 110°C) 6.00 total 100.07; S.G. 2.50 (G.M. Schwartz, 1924: Am. Mineralogist, 9, p. 141).

Quebec

21 L/9 Hisingerite, allophane and cyanotrichite are reported to occur with nickel minerals at the Eastern Metals Mine, 4.8 km from St-Fabien. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 66).

31 F/10 Hisingerite and pyrrhotite occur together in Pontiac County, Calumet Township, range IX, lot 12. A specimen from this locality was donated by C.W. Willimott, 1898, to the National Mineral Collection.

31 G/5 Minerals associated with the deposit at the Forsyth Mine north of Aylmer include hisingerite. (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 12).

31 I/16 At Tetrault Mines near Montauban-les-Mines in Portneuf County, hisingerite is found in a carbonate rock. It is associated with sulphides and is believed to have formed late in the sequence of mineralization (J.J. O'Neill and F.F. Osborne, 1938: Que. Dept. Mines, Prelim. Rept., 138, p. 18).

Chemical analysis of hisingerite from Montauban-les-Mines by H. Boileau: SiO_2 37.54, Al_2O_3 0.56, TiO_2 6.00, Fe_2O_3 37.02, FeO 4.66, MnO 0.75, MgO 2.81, CaO 1.52, H_2O^+ 9.20, H_2O^- 6.00 organic matter 0.05, total 100.11; S.G. 2.53-2.55 (F.F. Osborne and M. Archambault, 1950: Le Naturalistie Canadien, 77, pp. 283-290).

Hisingerite is reported to occur at the following localities in Montauban Township; range I, lots 33-41 and 312-322; range II, lots 38-41 (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 30).

32 D/3 A black glistening mineral occurring in fault zones at the Horne Mine, near Noranda, was identified by Ellsworth as hisingerite (M.E. Wilson, 1941: Geol. Surv. Can., Mem. 229, p. 73).

HOLLINGWORTHITE

(Rh,Ru)AsS

Ontario

52 L/7 The rare platinoid sulpharsenides, hollingworthite and irarsite, have been found in a specimen of drill core from Werner Lake. Electron probe microanalysis: Ir 0.22, Pt 0.61, Os 0.0, Rh 41.3, Pd 0.85, Ru 2.8, Ni 1.3, Co 2.5, As 33.3, S 16.4 total 99.2. (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 617-627).

HOLMQUISTITE

$Li_2(Mg,Fe)_3(Al,Fe)_2Si_8O_{22}(OH)_2$

Quebec

32 C/5 Specimens of holmquistite have been found on the property of the Quebec Lithium Corporation near Barraute in Lacorne and Fiedmont Townships, Abitibi County. This rare lithium amphibole occurs as massive aggregates at or near the contacts between spodumene-bearing pegmatite dykes and a hornblende rich rock. Chemical analysis by J.A. Maxwell: SiO_2 59.73, Al_2O_3 11.21, Fe_2O_3 2.97, FeO 8.92, MgO 10.16, CaO 0.56, Na_2O 0.18, K_2O 0.15, Li_2O 3.56, H_2O^+ 2.08, H_2O^- 0.02, TiO_2 0.17, MnO 0.20, F 0.24, total 100.15 less O F≡0.10, total 100.05; S.G. 3.13. (E.H. Nickel, B.S. Karpoff, J.A. Maxwell and J.F. Rowland, 1960: Can. Mineralogist, 6, pp. 504-512).

HORNBLENDE

$(Ca,NaK)_{2-3}(Mg,Fe^{++},Fe^{+++},Al)_5(Si,Al)_8O_{22}(OH)_2$

A relatively common member of the amphibole group, hornblende occurs in a wide variety of rock types including gneisses and schists of metamorphic origin and igneous rocks such as granite, syenite, diorite, gabbro, and basalt. Colour depends upon chemical composition and may be dark green, brown or black. Because the composition is somewhat variable, a number of names are in use to describe the many resulting varieties, notably, hastingsite, edenite, kaersutite, pargasite, and tschermakite. Further distinctions are often made by adding prefixes to the foregoing varietal names so that a particularly iron rich hastingsite might be called ferrohastingsite. Hornblendes form over a relatively wide range of pressures and temperatures and are all characterized by a relatively high calcium content. The distinct prismatic cleavage angles of 56 and 124 degrees distinguish hornblende from pyroxene and tourmaline with which it could otherwise be confused.

British Columbia

92 I/12 The following is a chemical analysis by Wait of a specimen of hornblende from Foster Bar in the Lillooet mining division: SiO_2 38.79, Al_2O_3 11.51, Fe_2O_3 16.88, FeO 15.96, MnO 0.62, MgO 2.86, CaO 11.57, K_2O 1.36, Na_2O 0.71, H_2O 0.92, total 101.18; S.G. 3.404 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 17R).

92 K/13 Hornblende occurs in hornblendite, about 3.2 km beyond the Ahnuati Valley on the north side of Knight Inlet, in the form of small greenish black prisms upon which crystal faces are seldom seen, and as blade-like crystals sometimes 5 to 7.5 cm long. Chemical analysis by W.B. Campbell: SiO_2 41.0, Al_2O_3 14.6, Fe_2O_3 4.1, FeO 10.5, MgO 13.2, CaO 11.6, Na_2O 2.7, K_2O 0.4, TiO_2 2.7, total 100.8 (J.A. Bancroft, 1913: Geol. Surv. Can., Mem. 23, p. 87).

Newfoundland

12 G/1 The metamorphic rocks in the contact zone of the North Arm Mountain pluton at Bay of Islands, grade from a calcic hornfels adjacent to the ultrabasic material to amphibolite and finally phyllite at the outer edge of the aureole. The amphibolite zone is composed of banded hornblende and plagioclase. The hornblende is poikiloblastic and pleochroix (X golden yellow, Z deep red-brown) with slightly more Mg then Fe. Crystals are aligned with the long axis parallel to the banding (C.H. Smith, 1958: Geol. Surv. Can., Mem. 290, pp. 14-16).

Ontario

31 C/7 Hornblende occurs as black crystals and in massive form in pegmatite in a quarry located on the north side of Sand Road. Sand Road branches out westward from Highway 38, 800 m south of Verona (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 11).

31 C/9 Chemical analysis of brown hornblende from amphibolite west of Hardwood Bay, Devil Lake, by G. MacDonald: SiO_2 35.60, Al_2O_3 16.00, Fe_2O_3 6.44, FeO 10.72, MgO 10.80, CaO 11.30, Na_2O 3.16, K_2O 0.93, H_2O^+ 0.61, H_2O^- 0.09, TiO_2 2.30, MnO 0.24, total 98.19 (H.R. Wynne-Edwards, 1967: Geol. Surv. Can., Memoir 346, p. 29).

31 C/10 Hornblende occurs as crystals and in massive form in crystalline limestone at the Enterprise Mine. This mine is located at about 42 km north of Kingston and 16 km west of Godfrey. Other minerals found in the mine are pyrite, pyrrhotite, molydenite, apatite, scapolite, hexahydrite, jarosite and copiapite (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

31 C/10 Black hornblende crystals in association with flesh-red to pink feldspar are found in pegmatite at the Richardson Feldspar Mine. The mine, now a large pit filled with water, is located about 3 km east of Highway 38 and about 1.6 km southeast of the Godfrey-Westport road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 14).

31 C/10 The mineral collection of the Royal Ontario Museum includes hornblende collected from the west shore of Wolfe Lake, Bedford Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 200).

31 C/15 Specimens of hornblende in the mineral collection at the Royal Ontario Museum are from: Boerth Mine, east half of lot 29, conc. VIII, Clarendon Township; and Robertsville (Mississippi) Mine, lots 3 and 4, conc. IX, Palmerston Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 200).

31 C/16 An analysis by Harrington of hornblende from conc. VIII, lot 11, Bathurst Township, Lanark Township, is as follows: SiO_2 40.02, Al_2O_3 15.55, Fe_2O_3 3.44, FeO 8.60, MgO 14.37, CaO 12.21, K_2O 2.13, Na_2O 2.40, H_2O 1.81, total 100.53 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., 201).

31 D/16
31 E/1 The following occurrences of hornblende in Haliburton County are represented in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 200):

(1) lot 28, conc. XV, Glamorgan Township
(2) Harcourt Mine, lot 3, conc. I, Harcourt Township
(3) lot 5, conc. I, Harcourt Township
(4) Esson (Otter) Lake, Monmouth Township
(5) near Tory Hill, Monmouth Township
(6) Urotomic occurrence, north half lot 19, conc. IV, Monmouth Township
(7) lots 6 and 7, conc. XI, Monmouth Township
(8) Millar's Mine, lot 15, conc. XI, Monmouth Township
(9) Dave Woodcox farm, lot 18, conc. XII, Monmouth Township
(10) Silver Crater (Basin) Mine, lot 31, conc. XV, Faraday Township.

31 E/9 Crystal aggregates of lustrous black hornblende are abundant at the Cameron and Aleck pegmatite quarry, 4.8 km northwest of Madawaska (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 55).

31 F/4 An analysis of hastingsite from the York River in Dungannon Township is as follows: SiO_2 34.184, TiO_2 1.527, Al_2O_3 11.517, Fe_2O_3 12.621, FeO 21.979, MnO 0.629, CaO 9.867, MgO 1.353, K_2O 2.286, Na_2O 3.290, H_2O (ign.) 0.348, total 99.601; S.G. 3.433 (B.J. Harrington, 1897: Can. Rec. Sci., VII, pp. 77-87).

31 F/4 Specimens of hornblende in the mineral collection at the Royal Ontario Museum are from: 3.2 km west of Bancroft on Highway 28, lot 7, conc. A, Faraday Township; and lot 3, conc. IV, Monteagle Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 202).

31 F/6 Black prismatic crystals of hornblende from conc. XII, lot 32, Sabastopol Township, Renfrew County, are present in the National Mineral Collection.

Chemical analysis by Stanley of hornblende from Renfrew County: SiO_2 43.76, TiO_2 0.78, Al_2O_3 8.33, Fe_2O_3 6.90, FeO 10.47, MnO 0.50, MgO 12.63, CaO 9.84, K_2O 1.28, Na_2O 3.43, H_2O 0.65, F 1.82, total 100.39, less $O \equiv F$ 0.76, total 99.63; S.G. 3.290 (S.L. Penfield and F.C. Stanley, 1907: Am. J. Sci., Ser. IV, vol. XXIII, p. 39).

31 F/10 Crystals of black hornblende occur in white to pale pink calcite at Elliotts' Mine on lot 6, conc. IX, Roxx Township, about 0.8 km north of Foresters Falls (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 61).

41 I/10 Chemical analysis of ferrotschermakite from the Frood Mine, Sudbury, by J. Muysson, McMaster

University: SiO_2 40.12, TiO_2 0.87, Al_2O_3 18.67, Fe_2O_3 2.64, FeO 16.75, MnO 0.27, MgO 5.48, CaO 11.65, Na_2O 0.80, K_2O 0.75, H_2O^+ 1.61, H_2O^- 0.01, F 0.07, total 99.69, less O for F 0.03, total 99.66 (F.C. Hawthorne and H.D. Grundy, 1973: Min Mag., 39, p. 36).

Quebec

31 F/15 Massive black hornblende is an abundant constituent of the Waltham pegmatite deposit located north of Highway 8 and 1.9 km west of Waltham Station (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 106).

31 G/5 Hornblende is the most common gangue mineral at the Forsyth Mine north of Aylmer (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 12).

31 G/8
31 G/9 Hornblende is found in the border zone between ijolite and carbonate rocks in the Oka Complex, located 32 km west of Montreal on the north shore of the Lake of Two Mountains. Chemical analysis: SiO_2 36.94, Al_2O_3 17.93, Fe_2O_3 6.70, FeO 4.96, MgO 12.59, CaO 14.08, Na_2O 2.34, K_2O 2.11, H_2O^+ 2.35, total 100.00. The six strongest lines on the X-ray powder pattern (Co radiation, Fe filter) of this hornblende are: 3.38 (9), 3.29 (7), 3.09 (9), 2.70 (10), 2.59 (7), 2.568 (7). Data reported by G. Perrault on ASTM card 9-434.

31 G/8
31 G/9 A mineral identified as lamprobolite (basaltic hornblende) occurs as phenocrysts and in the groundmass of alnoite and alnoite breccia at the Oka Complex, located 32 km west of Montreal on the north shore of the Lake of Two Mountains. Chemical analysis by W.H. Herdsman: SiO_2 38.70, Al_2O_3 14.52, TiO_2 1.33, Fe_2O_3 5.99, FeO 5.46, MnO 0.10, MgO 15.51, CaO 13.08, Na_2O 1.14, K_2O 2.42, P_2O_5 0.33, H_2O^+ 1.22, H_2O^- 0.02, total 99.82, S.G. 3.135 (D.P. Gold, 1966: Min. Soc. India, I.M.A. volume, p. 102-126).

31 G/10 Fine specimens of edenite are reported from lot 15, range IX, Grenville Township, Argenteuil County. The following chemical analyses are listed by Johnston, 1915, in Geol. Surv. Can., Mem. 74, p. 123, I. SiO_2 45.50, TiO_2 0.68, Al_2O_3 12.25, Fe_2O_3 0.28, FeO 0.75, MnO 0.11, MgO 20.63, CaO 13.31, K_2O 1.76, Na_2O 2.76, H_2O 0.40, F 2.80 total 101.23, less O≡F 1.17, total 100.06; S.G. 3.110 (B.J. Harrington, 1903: Am. J. Sci., Ser. IV, vol. XV, p. 392).
II. SiO_2 46.09, Al_2O_3 12.93, Fe_2O_3 0.79, MnO 0.36, MgO 20.82, CaO 12.91, K_2O 1.84, Na_2O 2.36, H_2O 0.66, F 2.84 total 101.60, less O≡F 1.19, total 100.41; S.G. 3.108 (G.C. Hoffmann, 1900: Geol. Surv. Can., Ann. Rept., XIII, p. 14R).
III. SiO_2 45.79, TiO_2 1.20, Al_2O_3 11.37, Fe_2O_3 0.42, FeO 0.42, MnO 0.39, MgO 21.11, CaO 12.71, K_2O 1.69, Na_2O 2.51, H_2O 0.67, F 2.76, less O≡F 1.16, total 99.88 (S.L. Penfield and F.C. Stanley, 1907: Am. J. Sci., Ser. IV, vol. XXIII, p. 49).

31 G/11 Greenish black hornblende is a common accessory mineral in pegmatite at the Pedneaud quarry near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 21).

31 G/12 Hornblende crystals occur in Hull Township, range XVI, lot 12. Specimens from this locality have been donated to the National Mineral Collection.

The National Mineral Collection contains crystals of hornblende from range I, lot 17, Wakefield Township, Gatineau County. They were contributed in 1882 by C.W. Willimott.

31 H/6 Chemical analysis of 'femaghastingsite' from essexite at Mount Johnson: SiO_2 38.633, Al_2O_3 11.974, Fe_2O_3 3.903, FeO 11.523, MgO 10.200, CaO 12.807, Na_2O 3.139, K_2O 1.489, MnO 0.720, TiO_2 5.035, total 99.432 (M. Billings, 1928: Am. Mineralogist, 13, p. 290).

31 H/6 Kaerustite-bearing rock has been exposed by seaway construction at Brossard east of the Mount Royal alkaline complex. Electron microprobe analysis (average of 20 random points): SiO_2 41.6, Al_2O_3 13.6, TiO_2 3.8, FeO 9.2, MgO 15.5, CaO 11.5, Na_2O 2.8, K_2O 1.9, MnO 0.1, total 100.0 (B.M. Gunn, 1972: Can. Mineralogist, 11, p. 840).

31 H/12 Chemical analysis of 'titaniferous femghastingsite' from diorite at Montreal: SiO_2 39.23, Al_2O_3 11.94, Fe_2O_3 5.92, FeO 12.04, MgO 11.01, CaO 11.21, Na_2O 2.33, K_2O 0.99, H_2O 0.36, MnO 0.10, TiO_2 7.99, total 103.12. Chemical analysis of 'magnesiohastingsite' from essexite at Montreal: SiO_2 39.23, Al_2O_3 14.38, Fe_2O_3 2.92, FeO 8.56, MgO 13.01, CaO 11.70, Na_2O 3.05, K_2O 0.98, H_2O 0.36, MnO 0.65, TiO_2 4.53, total 99.37; S.G. 3.159 (M. Billings, 1928: Am. Mineralogist, 13, p. 290).

31 I/16 Migmatite from Montauban-les-Mines in Chavigny Township is composed mainly of oligoclase and hastingsite. The rock also contains biotite, garnet, quartz, K-feldspar, sphene, apatite and zircon (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 16).

32 F/11 Ferrohastingsite has been identified in a specimen from a locality on the south shore of Alga Lake in the county of Abitibi-East (P.E. Imbault, 1952: Que. Dept. Mines, Geol. Rept., 51, p. 47).

32 I/14 Hastingsite occurs in the rocks along the Metawishish River in the Mistassini Territory as large grains containing inclusions of other minerals. Bluish green hastingsite comprises about 20 per cent of a granite near Grenier Lake in the Albanel area of the Mistassini Territory (J.N. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, pp. 14, 15).

HOWLITE

$Ca_2B_5SiO_9(OH)_5$

Newfoundland

12 B/7 Nodules of howlite are conspicuous on weathered surfaces of anhydrite on a vertical cliff at 48°18'30"N, 58°40'30"W, on the southern bank of Fischell's Brook by a railway bridge (V.S. Papezik and C.C.K. Fong, 1975: Can. Mineralogist, 13, p. 370).

Nova Scotia

Howlite was first identified as a new species by Professor H. How who described it under the name of silicoborocalcite. It occurs in earthy form and as nodules embedded in gypsum and anhydrite. Howlite is commonly white but may have streaks of other colours, notably black. Polished howlite has been used as an ornamental stone.

Chemical analysis by How of a specimen from Hants County: SiO_2 15.25, B_2O_3 44.22, CaO 28.69, H_2O 11.84, total 100.00; S.G. 2.55 (Phil. Mag., IV, vol. XXV, pp. 32-41).

Chemical analysis of howlite by Penfield and Sperry: SiO_2 15.33, B_2O_5 44.52, CaO 27.94,

Na_2O 0.53, K_2O 0.13, H_2O 11.55, total 100.00; S.G. 2.59 (S.L. Penfield and E.S. Sperry, 1887: Am. J. Sci., Ser. 3, vol. XXXIV, pp. 220-223).

11 E/3 Howlite and ulexite have been found in drill-core from a lead-zinc deposit at Gays River about 8 km southeast of Shubenacadie in Hants County (V.S. Papezik and C.C.K. Fong, 1975: Can. Mineralogist, 13, p. 370).

11 E/5 Howlite has been reported to occur at Noel, Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 38T).

11 F/15 Gypsum-anhydrite cliffs containing howlite and danburite occur along the shore about 3 km southwest of the ferry landing at Iona, Cape Breton Island. The howlite occurs as transparent, colourless to grey, slender crystals forming radial clusters in massive gypsum or in cavities in gypsum. Finely granular, snow-white howlite is found with transparent gypsum in the centers of the cavities (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 22).

11 K/16 Howlite is reported to occur as white nodules with yellowish brown calcite in anhydrite at the northwest end of a gypsum quarry at Dingwall, Victoria County. Ulexite is closely associated (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 26).

21 A/6 Nodules of howlite have been found at Wentworth, a few km east of Windsor in Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can. Ann. Rept., IV, p. 38T).
It is also reported to occur with ulexite in gypsum beds near Windsor (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 54).

21 H/1 Howlite occurs at Newport station (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 38T).

HÜHNERKOBELITE

$(Ca,Na)(Fe,Mn)_2(PO_4)_2$

Northwest Territories

85 I/1 Hühnerkobelite associated with triphylite has been identified in specimens of pegmatite from the Best Bet porperty at lat. 62°11'N, long. 112°17'W (X-ray Laboratory, Geol. Surv. Can.).

85 I/13 The X-ray Laboratory, Geological Survey of Canada, has identified hühnerkobelite in specimens of pegmatite from the Cota Group at lat. 62°51'N, long. 113°33'W, in the Blaisdell Lake area. It occurs with triphylite, columbite, and apatite.

Ontario

52 H/1 Hühnerkobelite makes up 1 to 3 per cent of a pegmatite dyke at lat. 49°13'30"N, long. 88°00'W, about 2.4 km west of the western end of Cosgrave Lake in the Port Arthur mining division. Other minerals in the dyke are microcline, quartz, albite, and muscovite. Identification was made at the Provincial Assay Laboratory, Ont. Dept. Mines (M.H. Frohberg, private communication).

HUMBOLDTINE

$FeC_2O_4 \cdot 1\ 1/2H_2O$

Ontario

40 O/1 Humboldtine has been observed as a sulphur yellow crust on black schists at Kettle Point in Bosanquet Township (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 39T).

HUMITE

$Mg(F,OH)_2 \cdot 3Mg_2SiO_4$

The humite group minerals, norbergite, chondrodite, humite and clinohumite occur almost exclusively in metamorphosed and metasomatized limestone. Identification of individual minerals of the group is difficult and often impossible without the use of X-ray diffraction techniques.

Ontario

31 E/11 Humite has been identified by X-ray powder pattern in a specimen taken from the property of Cardiff Uranium Mines in Wilberforce Township, Haliburton County (E.W. Nuffield and D.H. Gorman, 1960: private communication).

HUTTONITE

$ThSiO_4$

Ontario

41 I/5 Huttonite has been found on the Canadian Thorium property in the Agnew Lake area, Hyman Township, Sudbury district. The mineral was identified by X-ray diffraction (E.W. Nuffield and D.H. Gorman, 1960: private communication).

hyalite

(see OPAL)

hyalophane

(see POTASSIUM FELDSPAR)

HYDROCARBONS

Naturally-occurring hydrocarbon compounds that possess neither a definite chemical composition nor atomic structure cannot be properly classified as mineral species. Some of the better known occurrences are listed together for convenience.

British Columbia

103 Ozocerite, a paraffin wax of variable melting point, has been found at several points on Graham Island, Queen Charlotte mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 173).

Manitoba

63 F/8 Pieces of amber up to the size of a robin's egg were found in gravel and sand along the shore of Cedar Lake, near the mouth of the Saskatchewan River. The amber was named chemawinite after a nearby Hudson Bay Company post. Chemical analysis by B.J. Harrington: C 80.03, H 10.47, O 9.50, total 100.00 (J.B. Tyrrell, 1892: Geol. Surv. Can., Ann. Rept., V, p. 255E).

New Brunswick

21 H/15 A wedge-shaped vein of hydrocarbon, having a width at the surface of 5 m was discovered along

Frederick Brook, 6.4 km southwest of Hillsborough, Albert County, by one John Duffy in 1849. The hydrocarbon, named albertite after the county, was subsequently mined as coal for 14 years, during which time more than 200,000 tonnes of albertite were recovered and shipped to the United States (G.S. Hume, 1932: Geol. Surv. Can., Econ. Geol. Ser., 9, p. 177).

21 H/15 Chemical analysis of albertite by Rogers: C 78.80, H 6.16, N 1.50, S 2.03, O 10.11, ash 1.40, total 100.00 (A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 33).

Northwest Territories

75 E/13
85 H/16 Anthraxolite has been found on Union Island in Great Slave Lake. It occurs as a vein a few cm thick in a metamorphosed, fine-grained, sedimentary rock. It is associated with sulphides and quartz (R.L. Rutherford, 1928: Am. Mineralogist, 13, p. 516) (R.L. Rutherford, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 124).

95 F/7 A thin irregular band of anthraxolite occupies the medial part of a vein at Meilleur Creek in the South Nahanni River area. It also occurs finely intermixed with calcite, quartz, and sulphides (R.L. Rutherford, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 123).

Ontario

31 C/7 Anthraxolite collected from the Woodruff occurrence on lots 16 and 17, conc. IV, Kingston Township is in the mineral collection at the Royal Ontario Museum. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 36).

31 E/4 Thucholite occurs in a pegmatite dyke on lots 9 and 10, conc. IX, Conger Township, Parry Sound district. Approximate analysis: volatile gases 26.08 (H_2O, direct, 12.96; gas, by difference, 13.12), ash 28.06, fixed carbon 45.86, total 100.00. Chemical analysis of ash: water soluble 1.60, PbO 0.20, U_3O_8 5.80, ThO_2 48.48 $(Ce,La,Di)_2O_3$ 5.45, $(Yt,Er)_2O_3$ 10.95, Fe_2O_3 1.50, V_2O_5 2.25, MnO 0.02, Al_2O_3 1.45, CaO 0.50, ZrO_2 0.80, K_2O 0.15, Na_2O 0.22, P_2O_5 3.21, SiO_2 14.70, total 97.28. Volatile gases (volume per cent): CO_2 6.444, CO_2 35.827, CH_4 1.500, H_2 44.498, N_2 3.562, A 0.010, S_2 0.063, Cl_2 0.033, F_2 0.167, H_2O 7.857, total 99.961 (H.V. Ellsworth, 1928: Am. Mineralogist, 13, p. 419) (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 178).

41 H/15 Thucholite is intimately associated with uraninite at the Beaver Mine, lot 5, conc. B, Henvey Township. Approximate analysis: ash 24.13, volatiles 26.42, free carbon 49.45, total 100.00. Chemical analysis of ash (average of two samples): SiO_2 15.52, PbO 1.03, R.E. oxides + ThO_2 19.64, U_3O_8 53.09, Al_2O_3 0.97, Fe_2O_3 0.63, BeO 1.20, CaO 5.50, MgO 1.86, total 99.44 (G.L. Barthauer, C.L. Rulfs, and D.W. Pearce, 1953: Am. Mineralogist, 38, pp. 802-814).

41 I/11 Veins of anthraxolite occur in the rocks of the Onwatin Formation in the Sudbury Basin. Some development work has been carried out on a small deposit of the mineral in Balfour Township, lot 10, conc. I (H.C. Cooke, 1946: Geol. Surv. Can., Bull. 3, p. 48).

41 I/11 Chemical analysis of Sudbury anthraxolite by Coleman: approximate analysis - volatiles 5.3, 5.3; fixed carbon 74.2, 64.7, ash 20.5, 30.0; ultimate analysis: C 94.92, H 0.52, N 1.04, O 1.69, S 0.31, ash 1.52, total 100.00 (A.P. Coleman, 1928: Am. J. Sci., vol. 15, pp. 21-25).

41 I/11 Anthraxolite has been found on lot 9, conc. VI, Fairbank Township (G.M. Dawson, 1898: Geol. Surv. Can., Ann. Rept., X, p. 124A).

41 I/11 Specimens of anthraxolite in the mineral collection at the Royal Ontario Museum were collected near Chelmsford, Balfour Township. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 36).

41 J/10 Nodules and blebs of hydrocarbon occur in fractures in the radioactive conglomerate at the Quirke Mine in the Blind River camp. The fractures also contain calcite, pyrite, sphalerite and chalcopyrite. Analysis by Fuels Division, Mines Br., Can. Dept. Mines: proximate - ash 3.6, volatile matter 23.8, fixed carbon 7.26; ultimate - C 84.7, H 4.7, S 1.8, N 0.7, ash 3.6, O by difference 4.5. Spectrographic analysis of ash showed uranium and thorum contents less than 0.05 per cent (Unpublished report, R.J. Traill, 1956).

52 A/6 Veins of uranium-bearing anthraxolite occur in and near the city of Port Arthur . Other minerals present in the veins are silver, argentite, galena, chalcopyrite, sphalerite, pyrite, quartz, calcite, fluorite, and barite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 120).

52 N/4 A specimen of anthraxolite from the Cochenour Willans Mine in Dome Township is in the mineral collection at the Royal Ontario Museum. (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 36).

Quebec

21 L/12 Thucholite is present in a pegmatite dyke on lot 331, range III in the Parish of Notre Dame de Portneuf. Uranophane and autunite have been tentatively identied as associated minerals (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 152).

21 M/6 A pegmatite dyke near the north shore of Lac du Pieds des Monts, 29 km north of Murray Bay, is reported to contain some thucholite (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 250).

22 C/5 A small amount of anthraxolite is present at the McGie Mine on the northeast shore of Charlotte Lake. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 100).

31 F/9 A low density radioactive mineral from Pontiac County has been identified as thucholite. It is reported to occur in Clarendon Township on range XII, lot 5, and on range XIII, lot 3 (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 24).

31 G/14 Thucholite has been described from a pegmatite that constitutes the Wallingford Mine on lot 14, range II of Derry Township, Papineau County. It most commonly occurs as rounded grains but is also found intergrown with altered uraninite and possibly replacing the latter mineral as cubes and octahedrons. A pseudomorph of thucholite after tourmaline was also noted. Approximate analysis: water 13.53, gases 28.70, ash 19.84, fixed carbon 37.93, total 100.00. Approximate chemical analysis of ash: U_3O_8 18.2, ThO_2 10.4 $(Ce,La,Di)_2O_3$ 22.8, $(Yt,Er)_2O_3$ 12.8, CaO 15.7, Fe_2O_3 + Al_2O_3 etc. 4.3, SiO_2 6.4, total 90.6. (H.V. Ellsworth, 1928: Am. Mineralogist, 13, pp. 442-448).

Saskatchewan

74 K/6 Thucholite occurs with uraninite at the D uranium deposit at 58°21'35"N, 109°00'08"W, east of the northern tip of Cluff Lake (V. Ruzicka, 1975: Geol. Surv. Can., Paper 75-1C, p. 279).

74 N/7 Thucholite occurs with pitchblende, chalcopyrite, and pyrite in altered volcanic rocks on the eastern side of Black Bay, Lake Athabasca (A.H. Lang, 1957: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 93).

74 N/8 Thucholite is fairly abundant in surface exposures at the Consolidated Nicholson No. 4 deposit as well as underground. It has been reported also from the Box Mine and Fish Hook Bay. Chemical analysis of purest available material by E.J. Brooker: loss on ignition 94.66, SiO_2 0.18, PbO 0.32, CaO 1.75, MgO 0.24, NiO 0.58, CoO 0.26, Fe_2O_3 + Al_2O_3 0.11, CuO 0.26, U_3O_8 0.28, R.E. oxides 0.05, Al group insol. 0.02, total 98.71 (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 69).

74 N/9 Shear zones on the Hab Group, 1.6 km north of Donaldson Lake, are mineralized with thucholite, quartz, chlorite, carbonate, pitchblende, hematite, and a little pyrite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 91).

HYDROCERUSSITE

$Pb_3(CO_3)_2(OH)_2$

Ontario

31 C/7 Hydrocerussite as well as cerussite forms coatings on galena and sphalerite in veins at the Frontenac (Frontenac Draper Lake) lead mine. The mine is located about 27 km north of Kingston along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 24).

31 C/10 Hydrocerrusite and hydrozincite form white, finely granular, irregular encrustations on zinc ore at the Long Lake Zinc Mine about 800 m from Long Lake village and 8.8 km northwest of Parham (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 19).

Quebec

22 A/16 At the Little Gaspé lead mine galena occurs as cubes up to 2.5 cm across in calcite. The secondary minerals, cerussite and hydrocerussite, form a soft cream-white crust on galena (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 78).

31 G/11 Creamy white hydrocerussite which fluoresces yellow under ultraviolet radiation occurs as finely granular coatings on galena and calcite in veins cutting crystalline limestone on the Dan Gorman farm, located about 6.4 km west of Buckingham (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 6).

HYDRODRESSERITE

$BaAl_2(CO_3)_2(OH)_4.3H_2O$

Quebec

31 H/12 The new mineral, hydrodresserite, occurs in a silicocarbonatite sill exposed in the Francon limestone quarry at St-Michel, Montreal Island. It is unstable at most atmospheric conditions and dehydrates to dresserite. Chemical analysis: BaO 35.0, Al_2O_3 23.7, CO_2 21.8, H_2O 20.3, total 100.8 (J.L. Jambor, Ann P. Sabina and B.D. Sturman, 1977: Can. Mineralogist, 15, p. 399).

HYDROMAGNESITE

$4MgCO_3.Mg(OH)_2.4H_2O$

British Columbia

92 I/9 A hydromagnesite deposit occurs east of Buce Lake and 400 m south of Vernon road, 27 km east of Kamloops. It occupies a depression about 400 m long and from 60 to 120 m wide. The hydromagnesite appears to be in a horizon from 30 to 65 cm thick, and overlain by 25 to 75 cm of drift. The results of a partial analysis are as follows: insol. in HCl 20.74; Fe, Al group 3.91: CaO 1.76; MgO 34.20, MnO 0.07, SO_3 0.05, H_2O 6.56; loss on ignition 38.45. A dry lake on the road to Campbell Range, 3.2 km east of Barnhart Vale and 20 km east of Kamloops is filled to a depth of about 1.2 m with hydromagnesite. The deposit is covered by a 15 cm layer of overburden.

Irregular patches of hydromagnesite occur in a depression west of the road to Campbell Range and 21 km southeast of Kamloops. Thicknesses vary from 1 to 6 m and the diameter of the depression is about 76 m (W.E. Cockfield, 1948: Geol. Surv. Can., Mem. 249, p. 146).

92 O
92 P Hydromagnesite has been found at several localities in the Lillooet district, including the following: Clinton (92 P/4), Meadow Lake (92 P/5), Watson Lake (92 P/11); and Riske Creek (92 O/15).
Chemical analyses of some of the purest beds of hydromagnesite are as follows: Clinton, analyst F. Baridon: SiO_2 2.30, Al_2O_3 0.63, Fe_2O_3 0.13, MgO 41.60, CaO 0.22, CO_2 35.88, SO_3 0.36, H_2O^+ 17.53, H_2O^- 1.12, total 99.77. Meadow Lake, analyst F. Baridon, average of 5 samples: SiO_2 1.22, Al_2O_3 0.67, Fe_2O_3 0.18, FeO 0.63, MgO 40.56, CaO 1.26, CO_2 35.95, H_2O^+ 18.00, H_2O^- 1.45, total 99.93. Watson Lake, analyst R.A.A. Johnston: SiO_2 1.73, Al_2O_3 0.12, Fe_2O 0.07, MgO 43.73, CO_2 37.03, H_2O^+ 17.79, total 100.90. Riske Creek, analyst A. Sadler: lot 178, SiO_2 1.85, Al_2O_3 0.48, Fe_2O_3 0.20, FeO 0.16, MgO 41.74, CaO 0.17, CO_2 40.85, SO_2 0.11, H_2O^+ 12.98, H_2O^- 1.67, total 100.21, lot 1188, SiO_2 1.22, Al_2O_3 0.48, Fe_2O_3 0.25, FeO 0.09, MgO 41.14, CaO 0.10, CO_2 37.70, SO_3 0.08, H_2O^+ 17.78, H_2O^- 1.28, total 100.11 (L. Reinecke, 1920: Geol. Surv. Can., Mem. 118, p. 29).

104 N/12 Extensive deposits of earthy hydromagnesite are reported to occur in the Atlin area in northwestern British Columbia (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 11R).

104 N/12 Average of 8 analyses of pure white material by N.L. Turner: SiO_2 1.40, Al_2O_3 0.66, Fe_2O_3 0.22, FeO 0.59, MgO 41.10, CaO 0.90, CO_2 35.39, H_2O^+ 18.36, H_2O^- 1.38, total 100.00 (L. Reinecke, 1920: Geol. Surv. Can., Mem. 118, p. 29).

Northwest Territories

86 L/11
86 L/12
86 L/14 White and pinkish coloured hydromagnesite occurs along the south shore of Dease Bay, Great Bear Lake. It forms amorphous incrustations on the surfaces of cavities in a porous dolomite (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 22R).

Ontario

31 F/4 Hydromagnesite occurs with brugnatellite as cream-white waxy nodules in calcite at the York River tactite zone on the east side of the York River 320 m north of Highway 500 at a point 11 km east of Bancroft (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 337).

31 F/4 Hydromagnesite has also been identified as white fibrous aggregates in massive natrolite in specimens collected at the Princess sodalite quarry near Bancroft (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 L/6 Specimens containing hydromagnesite were collected at the Legendre quarry 1.9 km east of Rutherglen. The hydromagnesite occurs as colourless, very fine, platy aggregates with silky lustre. Pyroaurite and brucite are abundant in the quarry (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 71).

Quebec

21 E/14 Botryoidal patches of hydromagnesite occur on sjogrenite in fracture planes in massive serpentine at the Belmina Mine, located about 3 km north of St-Jacques (Stenson) (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 45).

21 E/14 Hydromagnesite specimens in the National Mineral Collection were obtained from an occurrence on the Montreal Chrome property, northeast of Little Lake St. Francis, Coleraine Township.

31 F/10 Specimens of hydromagnesite, pyroaurite, szaibelyite, hydrotalcite and brucite were obtained from a road-cut on the west side of Highway 148, 0.6 km south of Bryson (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 G/12 Colourless fine platy hydromagnesite occurs on crystalline limestone at the Cross Quarry near Meach Lake (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 41).

Yukon

116 C/7 White microscopic discs of hydromagnesite occur with serpentine at the Clinton Creek Mine on Porcupine Hill overlooking Clinton Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 111).

HYDRONEPHELITE

(aluminosilicate of Na)

British Columbia

82 N/1 Occurs as white and pinkish spherules in the nepheline syenites of Ice River, Beaverfoot River, and Kicking Horse River. Chemical analysis by Johnston: SiO_2 42.80, Al_2O_3 28.50, Fe_2O_3 0.34, CaO 1.90, Na_2O 14.33, K_2O 0.30, H_2O 10.81, total 98.98 (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 13R).

This species is of doubtful validity and may be a mixture of natrolite or nepheline, or both, with diaspore or gibbsite (M.H. Hey, 1962: Chemical Index of Minerals, p. 142).

HYDROROMARCHITE

$5SnO.2H_2O$

Ontario

52 L/3 Tin pannikins lost from the overturned canoe of a voyageur between 1801 and 1821 were recovered 4.5 m below the surface of the water at Boundary Falls, Winnipeg River. Some of the surfaces of the pannikins have a thin crust consisting of white crystals and black crystals. The white crystals have an X-ray powder pattern that matches that of the compound $5SnO.2H_2O$. This is the first reported occurrence of this compound in nature and the mineral is named hydroromarchite (R.M. Organ and J.A. Mandarino, 1971: Can. Mineralogist, 10, p. 916).

HYDROTALCITE

$MgCO_3.5Mg(OH)_2.2Al(OH)_3.4H_2O$

Ontario

31 C/9 Greasy, grey nodules of hydrotalcite are associated with clinohumite, spinel, serpentine, apatite, clinopyroxene, clinoamphibole, olivine and tourmaline in a railway cut at Chaffeys Locks (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

Quebec

21 L/3 Chemical analysis of hydrotalcite from Vimy Ridge Mine, Megantic County, by R.J.C. Fabry: SiO_2 3.92, Al_2O_3 21.08, MgO 34.79, CaO trace, H_2O 32.25, CO_2 8.51, insol. 0.13, total 100.68 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 308).

21 L/3 Hydrotalcite occurs with colerainite (a variety of chlorite) as crusts on pegmatitic rock at the Union Mine, about 800 m from Crabtree village in the Black Lake area (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 51).

31 F/10 Hydrotalcite has been identified as light brown grains in crystalline limestone exposed by a road-cut on the Bryson to Grand Calumet road just south of the Bryson bridge, 0.8 km from Highway 8 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 101).

31 G/12 Roadcuts on the road to St-Pierre-de-Wakefield, 5.9 and 6.4 km northeast of Wilson's Corners expose white hydrotalcite as nodular aggregates with satin to greasy lustre (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 16).

31 G/12 Grey waxy hydrotalcite occurs as nodules on serpentine at the Cross Quarry near Meach Lake (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 41).

31 G/15 Hydrotalcite has been identified by its X-ray diffraction pattern in a specimen from the Kilmar Mine in Argenteuil County.

31 H/11 Hydrotalcite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

31 J/4 Rock exposures along the Lièvre River at des Cèdres dam near Notre-Dame-du-Laus contain white flaky aggregates and nodules of hydrotalcite associated with spinel, clinohumite, olivine, serpentine, clinoamphibole, ilmenite and rutile. Brugnatellite forms white flaky coatings on clinohumite (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 J/5 Hydrotalcite occurs as charcoal-grey, greasy nodules associated with chondrodite, spinel, clinoamphibole, serpentine, mica, pyrite and graphite in crystalline limestone exposed in 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 (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

HYDROXYL-BASTNAESITE

$(Ce,La)CO_3(OH,F)$

Ontario

31 E/1 At the property of Desmont Mining Corporation near Wilberforce, hydroxyl-bastnaesite occurs as brownish yellow to dark brown granular aggregates in coarsely crystalline calcite. Stillwellite, monazite, thorianite, uranothorite and ancylite are associated (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

HYDROZINCITE

$Zn_5(CO_3)_2(OH)_6$

Hydrozincite is pure white to grey, fluoresces pale blue or lilac in ultraviolet light, and occurs as a secondary mineral found in the oxidized zone of copper and zinc deposits.

British Columbia

82 K/2 Crusts of white, compact, powdery and finely botryoidal hydrozincite are present on smithsonite specimens from the Moonshine silver-lead-zinc claims formerly worked by Willett Mines Limited near Lardeau (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 257).

82 K/8 White to blusih white hydrozincite forms crust on galena-sphalerite masses at the Mineral King Mine 32 km southwest of Invermere at 50°21'N, 116°26'W (X-ray Laboratory, Geol. Surv. Can.)

104 P/3 Galena, sphalerite, chalcopyrite, scheelite, and hydrozincite occur in a shear zone in limestone at the McDame Belle property, on McDame Creek, about 1.6 km east of Centreville (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 114).

Ontario

31 C/10 Hydrozincite and hydrocerussite form white, finely granular, irregular encrustations on zinc ore at the Long Lake Zinc Mine, about 800 m from Long Lake village and 8.8 km northwest of Parham (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 19).

41 A/4 White to yellowish white powdery encrustations of hydrozincite were found on sphalerite at the Albemarle zinc mine north of Wiarton in the Bruce Peninsula (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 337).

Quebec

22 B/16 Soft, white, fine-grained irregular patches of hydrozincite occur on quartz and sphalerite at the Federal lead-zinc deposit, located about 1.6 km west of the Trans Gaspésian Highway from a point 6.4 km south of the south gate to Parc-de-la-Gaspésie (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 73).

31 G/11 Cream-white hydrozincite (fluoresces bluish-white under "short" ultraviole rays) occurs as finely granular coatings on galena and calcite in veins cutting crystalline limestone on the Dan Gorman farm located about 6.4 km west of Buckingham (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 6).

31 G/11 Cream-white hydrozincite forms a powdery coating on sphalerite at the Emerald Mine near Glen Almond, it fluoresces bluish-white under ultraviolet rays (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 20).

Yukon

105 P/14 Abundant smithsonite occurs with barite, cerussite and hydrozincite is a fault zone at the ART-EKW1 property at 63°51'N, 129°12'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 C/7 Hydrozincite and cerussite occur with massive smithsonite in the oxidized zone of the lead-zinc deposits at Goz Creek (64°26'N, 132°31'W). Similar deposits occur at 64°26'N, 132°55'W, about 24 km west of Goz Creek on the Bonnet Plume River (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

HYPERSTHENE

$(Fe,Mg)SiO_3$

The orthorhombic pyroxene, hypersthene, is found in many basic igneous rock both of an intrusive and, more commonly an extrusive nature. It is the iron rich member of a series which, with increasing magnesium content grades into bronzite, $(Mg,Fe)SiO_3$, and finally entatite, $MgSiO_3$, the magnesium rich end-member. The minimum FeO content for hypersthene is about 15 per cent, and in many cases alumina is present, 10 per cent being its upper limit.

Newfoundland

14 C/11 The five strongest lines in the J.C.P.D.S. standard X-ray powder pattern of hypersthene are listed as 3.20 (10), 2.98 (8), 1.60 (6), 1.49 (8), 1.39 (6). The hypersthene is reported to have come from Isle Paul, and the following chemical analysis is given: SiO_2 52.19, TiO_2 0.50, Al_2O_3 6.23, Fe_2O_3 1.21, FeO 14.25, MgO 20.06, CaO 3.26, MnO 0.32, total 98.02 (J.C.P.D.S. X-ray diffraction pattern 2-0520).

14 C/12 Chemical analysis of colourless hypersthene from Nain, Labrador, by H.S. Washington: SiO_2 51.81, TiO_2 0.76, Al_2O_3 2.16, Fe_2O_3 4.52, FeO 13.96, MnO 0.16, MgO 24.57, CaO 1.95, Na_2O 0.39, K_2O 0.03, H_2O 0.19, total 100.50; S.G. 3.415 (H.S. Washington and H.E. Merwin, 1923: Am. Mineralogist, 8, p. 64).

14 D/8 Hypersthene occurs with osumilite, cordierite, quartz, orthoclase, plagioclase, graphite, and pyrrhotite in the contact aureole of the anorthositic Nain complex. Specimens were collected from the north branch of Ikkinikul-luit Brook at 56°28.8'N, 62°21.1'W. Electron microprobe analysis: SiO_2 50.38, Al_2O_3 3.75, TiO_2 0.24, Cr_2O_3 0.17, FeO 25.12, MnO 0.36, MgO 20.18, CaO 0.17, Na_2O 0.03, BaO 0.07, total 100.47 (J.H. Berg and E.P. Wheeler, 1976): Am. Mineralogist, 61, p. 29).

Quebec

21 L/14 The following are the results of two analyses of hypersthene from Chateau Richer, Montmorency County, by Hunt: I. SiO_2 51.35, Al_2O_3 3.70, FeO

20.56, CaO 1.68, MgO 22.59, volatiles 0.10, total 99.98: S.G. 3.41; II. SiO_2 51.85, Al_2O_3 3.90, FeO 20.20, CaO 1.60, MgO 21.91, volatiles 0.20, total 99.66 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 468).

22 D
22 F — Hypersthene is a common mineral in the dark-coloured anorthosites in Roberval and Chicoutimi counties to the northeast of Lake St. John. In the area between Passe Dangereuse and St. Ludger-de-Milot, crystals of hypersthene attaining lengths of 15 cm are often found (S.H. Ross, 1949: Que. Dept. Mines, Geol. Rept., 39).

22 D/6 — Crystals and cleavable masses of bronze-brown hypersthene are common in coarse-grained anorthosite in a roadcut on both sides of the Pont Arvida Road at a point 1.1 km north of Highway 16 (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 104).

Saskatchewan

74 N/9 — A mineralized zone located about 39 km northeast of Goldfields consists of brecciated norite cemented and partly replaced by pyrrhotite. The norite is comprised almost completely of hypersthene and plagioclase. In spite of a high ferrous iron content, the hypersthene is colourless and nonpleochroic. Chemical analysis of hypersthene by R.J.C. Fabry is as follows: SiO_2 48.91, Al_2O_3 3.50, Fe_2O_3 0.30, FeO 24.16, CaO 0.59, MgO 19.59, Na_2O 0.01, K_2O 0.12, H_2O^+ 0.99, H_2O^- n.d., TiO_2 0.83, MnO 0.16, total 99.16 (H.C. Cooke, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 67).

idocrase

(see VESUVIANITE)

ILESITE

$MnSO_4 \cdot 4H_2O$

Yukon

105 M/13 — Zincian ilesite occurs admixed with zincian szmikite in efforescences collected from the dump of the Silver King property in the Galena Hill area (J.L. Jambor and R.W. Boyle, 1962: Can. Mineralogist, 7, p. 217).

ILMENITE

$FeTiO_3$

Ilmenite may form both as a result of crystallization from a magma and as a product of metamorphism. It commonly occurs disseminated in basic to intermediate igneous rocks, and as a heavy constituent of beach sands. In many of its occurrences it is associated with magnetite. Ilmenite is an important ore mineral of titanium.

British Columbia

82 N/1 — An analysis by G.C. Hoffmann of ilmenite from the Ice River in the Golden mining division yielded the following results: TiO_2 47.5, FeO 39.8, MnO 6.5, total 93.8.
The ilmenite occurs as crystals in veins in a mass of intrusive syenite rocks which is extensively developed along the Ice River (G.M. Dawson, 1885: Geol. Surv. Can., Ann. Rept., I, p. 124B).

New Brunswick

21 H/11 — Ilmenite occurs in gabbro at Point Wolfe River in Saint John County (E.D. Kindle, 1961: Geol. Surv. Can., Map 1109A).

Nova Scotia

20 O/16 — Massive ilmenite from Chegoggin Point, about 4.8 km west of Yarmouth in Yarmouth County, was donated to the National Mineral Collection.

20 P
21 A — Iserine, a variety of ilmenite, is found in the sand of the western counties of Nova Scotia. A sample examined by H. How contained 30 per cent iserine (Henry How, 1864: Nova Scotia Inst. Nat. Sci., I, pp. 78-64).

21 A/12 — Iserine, a variety of ilmenite has been found on the north shore of St. Mary's Bay in Digby County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 40T).

Ontario

31 F/4 — Abundant ilmenite is associated with titanite, allanite, pyroxene, and zircon in the north dyke of the McDonald Mine. This mine is located in conc. VII, lots 18 and 19, Monteagle Township, Hastings County (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 209).

Quebec

12 L/11 — Major deposits of ilmenite are associated with anorthosite in the Lac Tio area. The ilmenite grains contain microscopic blades of hematite (E.R. Rose, 1969: Geol. Surv. Can., Econ. Geol. Rept. 25, p. 97).

21 L/14 — Chemical analysis by Hunt of ilmenite from Chateau Richer, Montmorency County: TiO_2 39.86, Fe_2O_3 and FeO 56.64, MgO 1.44, insol. 4.90, total 102.84 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 501).

21 M/8 — Chemical analyses of samples of ilmenite found in feldspar at Baie St. Paul, Charlevoix County, have yielded the following results: I. Hunt, 1863: TiO_2 48.60, Fe_2O_3 10.42, FeO 37.06, MgO 3.60, total 99.68; II. Penny, 1873-74: TiO_2 40.00, Fe_2O_3 20.35, FeO 29.57, Al_2O_3 4.00, MgO 3.17, CaO 1.00, SiO_2 1.91, total 100.00 (W.E. Logan, 1863: Geol. Surv. Can., Rept. Prog., p. 501) (B.J. Harrington, 1873-74): Geol. Surv. Can., Rept. Prog., p. 227).

21 M/9 — Ilmenite occurs on the east bank of the northeast fork of the Gouffre River, Charlevoix County. Partial analyses of five samples gave: I. Fe 44.13, Ti 38.88, V 0.14: II. Fe 43.00 Ti 38.07, V 0.15; III. Fe 44.60, Ti 36.60, V 0.16; IV. Fe 43.94, Ti 36.09, V 0.16; V. Fe 42.45, Ti 36.14, V 0.14 (H.W. McGerrigle and H. Girard, 1950: Que. Dept. Mines, Prelim. Rept., 173, revised ed., p. 11).

21 M/9 — Ilmenite specimens from the Brassard deposit, which is located 32 km northwest of la Malbaie and 800 m east of the northeast arm of the Gouffre River, 1.6 km beyond the point where the river crosses the west boundary of Lacoste Township, Charlevoix County, have been analyzed with the following results: Sample 1. massive ore: Fe 42.28, TiO_2 39.89. Sample 2, ore with rock inclusions: Fe 30.37, TiO_2 27.03. Sample 3. massive ore: Fe 41.79, TiO_2 39.28. Sample 4.

ore with rock inclusions: Fe 30.21, TiO_2 29.04. Sample 5. massive ore Fe 43.33, TiO_2 36.92. Sample 6. massive ore: Fe 42.22, TiO_2 27.76 (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, pp. 15, 16).

21 M/10 A mass of ilmenite is exposed at the Coulombe Mine on lot 319, Saint-Urbain range, Charlevoix County. Partial chemical analyses gave: I. SiO_2 2.64, FeO 51.54, TiO_2 41.00, P 0.04, S 0.041; II. SiO_2 3.12, FeO 55.14, TiO_2 35.46, P 0.044, S 0.04; III. SiO_2 2.68, FeO 52.98, TiO_2 38.40, P 0.041, S 0.04.

Partial chemical analyses of specimens from the Fourneau or Furnace Mine, lots 352, 361, Saint-Urbain range, Charlevoix County: I. Fe 36.25, Ti 29.16, SiO_2 --; II. Fe 37.21, Ti 24.00, SiO_2 1.91.

At Glen Prospects, lot 312, Saint-Urbain range, Charlevoix County, a mass of ilmenite 9 by 11 m was exposed. Partial chemical analysis: SiO_2 1.68, FeO 55.36, TiO_2 38.26, S 0.41, P tr. (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173).

22 I/7 An outcrop of ilmenite occurs 2.8 km northeast of the village of Thunder River (Rivière au Tonnerre) located at the confluence of the river of the same name with the St. Lawrence River. Partial analysis gave: Fe 49.75, Ti 21.20 (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 21).

22 J/1
22 J/8 Chemical analysis by Hunt of ilmenite from the Bay of Seven Islands, Saguenay County: TiO_2 34.30, Fe_2O_3 49.77, insol. 6.35, total 90.42 (T.S. Hunt, 1866-69: Geol. Surv. Can., Rept. Prog., p. 260).

22 J/2 Ilmenite occurs near Clarke City on the Sainte Marguerite River. Below the falls at the city, lenticulr masses of the ore occur in anorthosite. Partial analysis of the material gave the following results: Fe 55.10, Ti 12.42, P 0.049, SiO_2 1.52. A quarry about 800 m above the falls exposed ore giving the following analysis: Fe 38.86, Ti 9.06, P 0.08, SiO_2 15.96 (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 20).

22 J/8 Ilmenite occurs on the Des Rapides River at a point 30 m below Outarde Falls (Chute aux Outardes) and in an outcrop 30 m west of the river. Analysis of ore from the former locality gave: FeO 33.11, TiO_2 17.54, and from the latter: FeO 70.70, TiO_2 18.12, P_2O_5 0.075, S 0.08 (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 19).

31 G/16 A partial chemical analysis of ilmenite found at St. Jerome in Terrebonne County gave: TiO_2 32.36, Fe 24.65 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., p. 227).

31 H/1 A partial analysis of ore from conc. III, lot 1, Brome Township, Brome County, gave: TiO_2 24.16, Fe 41.46 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., pp. 227-228).

31 H/2 Ilmenite has been reported in conc. IX, lot 8, and in conc. XI, lot 7, Sutton Township, Brome County. Partial analysis of ore from the former location: TiO_2 29.86, Fe 39.14, and from the latter: TiO_2 27.20, Fe 40.87 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., p. 228).

31 H/13 Partial chemical analysis of ilmenite obtained at St. Julienne in Montcalm County gave: TiO_2 33.67, Fe 38.27 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., p. 227).

31 J/1 Ilmenite has been found to occur in range VI, lots 39-41, Beresford Township, Terrebonne County.
Specimens of ilmenite from the Ivry Mine in lots 37, 38, range V, Beresford Township, Terrebonne County were donated to the National Mineral Collection in 1926 by E.A. Thompson. Partial chemical analyses of ilmenite ore from the Ivry Mine gave: Fe 48.05, 47.86 and Ti 18.18, 19.00 (H.W. McGerrigle and H. Girard, 1950: Que. Dept. Mines, Prelim. Rept., 173, revised ed., p. 14).

ILVAITE

$$CaFe_2(FeOH)(SiO_4)_2$$

Ilvaite is a black opaque mineral which commonly forms striated prisms. It is found in association with magnetite, zeolites, and ores of zinc and copper. It often contains manganese replacing ferrous iron.

British Columbia

92 C/15 Ilvaite has been reported to occur at the Monitor Copper Mine, which is located at Montier Landing on the north shore of the Alberni Canal, 3.2 km above the entrance into Barclay Sound.

Chemical analysis by Hoffmann of a sample from this locality gave: SiO_2 29.81, Al_2O_3 0.16, Fe_2O_3 18.89, FeO 32.50, MnO 2.22, CaO 13.82, MgO 0.30, H_2O 1.62, total 99.32. A specimen of ilvaite found near the head of Barclay Sound was given to the National Mineral Collection (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 11R) (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 130).

92 C/15
92 C/16 Ilvaite is reported from two localities: (1) skarn zone on the property of Nadira Mines Limited at the headwaters of Horse Creek, a tributary of Parker Creek, which enters Nitinat River 11.2 km northwest of Nitinat Lake; (2) boulders of skarn in Millar Creek about 4 km west of Honeymoon Bay on the south side of Cowichan Lake (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 68).

INYOITE

$$Ca_2B_6O_{11}.13H_2O$$

New Brunswick

21 H/15 Inyoite occurs at Hillsborough in Albert County with ulexite. Specimens of this material were identified by R.P.D. Graham and stored at the Redpath Museum, McGill University (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 54; and Mrs. J.S. Stevenson, 1960: private communication).

21 H/15 Inyoite has been identified in a specimen collected at the Whitehead gypsum quarry, Hillsborough. It occurs with selenite crystals, sometimes superimposed on them, on a piece of greyish white, fairly compact gypsum. The inyoite forms white translucent crystals, which are remarkably well developed and clear, and with rare exceptions are doubly terminated. Chemical analysis by H.V. Ellsworth: CaO 20.42, H_2O^+ 9.46, H_2O^- 32.46, SO_3 0.55, B_2O_3 37.44, total 100.33 (E. Poitevin and H.V. Ellsworth, 1921: Geol. Surv. Can., Museum Bull. 32).

IRARSITE

(Ir,Pt,Os)AsS

Ontario

52 L/7 The rare platinoid sulpharsenides, irarsite and hollingworthite, have been found in a specimen of drill core from Werner Lake. Electron probe microanalysis: Ir 44.8, Pt 7.8, Os 2.2, Rh 3.8, Pd 1.2, Ru 0.0, Ni 0.19, Co 1.4, As 24.7, S 12.3, total 98.4 (J. Rucklidge, 1969: Can. Mineralogist, 9, pp. 617-627).

IRIDIUM

Ir

British Columbia

92 H/7 Native iridium has been identified in a placer concentrate from Bear Creek in the Tulameen River district. Electron microprobe analysis: Ir 81.6, Os 4.4, Ru 1.2, Pt. 8.6, Pd 0.2, Rh 1.8, Fe 1.4, Ni 0.1, total 99.3 (D.C. Harris, and L.J. Cabri, 1973: Can. Mineralogist, 12, p. 104).

IRIDOSMINE

Os,Ir

Iridosmine is the osmium-rich phase of the Os-Ir system. Rhodium, platinum, ruthenium and a few other elements are usually present in minor and trace amounts. It is found occasionally in placer deposits, usually in association with gold or platinum.

British Columbia

92 H/7 Iridosmine, in association with platinum and alluvial gold, has been reported on Granite Creek, a branch of the Tulameen River, Similkameen mining division (G.C. Hoffmann, 1886: Geol. Surv. Can., Ann. Rept., II, pp. 5-9T).

104 J/8 Iridosmine occurs at Dease Lake in the Quesnel mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 132).

104 N/11 Iridosmine occurs in deep or buried placer deposits on Ruby Creek, northeast of Atlin, in the Atlin mining division. The stream has cut a deep narrow canyon through a basalt flow to the gravels which were deposited before the volcanic eruption. The main normal components of the black sand are: cassiterite 38%, wolframite 52%, magnetite 10% (T.L. Gledhill, 1921: Univ. Toronto Stud., Geol. Ser., 32, p. 40).

92 H/7
104 N/11
104 N/12 Electron microprobe analyses of iridosmines from the Tulameen and Atlin districts:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ir	42.0	37.9	24.5	41.3	41.1	40.4	42.5	22.2
Os	55.5	61.8	69.7	55.5	57.3	50.4	54.6	76.1
Ru	1.3	0.2	4.0	2.0	0.8	5.2	2.3	2.1
Pt	0.3	0.2	0.2	-	0.4	1.8	0.4	-
Pd	-	-	0.1	0.1	-	0.2	-	-
Rh	0.2	-	0.4	0.3	0.2	0.9	0.2	-
Fe	0.3	0.1	-	0.3	0.2	0.2	0.3	-
Total	99.6	100.2	98.9	99.5	100.0	99.1	100.3	100.4

(D.C. Harris and L.J. Cabri, 1973: Can. Mineralogist, 12, p. 104)

Quebec

21 E/16
21 L/2 Iridosmine is associated with platinum in the gold washings of the Rivière du Loup, now known as the Rivière Liniere, a branch of the Chaudiere River, in Beauce County (T.S. Hunt, 1863: Geol. Surv. Can., Rept. Prog., P. 520) (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 40T).

IRON

Fe

Naturally occurring iron may be of terrestrial or meteoric origin. The terrestrial variety has been found in a number of placer deposits and is known also to occur embedded in feldspar and basalt. Most meteorites contain iron invariably alloyed with nickel. It may comprise the whole mass of the meteorite, or form a spongy matrix containing grains of silicates, or occur disseminated throughout a stony matrix.

Alberta

83 G/8 Metallic iron reduced from clay ironstone by the action of burning lignite has been observed by Tyrrell at a point on the North Saskatchewan River about 112 km above Edmonton. Some masses of iron weighed between 6 and 9 kg (J.B. Tyrrell, 1887: Am. J. Sci., XXIII, Ser., 3, p. 73).

Northwest Territories

86 J/14
86 O/3 Native iron is widely distributed through the Muskox Intrusion. It occurs as discrete particles in serpentine sometimes enclosed within larger grains of magnetite. Electron microprobe analyses indicate that the mineral is at least 99 per cent pure iron (J.A. Chamberlain, C.R. McLeod, R.J. Traill and G.R. Lachance, 1965: Can. Jour. Earth Sci., 2, p. 188).

Ontario

31 L/7 Minute steel grey spherules of native iron have been found in a perthitic pegmatite on lot 7, conc. B of Cameron Township. They occur with magnetite in association with kaolinite and limonite. The following is an analysis by Johnston of iron from this locality: Fe 90.45, Mn 0.75, Ni trace, S undetected, P undetected, organic mar., undetected, insol. 7.26, total 98.46; S.G. 7.257 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, pp. 23 24R).

41 J/5 Iron is found as spherules embedded in limonite which coats fissures in quartzite on the north shore of St. Joseph Island and on Campement d'Ours Island in Lake Huron, Algoma district. An analysis of the iron from St. Joseph Island gave: Fe 88.00, Mn 0.51, Ni 0.10, Co 0.21, Cu 0.09, S 0.12, P 0.96, insol. 9.76 (SiO_2 9.17, Al_2O_3 0.11, Fe_2O_3 0.10, CaO 0.06, MgO 0.03, loss 0.29, total 9.76), total 99.75; S.G. 6.8612 (G.C. Hoffmann, 1890: Trans. Roy. Soc. Can., VIII, sec. 3, pp. 39-42).

41 P/7 Iron occurs as scales with silicates in a gossan at Smooth Water Lake in the Gowganda mining division, Timiskaming district (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., p. 266).

ISOFERROPLATINUM

near Pt_3Fe

British Columbia

92 H The name isoferroplatinum has been approved by the International Mineralogical Association

Commission on new minerals and mineral names for Pt-Fe alloys with a primitive cubic structure as opposed to ferroan platinum which has a face-centred cubic structure. Its composition is usually near Pt_3Fe but has no definite compositional limits. Electron microprobe analyses of isoferroplatinum from Tulameen River placers:

	(1)	(2)	(3)
Pt	89.7	90.2	88.9
Ir	0.18	n.d.	0.05
Pd	-	-	-
Fe	6.2	7.6	8.8
Cu	2.2	0.94	0.21
Ni	n.d.	0.06	0.06
Sb	n.d.	n.d.	0.60
Total	98.28	98.80	98.62

(L.J. Cabri and C.E. Feather, 1975: Can. Mineralogist, 13, p. 117).

jade

(see ACTINOLITE)

JAGOWERITE

$BaAl_2P_2O_8(OH)_2$

Yukon

105 N/7 Jagowerite, a new mineral named in honour of J.A. Gower professor of mineralogy at the University of British Columbia, was found in crystalline masses up to one inch across in quartz veins at a locality about 25.7 km north of Hess River at 63°35'N, 132°48'30"W. Chemical analysis: BaO 38.41, P_2O_5 31.41, Al_2O_3 25.87, Fe_2O_3 0.26, S 0.15, H_2O^+ 4.09, total 100.19 (E.P. Meagher, M.E. Coates and A.E. Ako, 1973: Can. Mineralogist, 12, p. 135).

JAMESONITE

$4PbS.FeS.3Sb_2S_3$

Most jamesonite contains up to 3 per cent Fe and minor amounts of other elements, notably Ag, Cu, Zn, in addition to the major elements, Pb, Sb, and S. This sulphosalt mineral is found in ore veins associated with other sulphosalts, galena, stibnite, sphalerite, pyrite, tetrahedrite, etc., in a quartz or carbonate gangue.

British Columbia

82 F/9 Jamesonite occurs at the Sullivan Mine at Kimberley in the form of long fine needles or curved fibrous aggregates with galena in schist (L.G. Berry, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 6).

82 F/14 Massive, compact to fibrous lumps of jamesonite occur in vein quartz at the Reco claim located southwest of Reco Mountain, Slocan mining camp (C.E. Cairnes, 1934: Geol. Surv. Can., mem. 173, p. 126).

At the Boadicea claim on Robb Creek, Ainsworth mining division, jamesonite is found disseminated in quartz and in the form of needles in vugs. Associated minerals are galena and sphalerite (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 85).

82 K/3 Jamesonite occurs at the Best claim located south of the headwaters of McGuigan Creek in the Slocan mining camp. It is in massive, compact to fibrous lumps in vein quartz (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 126).

82 K/15 Fibrous massive jamesonite is reported on Vermont and Deception creeks, branches of Bobbie Burns Creek, in the Golden mining division (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 60R).

82 K/15 Granular jamesonite in association with galena has been reported at the East Kootenay Mine on Vermont Creek in the Golden mining division (L.G. Berry, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 6).

82 L/1 The David Whitley (or Red Paddy) claim at the head of the Kettle River, Greenwood mining divison, reportedly yielded fine specimens of jamesonite. The jamesonite occurs with native gold in a gangue of white subtranslucent quartz (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., XII, p. 22R).

82 L/1 Jamesonite occurs as a fibrous mineral in association with arsenopyrite, pyrite, and pyrrhotite at the St. Paul Mine on Monashee Mountain, Vernon mining division (H.V. Warren and R.M. Thompson, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 82).

82 N/5 Jamesonite is found with galena, sphalerite and pyrite on the Tangier claim located in the valley of Sorcerer Creek (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

92 H/3 Finely fibrous jamesonite partially fills vugs in quartz at the Defiance Group on the south bank of the Sumallo River about 1.6 km above its confluence with the Skagit River, Yale mining division. A spectrographic analysis showed traces of Ag, Cu, and As, in addition to the main constituents (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 86).

92 N/9 At the Morris Mine, Tallayoko Lake, Clinton mining division, jamesonite, closely associated with tetrahedrite and galena, is found as minute needles along fractures and disseminated in quartz veins (H.V. Warren and R.M. Thompson, 1949: Am. Mineralogist, 34, p. 458).

92 O/2 Fibrous jamesonite intergrown with calcite is found near Bonanza Creek at the Robson Group, Tyaughton Lake area, Bridge River district. Associated minerals are sphalerite, tetrahedrite, gold, arsenopyrite, pyrrhotite and chalcopyrite (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 71).

93 M/5 A specimen of jamesonite from the Comet Mine on the south side of Four Mile Mountain near Hazelton was donated to the National Mineral Collection in 1917 by J.J. O'Neill.

93 M/5 Jamesonite has been reported at the Silver Bell Mine in association with silver-lead ores. The mine is located on the road west of the Skeena River, about 800 m south of the mouth of the Kispion River, in the Omineca mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 136).

93 M/5 Fibrous aggregates of jamesonite occur on the Silver Cup claim on the north side of Nine Mile Mountain 12.8 km north of New Hazelton Station (L.G. Berry, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 7).

93 M/6 Jamesonite is reported to be a constituent of silver-lead deposits at the Lead King property 21 km northeast of Hazelton, and at the Sunrise Group on the north slope of Nine Mile Mountain 16.1 km northeast of Hazelton (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 98).

93 M/6 Quartz-siderite veins containing sphalerite, galena, jamesonite and pyrite are present on the MG claims at 55°16'N, 127°10'W, on the south bank of the Suskwa River about 24 km east of New Hazelton (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 174).

93 N/11 At the Kay Group, 32 km east of Oakla Landing on Stuart Lake, on the hillside on the west side of the pass from Kwanika Creek to Silver Creek, ore composed largely of jamesonite, stibnite, arsenopyrite, sphalerite, pyrite, andorite, freibergite, native silver and realgar, occurs erratically in a vein that stands nearly vertical and is heavily weathered to a depth of 4.5 m. The jamesonite has the appearance of a very compact, felted mass of needle-like crystals which range up to 3 mm in length (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 71).

103 P/13 Jamesonite is found on the Black Hill Mining Company holdings on the east side of the south fork of Glacier Creek; on the Mother Lode claim located 8.8 km from Stewart on a creek on the east side of the Bear River; and on the Ruth and Francis claim on the north side of Glacier Creek; all of which are in the Portland Canal area (G. Hanson, 1935: Geol. Surv. Can., Mem. 175, pp. 109, 132, 145).

104 K/12 Radiating needles of silver grey jamesonite are found in milky white quartz-calcite vein material in the Polaris Taku Mine on the west bank of the Tulsequah River about 10 km above its confluence with the Taku River, Atlin mining division. A cleavage perpendicular to the elongation was seen in both the crystals and the more compact material (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 452).

104 K/12 Jamesonite is found with pyrite, sphalerite and galena in short, irregular lenses of mixed sulphides in the Potlatch-Banker Group of claims located just above the valley flat, east side of Tulsequah River valley about 4 km above its mouth (F.A. Kerr, 1948: Geol. Surv. Can., Mem. 248, pp. 70, 71).

Manitoba

52 L/6 The largest pegmatite on the southern shore of Shatford Lake, about 1.2 km west of the eastern end of the lake, is reported to contain stibnite. A specimen originally believed to be stibnite was identified as jamesonite by X-ray diffraction pattern (P. Černý and N.A. Bristol: 1972: Can. Mineralogist, 11, p. 560).

64 I/7 Jamesonite is found in altered volcanic rock on the Echimamish gold property. The mineral may contain blebs of blue quartz (C.K. Bell, 1961: Geol. Surv. Can., Paper 61-22, p. 17).

New Brunswick

21 P/5 Inclusions of jamesonite in galena have been found in polished specimens of ore from the Brunswick No. 12 deposit in Gloucester County, Bathurst-Newcastle area (R.S. Boorman, 1968: New Brunswick Res. Prod. Council, Res. Note 11).

21 P/13 The ore of the Sturgeon River Mine, Bathurst area, contains analcime and jamesonite (X-ray Laboratory, Geol. Surv. Can.).

Northwest Territories

85 J/8 Jamesonite occurs in the Yellowknife Bay area in the Con, P and G, and Negus groups. Pyrite, stibnite and tetrahedrite are the commonest associated minerals. These minerals are found in quartz-carbonate veins, either filling cracks, vugs and drusy joints in the vein, or disseminated throughout. The three claims are located about 1.6 km west and slightly south of Mosher Island in Yellowknife Bay (A.W. Jolliffe, 1938: Geol. Surv. Can., Paper 38-21, pp. 19-22, 28) (L.C. Coleman, 1953: Am. Mineralogist, 38, p. 516).

85 J/8 Jamesonite occurs in small pockets and fine veinlets associated with stibnite, pyrite, arsenopyrite, bournonite and gold at the Akaitcho property in the Yellowknife area. The gangue is quartz and calcite. Spectrographic analysis showed Ag present in addition to Au, Pb, Fe and Sb; but As was not found (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 86).

85 J/9 Samples from the 306 stope of the Giant Mine, located about 1.6 km west of Yellowknife Bay, consist of quartz-calcite vein material with large compact areas of jamesonite in contact with brown sphalerite and minor amounts of pyrite. The cleavage perpendicular to the elongation of the mineral is well developed (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 452).

85 J/16 Irregular veins and masses of white and grey quartz which locally are mineralized with pyrrhotite, pyrite, chalcopyrite, arsenopyrite, gold, and jamesonite, have been found on the Howey property, 300 m west of the southwest arm of Clan Lake. The jamesonite, which shows a distinct cleavage across the elongation of the crystals, was identified by means of an X-ray powder photograph (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 50, p. 71).

Nova Scotia

21 A/12 Jamesonite occurs with pyrite and arsenopyrite in a quartz vein in slates about 1.6 km west-southwest of Lansdowne (F.C. Taylor, 1969: Geol. Surv. Can., Memoir 358, p. 53).

Ontario

31 C/6 Jamesonite is the most abundant of the sulphosalt minerals occuring at the small prospect pit on lot 12, concession XIV, Huntingdon Township on the farm of Mr. Ed Taylor of Madoc, which yielded nine new mineral species (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 211).

31 C/11 In 1919, A.T. McKinnon donated to the National Mineral Collection a specimen of jamesonite from lot 11, conc. XIV, Madoc (Huntingdon Township), Hastings County.

31 C/14 Good specimens of fibrous massive jamesonite were obtained on lot 10, conc. VIII, and lot 7, conc. X, Barrie Township, Frontenac County, Jamesonite from the first locality was associated with chalcopyrite and occurred in a gangue of fine-grained impure dolomite, while in

the latter specimen it was associated with sphalerite (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 30R).

31 C/15 Jamesonite is found with pyrite and pyrrhotite in a gangue of crystalline dolomite, lot 30, conc. II, Clarendon Township, Frontenac County (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 15R).

31 F/2 Jamesonite has been identified with berthierite and tetrahedrite in specimens from Flower Station (near Clyde Forks) in Lanark County (X-ray Laboratory, Geol. Surv. Can.).

31 M/4 A specimen of jamesonite from the Frontier Mine in the northeast part of South Lorrain Township is represented in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 204).

52 N/4 Jamesonite is a constituent of massive sulphide ore at the Cochenour Willans Mine, located just east of MacKenzie Island, in Red Lake, Dome Township. Associated minerals include: stibnite, berthierite, tetrahedrite, pyrite, pyrrhotite, arsenopyrite and gold (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Yukon

105 D/2 Jamesonite is reported to be present in the ore mined at the Venus Mine on the eastern slope of Montana Mountain above Windy Arm (Tagish Lake) (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 45).

105 G/3 Jamesonite is the principal sulphosalt mineral at the property of Tintina Silver Mines at 61°09'N., 131°09'W., 11 km northwest of the confluence of the Ings and Upper Liard Rivers. Associated minerals are argentian tetrahedrite, galena, sphalerite, pyrite, arsenopyrite, marcasite, bournonite, owyheeite, pyrrhotite, chalcopyrite and tintinaite (D.C. Harris, J.L. Jambor, G.R. Lachance and R.I. Thorpe, 1968: Can. Mineralogist, 9, p. 371-382).

105 M/14 Pods of jamesonite and lesser amounts of arsenopyrite, sphalerite and galena have been reported in a quartz vein at the Homestake group on Bunker Hill, at 63°54'30"N, 135°12'30"W (L.H. Green, 1965: Geol. Surv. Can., Paper 65-19, p. 14).

106 D/4 The No. 1 vein at Peso Silver Mines Limited contains abundant jamesonite. The vein is located about 800 m west of Secret Creek at an altitude of about 1,130 m at lat. 64°00'30"N, long. 135°54'W (R. Skinner, 1962: Geol. Surv. Can., Paper 62-27, p. 32).

115 A/3 Jamesonite and stibnite are associated with massive argentian galena, sphalerite and minor chalcopyrite on the MOHAWK, SKY and STE claims at 60°07'N, 137°08'W, roughly 4.8 km due west of Dalton Post at elevations of 950 to 1060 m (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory: Dept. Indian and Northern Affairs, p. 140).

115 I/3 Minor amounts of jamesonite have been detected in polished sections of drill core from the Brown-McDagle property on Pony or Victoria Creek, 56 km west of Carmacks (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 86).

JAROSITE

$KFe_3(SO_4)_2(OH)_6$

British Columbia

94 M/9 Rust coloured to yellow coatings of jarosite with associated gypsum, alunogen and calcite have formed on black shale exposed along the side of a ridge on the southeast side of the bridge on the Alaska Highway over the Smith River (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 20).

Manitoba

63 K/12 Coatings of yellow jarosite and white aragonite are reported on specimens from the dumps of the Cuprus Mine about 16 km east of Flin Flon via Highway 10 (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 42).

63 K/13 Yellow jarosite and rusty brown goethite occur as powdery coatings on pyrite-bearing schist at the Baker-Patton deposit located just east of the north end of Sourdough Bay (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 45).

63 K/16 Powdery coatings of white leonhardtite and yellow jarosite are reported on ore specimens from the Chisel Lake Mine at the southern end of Chisel Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 65).

63 N/3 Olive-green jarosite, white gypsum and light blue devilline have been identified as encrustations on ore specimens from the Sherritt-Gordon Mine at Sherridon (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 48).

New Brunswick

21 H/5 Jarosite occurs in Saint John County between Grassy Lake and Golden Grove Mountain as a yellow coating on weathered graphite-quartz schist. The mineral was identified by means of X-ray diffraction in the Assay Laboratory of the Ontario Department of Mines (D.A. Moddle, 1960: private communication).

The following occurrences of jarosite have been reported by Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51.

21 J/4 As yellow, powdery crusts on quartz and pyrite at the Dominion No. 1 Mine on the Carl Robinson farm, 4 km from Woodstock.

21 J/10 As yellow, powdery crusts on sulphides and on the host rock at the Burnt Hill tungsten deposit, which may be reached by road (26 km) from Maple Grove Station.

21 O/8 In the gossan at the Heath Steele Mine, 53 km from Newcastle, via Highway 331).

21 P/5 In the gossan at Brunswick No. 6 Mine, which may be reached from Highway 331 via the road to Grand Falls.

Newfoundland

2 E/12 Pyrite specimens coated with powdery yellow jarosite were collected at a former pyrite producer on the northeast side of Pilleys Island Harbour on the south side of Pilleys Island in Notre Dame Bay. Pyrite-chalcopyrite specimens

coated with jarosite were found on the dumps of the Little Bay Mine, a former copper producer in the Halls Bay area. The mine is 0.8 km southeast of Little Bay village on the south slope of a ridge on the peninsula between Little Bay and Little Bay Arm in Notre Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, pp. 109, 113).

Ontario

31 C/10 Jarosite forms irregular coatings on pyrite and pyrrhotite at the Enterprse Mine (Foley prospect). The property is located about 42 km north of Kingston and 16 km west of Godfrey (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

31 E/11 Jarosite has been identified in specimens from the property of Silver Crater Mines Limited, lot 31, conc. XV, Faraday Township, Hastings County (X-ray Laboratory, Geol. Surv. Can.).

Jarosite has been identified as coatings on sulphides at the following occurrences:

31 F/5 Craigmont Mine, Raglan Township, lots 2-4, conc. XVIII-XIX,

31 F/6 Jamieson Mine, Lyndoch township, lot 5, conc. VIII, Radnor Mine, Grattan Township, lot 16, conc. IX,

31 F/7 Buckhorn Mine, Bagot Township, lot 28, conc. IV,

31 F/11 Road-cuts on Highway 60, 5.9 km west of Douglas (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, pp. 16,21,26,30,43).

31 M/4 Yellow jarosite forms earthy coatings on ore specimens on the mine dumps at the Little Dan Mine. The dumps are located at the east end of Arsenic Lake near the shore (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 8).

52 L/2 Jarosite has been reported on a hillside at the northwest corner of Vermilion Lake, about 13 km north of Minaki. Several pits have exposed a mixture of friable and nonfriable hydrous silica. Some of the fragments are coated by orange to yellowish jarosite, and some narrow veinlets of jarosite cut the hydrous silica. Chemical analysis by R.J.C. Fabry gave: Fe_2O_3 48.09, K_2O 11.82, Na_2O 3.61, SO_3 33.13, H_2O 3.35, total 100.00 (J.F. Wright and C.H. Stockwell, 1933: Geol. Surv. Can., Sum. Rept., Pt. D, pp. 2-4).

Quebec

The following occurrences of jarosite have been reported by Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51.

21 E/10 As pale yellow powder coatings on quartz and ore minerals at a molybdenite deposit on the Joseph Gregoire farm, St.-Cecile Station.

21 E/11 With gypsum and rozenite as crusts on massive sulphides at the Weedon Mine, 2.1 km from Fontainebleau and 16 km east from Weedon.

21 E/13 As pale yellow acicular aggregates in quartz cavities and as a yellowish-orange powder on the metallic minerals at the South Ham antimony mine, located 13.6 km west of Highway 1 on Highway 34.

22 A/16 With tiny pyrite grains, as spherical concretions in sandstone cliffs at Cap-aux-Os.

- -

31 F/10 Jarosite occurs with leonhardtite as coatings on sulphides at the Squaw Lake molybdenite mine in Huddersfield Township about 7 km north-northwest of the village of Otter Lake (Ann P. Sabina, 1971: Geol. Surv. Can., paper 70-50, p. 98).

31 G/12 Jarosite occurs as dull yellow powdery encrustations on pegmatite and gneiss in roadcuts along the Gatineau Parkway (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 39).

31 G/13 Roadcuts along Highway 35 north of Notre-Dame-de la-Salette contain biotite gneiss which, in places, is coated with yellow, powdery jarosite (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 40).

31 H/11 Earthy, yellowish to reddish brown jarosite forms coatings on the rock at the Goyer Quarry north of St-Bruno (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 54).

31 I/16 Coatings and encrustations of yellow jarosite were noted on the surfaces of the tremolite rock at the Tetreault Mine near Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 88).

31 J/7
31 J/11 Roadcuts on Highway 11 north of L'Annonciation expose biotite gneiss coated with powdery yellow jarosite and with white to greyish and yellowish cauliflower-like encrustations of gypsum (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 60).

32 D/2 Rusty yellow, powdery jarosite is present on specimens on the dumps of the Hosco Mine, located 0.6 km north of Highway 59, 3.2 km west of Joannès (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 65).

32 D/6 Ore specimens coated with yellow jarosite were found on the mine dumps at the Powell Rouyn Mine about 4.8 km northwest of Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., paper 73-30, p. 50).

32 D/10 Specimens coated with rusty brown jarosite occur on the dumps at the Lyndhurst Mine, 5.8 km by road east of Highway 46 along the road to Laferté, 44.1 km from Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 57).

Saskatchewan

63 K/12 Goethite and jarosite occur as rusty powdery accumulations on quartz and on chlorite schist at the Newcor mine site about 4 km south of Creighton (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 22).

73 P/7 Dull yellow jarosite occurs with goethite and secondary copper minerals as crusts and coatings on rocks at the Eureka deposit. Several trenches are exposed on a ridge forming a peninsula at the southern end of Heyer Bay, MacKay Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 7).

jasper

(see QUARTZ)

JOAQUINITE

$Ba_2NaCe_2Fe(Ti,Nb)_2Si_8O_{26}(OH,F)_2$

Quebec

31 H/11 Joaquinite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

JOHANNITE

$Cu(UO_2)_2(SO_4)_2(OH)_2.6H_2O$

Northwest Territories

86 L/1 Minor amounts of tiny, radial, fibrous globules of johannite, together with golden yellow zippeite, erythrite, fourmarierite and uranopilite are found as crusts on massive pitchblende at Great Bear Lake (X-ray Laboratory, Geol. Surv. Can.).

JORDANITE

$27PbS.7As_2S_3$

Northwest Territories

85 J/8 Jordanite has been identified as the least abundant member of a suite of sulphosalts that have widespread distribution in the highly mineralized parts of the shear zones in the Con, Negus-Rycon, Giant Campbell and Crestaurum systems in the Yellowknife camp (B.W. Boyle, 1961: Geol. Surv. Can., Memoir 310, p. 55).

JOSEITE

near Bi_4TeS_2

British Columbia

82 L/4 A roughly tetrahedral mass of untarnished joseite, with visible spongy gold and calcite, was found at the White Elephant Group, 3.2 km west of Okanagan Lake, near Vernon (M.A. Peacock, 1941: Univ Toronto Stud., Geol. Ser., 46, pp. 85, 103).

92 H/8 Joseite II has been found at the Good Hope claim near Hedley, in the Osoyoos mining division. It occurs as coarse plates which are often intergrown with native bismuth and associated with hedleyite, pyrrhotite, arsenopyrite, molybdenite, and gold. These minerals occur in quartz and skarn (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 367).

92 H/8 Joseite II occurs on the Oregon (French) property between Sixteen Mile and Eighteen Mile (now Cahill)Creek, about 4.8 km east of Hedley, in the Osoyoos mining division. It appears with hedleyite in polished sections as rounded grains with smooth boundaries. Native bismuth, molybdenite and gold are closely associated with the tellurides (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

92 P/8 Gold, bismuth, and bismuthinite are associated with joseite at Windpass on Baldy Mountain, 800 m east of Boulder Station on the Canadian National railway line north of Kamloops (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 78). Windpass material is cited in Berry and Thompson as joseite I (L.G. Berry and R.M. Thompson, 1962: Geol. Soc. Am. Mem. 85).

93 L/14 Both joseite I and joseite II have been found at Glacier Gulch on Hudson Bay Mountain near Smithers, in association with bismuth, bismuthinite and electrum. Joseite occurs in cleavable, platy maasses and also in similarly oriented fragments intergrown with quartzose gangue. Its specific gravity varies from 8 to 9. An analysis by F.A. Forward of a sample with an average S.G. of 8.6 gave: Bi 79.3, Te 12.2, S 6.0, Se nil, Au trace, insol. trace, total 97.5, Joseite I was identified by X-ray powder photographs. Analysis of joseite II gave: Bi 75.14, Te 19.25, S 3.64, Pb 0.68, Fe 0.52, insol. 0.30, total 99.53; S.G. 8.3 (H.V. Warren and P. Davis, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 110) (M.A. Peacock, 1941: Univ. Toronto Stud, Geol. Ser. 46, p. 103) (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 367).

Yukon

115 P/9 An examination of the heavy minerals from a placer operation on Highet Creek in the Mayo district revealed a few small flexible plates of a bismuth telluride which was identified by means of an X-ray powder photograph as joseite I (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 452).

115 P/14 An examination of the heavy minerals from a dredge operating on Clear Creek in the McQueston district showed an occasional plate of joseite I (R.M. Thompson, 1950: Am. Mineralogist, 35, p., 453).

josephinite

(see NICKEL-IRON)

kaersutite

(see HORNBLENDE)

KAINOSITE

$Ce_2(Ce,Yt)_2Si_4O_{12}CO_3.H_2O$

Kainosite was first described from Hitero, Norway, in 1886. The name subsequently was changed to cenosite in Dana's System of Mineralogy. Although cenosite is commonly used, kainosite clearly has priority.

Ontario

31 C/11 Kainosite has been identified in specimens from the property of the Cavendish Uranium and Mining Company, Cavendish Township, conc. VII, lots 14 and 15 (X-ray Laboratory, Geol. Surv. Can.).

31 C/16 An occurrence of kainosite has been reported in South Sherbrooke Township on lot 8, conc. V (D.F. Hewitt, 1960: private communication). Kainosite occurs in an apatite vein on lot 8, conc. V, North Burgess Township, Lanark County. An analysis by Ellsworth gave: SiO_2 34.66, CaO 16.72, $(Yt,Er)_2O_3$ 35.46, CO_2 6.58, $(Ce,La,Di)_2O_3$ 3.22, SrO 0.31, H_2O 2.58, Na_2O 0.27, Fe_2O_3 0.22, MgO 0.19, MnO 0.02, SO_3 0.04, total 100.23; S.G. 3.612 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 237).

31 D/16 Kainosite has been found at the Centre Lake property of Bicroft Uranium Mines, Ltd., Cardiff Township, Haliburton County, conc. XI, lots 26 and 27. A chemical analysis of kainosite from the Bicroft Uranium Mine by J.A. Maxwell and G.R. Lachance gave the following results: CaO 16.78, Na_2O 0.04, K_2O 0.01, Ce_2O_3 0.38, Nd_2O_3 0.19, SmO_2 0.27, Y_2O_3 25.27, Gd_2O_3 2.44, Dy_2O_3 3.10, Er_2O_3 3.53, Yb_2O_3 2.71, Al_2O_3 1.20, SiO_2 35.24, TiO_2 0.02, ThO_2 0.03, CO_2 4.60, H_2O 2.59, Fe_2O_3 0.57, total 98.97 (X-ray Laboratory, Geol. Surv. Can.).

31 F/4 Kainosite occurs at the Greyhawk Uranium Mines property, Faraday Township, conc. XII, lot 10 (X-ray Laboratory, Geol. Surv. Can.).

31 F/4 A specimen of kainosite in the mineral collection of the Royal Ontario Museum is from the Faraday Mine, lots 16 and 17, conc. XI, Faraday Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 205).

Quebec

31 G/12 Kainosite occurs at the Evans-Lou Mine near St-Pierre-de-Wakefield (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 69-50, p. 35).

31 H/11 Kainosite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

KALINITE

$KAl(SO_4)_2.11H_2O$

Ontario

52 A/3
52 A/6 Kalinite is abundant on the exposed faces of high bluffs of argillaceous rock along the Kaministikwia and Slate rivers in the Thunder Bay district (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 41T).

KAMMERERITE

$Mg_5(Al,Cr)_2Si_3O_{10}(OH)_8$

Kammererite is a reddish alumino-silicate of magnesium and chromium, possibly a variety of chlorite.

Quebec

31 H/1
31 H/8 Kammererite occurs in Bolton Township, Brome County with chromite and serpentine.

31 H/9 It has also been found in similar occurrence in Melbourne Township, Richmond County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 41T).

KAOLINITE

$Al_2Si_2O_5(OH)_4$

Kaolinite and its polymorphs, nacrite and dickite, constitute the kaolinite group of clay minerals. The kaolinites are secondary products of the decomposition of aluminous minerals, notably feldspars.

Quebec

21 L/11 An analysis by Hunt of kaolinite from Chaudiere Falls, Levis County, gave the following results: SiO_2 46.05, Al_2O_3 38.37, CaO 0.61, MgO 0.63, H_2O 14.00, total 99.66 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 495).

31 G/9 Kaolinite occurs at Grand Fresniere in Two Mountains County. Specimens from this locality are present in the National Mineral Collection.

31 G/13 Kaolinite occurs in the Villeneuve Mine, lot 31, range I, Villeneuve Township, Papineau County. A specimen from the property was presented to the National Mineral Collection by A.T. McKinnon.

31 H/9
31 H/10 The following are the results obtained from an analysis of kaolinite from range V, lot 23, of Acton Township, Bagot County: SiO_2 44.604, Al_2O_3 39.145, Fe_2O_3 1.035, CaO 0.390, MgO 0.213, Na_2O 0.270, K_2O 0.196, H_2O 14.240, total 100.093; S.G. 2.577 (G.C. Hoffmann, 1874-75: Geol. Surv. Can., Rept. Prog., p. 314).

32 F/14 Kaolinite is reported to occur on the east side of Olga Lake, Abitibi East County (P.E. Imbault, 1952: Que. Dept. Mines, Geol. Rept., 51, p. 12).

karpinskyite

(see LEIFITE)

KASOLITE

$PbUO_2SiO_4.H_2O$

A secondary uranium mineral, kasolite occurs as yellow to brownish coatings associated with primary uranium minerals. It forms minute prismatic crystals of monoclinic habit.

Northwest Territories

86 L/1 Kasolite was found on a large specimen of pitchblende from LaBine Point, Great Bear Lake. It coated almost every surface of the specimen, and filled minute cracks with a dull sulphur yellow crust (L.I. Cowan, 1962: Can. Mineralogist, 7, p. 331).

Ontario

31 D/16 Specimens from Dyno Mines Limited, conc. VIII, lot 12, Cardiff Township, and from Aumacho River Mines Limited, conc. IX, lot 22, of the same township have been found to contain kasolite (X-ray Laboratory, Geol. Surv. Can.).

31 D/16 Kasolite and uranophane occur in marble exposed in a open-cut on a ridge which parallels the Gibson Road at Tory Hill. The occurrence is north of McCue Lake about 1.1 km by road west of the junction of Gibson Road on Highway 121. Thorite and uraninite are also present (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 E/1 Kasolite occurs as a yellow to orange-yellow coating on rocks at the Cudney and Cavendish properties, Monmouth Township, conc. XVI, lots 29 and 30 (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 23).

31 F/4 Kasolite has been identified from the property of Faraday Uranium Mines Limited, Faraday Township, conc. XI, lots 16 and 17 (X-ray Laboratory, Geol. Surv. Can.).

Rust coloured fracture fillings at the MacDonald Mine, in the Bancroft area, were found to contain kasolite, pyrite, uranothorite and zircon (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI).

52 E/16 Radioactive minerals occurring adjacent to the Trans-Canada Highway north of Hawk Lake and 48 km east of Kenora, have been identified as kasolite, uranophane and beta-uranophane (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd Ed., p. 281).

52 F/13 The secondary uranium minerals kasolite, uranophane and beta-uranophane have been identified in pegmatite exposed west and north of Richard Lake in MacNicol Township. Uraninite, monazite and allanite have also been identified (A.P. Pryslak, 1976: Ont. Div. Mines, GR130, p. 43).

Quebec

22 B/2 An earthy yellowish material coating fracture surfaces in galena from the Gaspé area, has been identified as kasolite. The specimen was obtained from a property located 3.2 km east of

Cross Point, Bonaventure County, on the south shore of the peninsula (X-ray Laboratory, Geol. Surv. Can.).

Saskatchewan

64 D/9 Kasolite and uranophane have been identified with uraninite in a pegmatite near Bleasdell Lake, east of Reindeer Lake (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd Ed., p. 317).

64 L/4 Kasolite has been identified in specimens from the Rabbit Lake uranium deposit located at 58°11'00"N, 103°42'36"W, west of Wollaston Lake (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1B, p. 235).

73 P/1 Secondary minerals identified at the Lee (Jahala) Lake deposit include coffinite, curite, kasolite and uranophane. The deposit is at the side of a hill facing the northeastern end of Lee (Jahala) Lake, 8 km east of Hunter Bay, Lac La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 10).

74 N/8 Kasolite forms orange-yellow crusts on fracture surfaces at the Consolidated Nicholson Mine near Goldfields, on the north shore of Lake Athabasca. It occurs with an unidentified yellow-green mineral near the centre of a radioactive area (D.D. Hogarth, 1951: Am. Mineralogist, 36, p. 412).

KERMESITE

Sb_2S_2O

Kermesite is a cherry red mineral found as an alteration product of stibnite, commonly associated with senarmontite, valentinite and stibiconite.

British Columbia

82 K/3 Kermesite is present as thin films on stibnite at the Alps-Alturas property located at the head of Martin Creek, the west branch of Kane Creek, a tributary of Carpenter Creek which it joins near Sandon (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 78).

21 G/11
21 G/14 Kermesite occurs with native antimony at the Lake George Mine in York County (G.F. King, 1885: Am. J. Sci., Ser. III, vol. XXX, pp. 275-277).

Newfoundland

2 E/10 Kermesite is reported to have been present in the ore of the antimony mine on the steep side of a hill at the south shore of Frost Cove on the west side of Moreton's Harbour, New World Island, Notre Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 97).

Nova Scotia

11 E/4 Stibnite and kermesite are found together at the West Gore Mine in Hants County (A.R.C. Selwyn, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 58A).

Ontario

52 N/4 Cherry red acicular crystals of kermesite have been found in the Cochenour-Willans Mine at Red Lake. They are up to 2 millimetres in length, transparent, and occur in small vugs with senarmonite on quartz and partially leached stibnite. The kermesite was identified by chemical and X-ray methods (M.H. Frohberg, 1960: private communication).

Quebec

21 E/12 Kermesite forms crystalline tuffs in veins cutting argillite on range I, lot 56, South Ham Township, Wolfe County (R.W. Ells, 1888-89; Geol. Surv. Can., Ann. Rept., IV, p. 80K).

KESTERITE

Cu_2ZnSnS_4

British Columbia

82 N/4 Kesterite containing exsolved stannite occurs in a sphalerite-pyrite-galena ore from a prospect located 30.5 km northeast of Revelstoke in the vicinity of the Snowflake Mine. Also present are small amounts of cassiterite, pyrrhotite, rutile, scheelite, tetrahedrite, chalcopyrite, covellite, cerussite and canfieldite. Electron microprobe analysis of the kesterite: Cu 29.93, Zn 9.40, Fe 4.38, Sn 27.66, S 28.74, total 100.11 (D.C. Harris and D.R. Owens, 1972: Can. Mineralogist, 11, p. 531).

New Brunswick

21 G/7 Electron microprobe analyses of kesterite and ferrian kesterite from Brunswick Tin Mines Limited, Mount Pleasant:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cu	27.0	29.7	29.5	27.8	26.8	26.9	26.9	25.6
Sn	25.8	26.9	23.9	25.2	23.4	23.1	26.1	22.4
In	0.2	nil	0.5	1.5	3.6	2.6	1.3	3.8
Fe	3.7	1.4	2.5	8.0	7.6	8.9	8.1	7.8
Zn	13.7	13.8	14.5	7.9	9.4	8.4	8.9	10.5
Cd	-	-	-	0.2	0.1	0.1	-	0.1
S	29.0	29.7	29.8	29.0	29.3	29.6	29.9	29.7
Total	99.4	101.5	100.7	99.6	100.2	99.6	101.2	99.9

(W. Petruk, 1973: Can. Mineralogist, 12, p. 46)

Ontario

42 A/11 Kesterite is reported to occur in a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine north of Timmins. Electron microprobe analysis gave: Cu 27.6, Fe 1.1, Zn 13.2, Sn 28.4, As 0.2, Se 0.4, S 28.9, total 99.8 (R.I. Thorpe, G.J. Pringle, and A.G. Plant, 1976: Geol. Surv. Can., paper 76-1A, p. 311).

KLOCKMANNITE

CuSe

Ontario

41 N/2 Bluish black aggregates of klockmannite up to 5 millimetres in diameter occur associated with pitchblende, chalcomenite and secondary uranium minerals on property belonging to Ranwick Uranium Mines Limited. The holdings are located on range XV, township 2, about 3.2 km southeast of the mouth of the Montreal River, at the eastern end of Lake Superior (M.H. Frohberg: private communication).

42 A/11 Klockmannite has been identified as one of the most commonly encountered selenide minerals in a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine north of Timmins. The mine may be reached via Highway 655, 25.7 km north of

Highway 101 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

Quebec

32 D/6 The selenide minerals klockmannite and umangite have been identified in the ore at the Horne Mine in Noranda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 47).

Saskatchewan

74 N/8 Minor amounts of klockmannite are found in shear zones in the Goldfields district (S.C. Robinson and E.J. Brooker, 1952: Am. Mineralogist, 37, p. 542).

74 N/10 A suite of selenide minerals occurs in pitchblende ore and hematite-stained carbonate veins in the Martin Lake Mine located at the northeast corner of Martin Lake in the neck of land between Beaverlodge Lake and Martin Lake. The selenides include klockmannite, umangite, clausthalite, athabascaite, eucairite, berzelianite, eskebornite and tyrrellite. Native copper and silver are also present (D.C. Harris, L.J. Cabri and S. Kaiman, 1970: Can. Mineralogist, 10, p. 207).

knebelite

(see OLIVINE)

knopite

(see PEROVSKITE)

KOBELLITE

$Pb_5Bi_8S_{17}$

British Columbia

82 F/3 Kobellite occurs in quartz at the Dodger Tungsten Mine near Salmo (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 526).

KORNERUPINE

$Mg_3Al_6(Si,Al,B)_5O_{21}(OH)$

Quebec

31 F/16 Prismatic crystals of kornerupine up to 5 cm in length occur with quartz, orthoclase, biotite, tourmaline, andalusite, almandine, rutile, zircon and dumortierite in schists and gneisses on the southwest bank of the Gatineau River near Hinks Bridge, Aylwin Township, range III, lots 15 and 16. The following is an analysis by H. Boileau of greenish kornerupine from the above locality: SiO_2 30.24, B_2O_3 3.50, Al_2O_3 40.86, Fe_2O_3 0.42, FeO 8.52, MgO 14.87, CaO 0.06, Na_2O 0.08, H_2O^+ 0.97, TiO_2 0.19, P_2O_5 0.09, Cr_2O_3 0.06, MnO tr., total 99.86; S.G. 3.37 ± 0.01 (J.P. Girault, 1952: Am. Mineralogist, 37, p. 531).

KRENNERITE

$(Au,Ag)Te_2$

A silver white to brass yellow mineral, krennerite is similar to sylvanite in composition, mode of occurrence, and appearance. It is however somewhat rarer than sylvanite, and is orthorhombic whereas sylvanite is monoclinic.

New Brunswick

21 P/5 Krennerite and petzite are associated with chalcopyrite and occur as inclusions within pyrite and silicates at the Captain deposit situated on the headwaters of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland Counties, 14.4 km from Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can., Paper 66-18, p. 12).

Ontario

42 A/2 Krennerite has been found in the Ashley Mine, Bannockburn Township, where it occurs sparingly in association with altaite (H.C. Rickaby, 1931: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. II, p. 16).

42 E/10 A lath-shaped mineral found in galena at the MacLeod-Cockshutt Mine in Ashmore Township, has been identified as krennerite (E.G. Pye, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. V, p. 49).

52 N/4 Krennerite has been reported to occur in the McKenzie-Red Lake Gold Mine on McKenzie Island in Red Lake (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 350).

Quebec

32 C/4 The telluride minerals tellurbismuth, hessite, calaverite and krennerite have been identified at the Lamaque Mine in Val d'Or. Quartz crystals studded with coarse gold and with tellurides have been found lining cavities in the ore veins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 111).

32 D/5 Krennerite is an important ore mineral in parts of the Robb-Montbray Mine in Montbray Township. It occurs with other tellurides, native gold and sulphides and appears to be most intimately associated with pyrite and chalcopyrite (Ellis Thomson, 1928: Univ. Toronto Stud., Geol. Ser., 27, p. 12).

32 D/6 Short, vertically striated, prismatic crystals and fragments of krennerite are reported to occur in the Horne Mine, 4.8 km west of Noranda (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 350).

KULANITE

$Ba(Fe,Mn,Mg,Ca)_2(Al,Fe)_2(PO)_4)_3(OH)_3$

Yukon

117 A/9 The mineral kulanite, named after the finder Mr. Alan Kulan of Ross River, was discovered at a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Minerals found at the locality include lazulite, wardite, vivianite, childrenite, ludlamite, metavivianite, arrojadite, augelite and brazilianite. XRF analysis by E.J. Brooker of kulanite heated in an oxygen atmosphere: Na_2O 0.02, MgO 3.16, CaO 0.79, MnO 6.49, BaO 24.3, Al_2O_3 14.7, Fe_2O_3 14.2, P_2O_5 34.2, SiO_2 0.2, total 98.06 (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

kunzite

(see SPODUMENE)

KYANITE

Al_2SiO_5

Identical in composition with sillimanite and andalusite, kyanite commonly occurs as bladed crystals. It is found in gneissic rocks and mica schists, often in association with garnet, staurolite and corundum. Crystals or blades are commonly blue in the centre with white margins. They may also be green, grey, or black.

British Columbia

82 F/2 Kyanite occurs in a biotite schist on a ridge south of Summit Creek between the Salmo and Kootenay rivers in the Nelson mining division (G.M. Dawson, 1897: Geol. Surv. Can., Ann. Rept., X, p. 30).

82 M/16
83 D/1 Kyanite is present in schists, gneisses and pegmatites at the head of Yellow Creek at about 52°00'N, 118°22'W (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept. 23, p. 60).

83 D/11 Translucent, blue, bladed crystals of kyanite occur embedded in a groundmass of fractured quartz in the Albreda district near Mile 2487, west of Jasper (R.L. Rutherford, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 102).

Chemical analysis of transparent bluish kyanite from North Thompson River by Hoffman: SiO_2 36.29, Al_2O_3 62.25, Fe_2O_3 0.55, MgO 0.36, CaO 1.06, total 100.51; S.G. 3.600 (G.C. Hoffmann, 1880, Geol. Surv. Can., Rept. Prog. 1878-79).

83 D/14 Kyanite and beryl are found together in a vein located 11.2 km south of Tête Jaune Cache in the Cariboo mining division (G.M. Dawson, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 163A).

Manitoba

63 J/13 Kyanite crystals were collected from a small rock dump near the shaft of the Stall Lake Mine at Stall (Miller) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., paper 71-27, p. 61).

63 K/16 Light blue to grey kyanite crystals several cm long and up to 2.5 cm wide are common at the Anderson Lake Mine. They are associated with staurolite, garnet, anhydrite, anthophyllite and cordierite. Kyanite also occurs in sericite schist exposed along the railway about 450 m east of the mine. The kyanite-staurolite-garnet association is also found at the Chisel Lake Mine about 12.8 km west of the Anderson Lake deposit (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, pp. 63-65).

Ontario

31 C/11 Kyanite occurs with quartz in mica schist at the Golden Fleece Mine in conc. VI, lot 25, Kaladar Township (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 200).

31 C/14 A kyanite-bearing band of mica schist trends in a northeasterly direction across Clarendon Township about 80 km northwest of the City of Kingston. The kyanite content is reported to average as high as 12 to 15 per cent (A.V. Haw, 1954: Bull. Can. Inst. Mining Met., vol. 47, No. 501, pp. 27-35).

31 F/5 Blue-banded kyanite crystals up to 6 mm across, occur in gneiss on lots 23 and 24, conc. XII, of Carlow Township. Sillimanite, garnet, and biotite are also present in the rocks (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. VI).

31 L/11 Colourless light blue and greenish blue crystals of kyanite up to 4.8 cm long occur in rock located at the northeast end of Crocan Lake, along the east shore of the lake, and along a lumber road from Timber Creek to Crocan Lake. The showings are mainly in Antoine Township at about 46°31'N, 79°00'30"W (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 68).

41 I/4 The mineral collection at the Royal Ontario Museum includes kyanite from Dreamers Rock, Dreamers Peninsula, south of La Cloche Peninsula, Indian Reserve No. 4 (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 208).

41 I/7 Coarse grains of kyanite with garnet, biotite, quartz, and feldspar comprise a gneissic rock which outcrops in an area 19 km east of Sudbury. The kyanite occurs as blue, green, or grey, bladed crystals varying from 6 mm to 10 cm in length (A.V. Haw, 1954: Bull. Can. Inst. Mining Met., vol. 47, No. 501, pp. 27-35).

Kyanite occurs in a pegmatite vein cutting Grenville gneiss in Dryden Township, conc. III, lot 9 (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 28R).

Quebec

31 L/7 Specimens of kyanite have been found in gneiss at Snake Creek which flows into the Ottawa River at a point about 16 km north of the town of Mattawa, Ontario (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 56A; also 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 117A). Kyanite taken from an outcrop about 800 m north of the mouth of the creek was donated by A.E. Barlow, to the National Mineral Collecion in 1894.

31 L/10 Bladed aggregates of kyanite and individual crystals up to 12 cm long occur at the Narco deposit located at 46°36'N, 78°59'W, about 4.8 km south southeast of Beauchêne (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 82).

32 E/3 Porphyroblasts of kyanite have been found in the wall-rock at the Normetal property in Abitibi-West County (Carl Tolman, 1951: Que. Dept. Mines, Geol. Rept., 34).

LABRADORITE

$(CaAl_2Si_2O_8)_{0.5-0.7}(NaAlSi_3O_8)_{0.3-0.5}$

The name labradorite is applied to those feldspars of the plagioclase series having an anorthite content of between 50 to 70 per cent. Labradorite occurs in igneous rocks, particularly the more basic ones. Its colour varies from light to dark grey and specimens characteristically display iridescence in blues and greens which is often attractive and valued as an ornamental and gem stone.

Manitoba

63 J/13 Labradorite containing 55 per cent anorthite molecule occurs in a quartz gabbro south of Hub Bay, Wekusko Lake. Phenocrysts of labradorite up to 5 cm long, have been found in a porphyrite phase of the rock (J.E. Armstrong: Geol. Surv. Can., File No. 21-A-16, p. 19).

Newfoundland

3 E/4 An iridescent labradorite from Hawks Harbour, Labrador coast, gave the following chemical analysis: SiO_2 55.24, TiO_2 0.07, Al_2O_3 27.61, Fe_2O_3 1.22, CaO 10.70, Na_2O 5.40, K_2O 0.14, H_2O 0.10, total 99.48. Its composition in terms of percentage of feldspar was found to be An 53.10, Ab 45.59, and Or 0.56 (V.B. Meen, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 39).

12 B/10 Light grey labradorite exhibiting a light to medium blue iridescence occurs in anorthosite rock at Indian Head on the north shore of St. George's Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 153).

13 G/11 Labradorite is abundant west of Long Point on the south shore of Melville Lake, Labrador (E.M. Kindle, 1926: Geol. Surv. Can., Mem. 141, p. 77).

14 C/3 Specimens of labradorite suitable for ornamental purposes are reported to occur at Ford Harbour, Pauls Island, and Black Island, Labrador (D.S.M. Field, 1951: Can. Mining J., vol. 72, Pt. 2, p. 73).

14 C/5 Gem quality labradorite occurs in a coarse pegmatitic anorthosite in the Grenfell quarry on the southern side of Tabor Island, south of Nain, Labrador (A.K. Snelgrove, 1953: Nfld. Dept. Mines and Res., Information Circular, No. 4, pp. 139-140).

Ontario

31 C/5
31 C/12 Large phenocrysts of labradorite may be seen in diabase in Belmont Township, Peterborough County (G.M. Dawson, 1899): Geol. Surv. Can., Ann. Rept., XII, p. 127A).

31 C/15 A coarse-grained diorite on lot 16, conc. III, North Sherbrooke Township, Lanark County, contains white feldspar with a vitreous lustre on cleavage surfaces, some of which display fine parallel striae. It is translucent except on weathered parts, where it becomes opaque-white. Analysis by G.C. Hoffmann (1876): SiO_2 54.19, Al_2O_3 27.51, Fe_2O_3 0.45, MgO 0.78, CaO 9.39, Na_2O 6.04, K_2O 1.40, H_2O 1.12, total 100.88; S.G. 2.697 (J.A. Maxwell et al. 1965: Geol. Surv. Can., Bull. 115, p. 381).

31 G/7
31 G/8 Boulders containing labradorite have been reported from Lochiel Township, Glengarry County (G.M. Dawson, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 74A).

42 A/9 Fresh labradorite is reported to make up to 75 per cent of a volcanic rock outcropping in conc. VI, lot 1, Beattie Township. Labradorite laths are present in thin sections made from specimens of diabase dyke rock occurring in conc. I, lot 6, of Beattie Township (P.E. Hopkins, 1915: Ont. Dept. Mines, vol. 24, Pt. 4).

Quebec

12 M/12 Large crystals of labradorite are distributed throughout a finer grained groundmass in a rock at a locality east of Rougemont Lake, Saguenay County. The crystals have been bent and fractured and their contact with the finer material are ragged (J. Claveau, 1949: Que. Dept. Mines, Geol. Rept., 38, p. 19).

21 L/14 Labradorite is reported from Chateau Richer in Montmorency County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 42T).

22 D/6 Labradorite, exhibiting a characteristic blue play of colours, occurs in coarse-grained anorthosite in a roadcut on the Pont Arvida road at 1.1 km north of Highway 16 (Ann P. Sabina, 1968: Geol. Surv. Can., paper 67-51, p. 104).

22 D/13 Labradorite has been found on the Peribonka River, 48 km above its entrance into Lake St. John (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 46).

22 I/7 Labradorite occurs at Sheldrake in the Seigniory of Mingan, Saguenay County (A.R.C. Selwyn, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 4A).

31 G/16 Occurrences of labradorite have been reported from St. Jerome, Morin, Mille Isle, and Abercrombie in Terrebonne County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 42T).

31 H/13
31 I/4 Bluish white, granular labradorite occurs at Rawdon in Montcalm County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 42T)

Analysis by T.S. Hunt is as follows: SiO_2 54.45, Al_2O_3 28.05, Fe_2O_3 0.45, CaO 9.68, Na_2O 6.25, K_2O 1.06, volatile 0.55, total 100.49; S.G. 2.69 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, pp. 382, 383).

31 F/11 Labradorite of composition An_{60} forms zoned crystals in an outcrop south of the west end of Baptiste Lake in the Iserhoff River area (J. Claveau, 1951: Que. Dept. Mines, Geol. Rept., 49, p. 25).

LABUNTSOVITE

$(K,Ba,Na)(Ti,Nb)(Si,Al)_2(O,OH)_7.H_2O$

Quebec

31 H/11 Labuntsovite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

lamprobolite

(see HORNBLENDE)

LAMPROPHYLLITE

$Na_2(Sr,Ba)_2Ti_3(SiO_4)_4(OH,F)_2$

British Columbia

82 N/1 Lamprophyllite is reported to occur as acicular, strongly pleochroic, brownish, flaky prisms in thin section of a dyke-like mass south of Sodalite Creek in the Ice River alkaline complex (K.L. Currie, 1975: Geol. Surv. Can., Bull. 245, p. 45).

LANGISITE

(Co,Ni)As

Ontario

31 M/12 Langisite, the cobalt rich analogue of niccolite (nickeline), has been discovered in a fault vein in the Langis Mine, Casey Township, Cobalt-Gowganda area. Its composition corresponds to $Co_{0.84}Ni_{0.16}As_{1.04}$. Langisite was found only as irregular grains and lamellae in safflorite. Electron probe microanalysis by D.C. Harris: Co

35.5, Ni 7.0, As 56.0, total 98.5 (W. Petruk, D.C. Harris and J.M. Stewart, 1969: Can. Mineralogist, 9, pp. 597-616).

LANGITE

$Cu_4SO_4(OH)_6.H_2O$

British Columbia

92 K/3 Langite has been identified as light to medium blue flaky or scaly crusts on specimens from the Menzies Bay area (X-ray Laboratory, Geol. Surv. Can.).

Quebec

31 H/8 Langite has been identified among the secondary copper minerals at the Ives and Huntingdon Mines, located between Eastman and Bolton Centre, 1.3 and 5.0 km respectively, from Eastman. Associated minerals include: brochantite, malachite and posnjakite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 8, 9).

LANSFORDITE

$MgCO_3.5H_2O$

British Columbia

104 N/11, 104 N/12 Lansfordite occurs lining cavities in hydromagnesite at a locality east of Atlin (E. Poitevin, 1924: Am. Mineralogist, 9, p. 225).

LAROSITE

$(Cu,Ag)_{21}PbBiS_{13}$

Ontario

31 M/5 A new mineral, larosite, was discovered in a sample from the Foster Mine. The mineral is rare and occurs as small acicular crystals in a chalcocite-stromeyerite assemblage. Chemical analyses by electron probe: Cu 49.7, 48.3; Ag 15.6, 15.6; Pb 9.0, 8.5; Bi 8.9, 9.6; S 18.5, 19.8; totals 101.7, 101.8 (W. Petruk, 1972: Can. Mineralogist, 11, p. 886).

LATRAPPITE

$CaNbO_3$

Quebec

31 G/8 31 G/9 Latrappite was found near the small community of La Trappe, Quebec, in the Oka district about 32 km west of Montreal. It is defined as "a mineral with the perovskite structure and a composition corresponding to the general formula ABO_3, in which the A and B cation sites are occupied predominantly by calcium and niobium respectively". It occurs as small black cubic crystals with diopside, biotite, and apatite in white calcite. Accessory minerals include pyrochlore, magnetite, pyrrhotite, dolomite, nepheline and monticellite. Chemical analysis by R.C. McAdam: CaO 25.95, Na_2O 4.03, RE oxides 2.03, K_2O 0.03, Nb_2O_5 43.90, TiO_2 10.05, Fe calc. as Fe_2O_3 8.74, MgO 2.20, MnO 0.77, SiO_2 0.45, S 0.90, loss on ignition 0.65, total 99.70, S.G. 4.40 (E.H. Nickel and R.C. McAdam, 1963: Can. Mineralogist, 7, pp. 683-697. E.H. Nickel, 1964: Can. Mineralogist, 8, pp. 121-2).

LAUMONTITE

$CaAl_2(SiO_3)_4.4H_2O$

Laumontite is a member of the zeolite group of minerals which are capable of undergoing cation exchange, and which may lose part or all of their water content and replace it with other compounds without losing their crystal structure. Zeolites are found in amygdaloidal cavities and other openings in igneous rocks, in metalliferous veins, and in sediments altered by diagenesis.

British Columbia

82 E/5 Zeolites are abundant along the north side of Yellow Lake about 14.4 km west of Okanagan Falls. They occur as nodules up to 7 cm in diameter and include natrolite, heulandite, laumontite, thomsonite and analcime (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 20).

82 F/4 Laumontite is reported to occur at the Centre Star Mine in the Rossland area, Trail Creek mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 140).

92 B/5 Veins and amygdules containing epidote, prehnite, pumpellyite, laumontite, chabazite, stilbite, analcime, quartz and calcite occur in the Metchosin basalt, east of the Sooke River (W.G. Libby and Jerry Kopel, 1971: Can. Mineralogist, 10, p. 915).

103 H/13 Laumontite has been found at the Drumlummon Mine on Douglas Channel about 160 km southeast of Prince Rupert (National Mineral Collection).

New Brunswick

22 B/1 Cavities up to 10 cm in diameter and fractures up to 5 cm wide in volcanic flows along the shoreline between Inch Arran and Bon Ann Point are filled with one or more of laumontite, stilbite, thomsonite, heulandite and prehnite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 103).

Nova Scotia

21 A 21 B 21 H Occurrences of laumontite are prominent along the shore of the Bay of Fundy from Long Point in Kings County to Port Lorne, Annapolis County. From Port Lorne southwesterly along the coast to Freeport it is found as a subordinate mineral. It usually occurs with stilbite. An analysis of a specimen from Margaretsville is as follows: SiO_2 50.96, Al_2O_3 21.60, Fe_2O_3 0.03, CaO 11.27, Na_2O 0.32, K_2O 0.18, H_2O 16.04, total 100.40; S.G. 2.283 (T.L. Walker, 1927: Univ. Toronto Stud., Geol. Ser., 14, p. 54).

21 H/3 An analysis by How of laumontite from Port George, Annapolis County, is as follows: SiO_2 51.43, Al_2O_3 21.64, CaO 12.07, H_2O 15.26, total 100.40 (H. How, 1858: Am. J. Sci., Ser., 2, XXVI, p. 34).

21 H/7 Laumontite is exposed in the rocks at Cape D'Or in Cumberland County (National Mineral Collection).

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Laumontite is of widespread occurrence in the basalts of the Minas Basin - Bay of Fundy area. The following occurrences were noted by Ann P. Sabina, (1964) in Rocks and Minerals for the Collector, Bay of Fundy Area; Geol. Surv. Can., Paper 64-10.

21 A/14 Port Lorne, Annapolis County; with stilbite, mesolite, thomsonite and apophyllite.

21 H/2 Baxter's Harbour, Long Beach, Kings County; with heulandite, analcime and stilbite.

Halls's Harbour, Kings County; with stilbite, heulandite, apophyllite and thomsonite.

Chipman Brook, Kings County; with heulandite, stilbite and mordenite.

Canada Creek, Black Rock, Kings County; with stilbite, mordenite, heulandite, mesolite, apophyllite, prehnite and gyrolite.

Harbourville, Ogilvie, Kings County; with stilbite, heulandite and mesolite.

Morden, Kings County; with stilbite, mordenite, apophyllite, analcime, heulandite and mesolite.

21 H/3 Margaretsville, Annapolis County; laumontite is the most prominent zeolite, and is associated with heulandite, analcime, apophyllite, gyrolite, mesolite, stilbite, scolecite and natrolite.

Port George, Annapolis County; with stilbite, heulandite, analcime, mesolite, apophyllite, gyrolite, and thomsonite.

21 H/8 Cape Blomidon to Cape Split, Kings County; with apophyllite, heulandite, natrolite, stilbite, chabazite, analcime, gmelinite, mesolite and thomsonite.

Ontario

41 N/2 A specimen of laumontite in the mineral collection of the Royal Ontario Museum is from the Tribag Mine located in the eastern part of Nicolet Township, Algoma district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 210).

Quebec

21 M/10 Vugs in the ore at the St. Urbain Titanium Mines deposit are partly filled with pyrite, limonite, hematite and with pale green chlorite, pinkish white zeolites and calcite crystals. The zeolites - pale pink, radiating, platy mesolite and greenish white massive laumontite - are associated with calcite and dark mica, and occur on the host rock and on the ore (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 96).

LAUNAYITE

$22PbS.13Sb_2S_3$

Ontario

31 C/6 The new mineral, launayite, was found in polished sections of specimens collected from a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed. Taylor of Madoc. It occurs sparingly in association with veenite and boulangerite. Electron probe microanalysis (average of two grains) by G.R. Lachance: Pb 48.5, Sb 29.5, As 1.5, S 21.25, total 100.75 (J.L. Jambor, 1967: Can. Mineralogist, 9, pp. 191-213).

LAVENITE

$(Na,Ca)_3ZrSi_2O_7(O,OH,F)_2$

British Columbia

82 N/1 Lavenite is reported to have been identified in two specimens of sodalite-nepheline syenite from Manganese Mountain in the Ice River alkaline complex at about 51°09'N, 116°23'W (K.L. Currie, 1975: Geol. Surv. Can., Bull. 245, p. 45).

Quebec

31 H/11 Lavenite has bee identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

LAZULITE

$(Mg,Fe)Al_2(PO_4)_2(OH)_2$

This azure blue, brittle mineral occurs as pyramidal crystals or in massive form. It makes an attractive ornamental and gem stone.

British Columbia

92 H/6 Small, irregular, patches of deep blue lazulite have been found in quartzite boulders discovered in the Fraser River, about 1.6 km north of Hope. The lazulite is associated with muscovite and sillimanite (R.M. Thompson, 1960: private communication).

93 L/1 Bright blue lazulite is present in much of the drill core and surface trenches at the Sam Goosly property of Kennco Explorations Limited at 54°11'N, 126°16'W, about 33.7 km southeast of Houston (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 126-127).

Manitoba

54 L/9 Blue crystals of lazulite, suitable for ornamental pruposes, are found near Fort Churchill (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 48). A chemical analysis of lazulite from an occurrence 1.2 km east of the Churchill River, is as follows: P_2O_5 46.388, Al_2O_3 29.140, FeO 2.091, MgO 13.838, CaO 2.829, H_2O 6.468, total 100.754; S.G. 3.0445 (G.C. Hoffmann, 1878-79: Geol. Surv. Can., Rept. Prog., p. 2H).

Quebec

32 I
32 P Lazulite occurs with quartz at Lake Mistassini (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 66R).

Yukon

117 A/9 Good crystals of lazulite have been collected from a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Kulanite, wardite, vivianite, childrenite, ludlamite, metavivianite, arrojadite, augelite and brazilianite were collected at the same locality (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

117 A/10 Lazulite was collected along the Blow River near Fitton Mountain. It occurs as open space fillings and veinlets in quartzitic Jurassic sediments. Clusters of deep blue terminated crystals have developed on light blue massive lazulite. Chemical analysis by A. Stelmach: MgO 11.10, FeO 4.74, Al_2O_3 32.05, MnO 0.06, CaO tr., P_2O_5 45.61, TiO_2 0.06, H_2O+ 6.38, total 100.00 (after removal of 0.42% SiO_2) (F.A. Campbell, 1962: Am. Mineralogist, 47, p. 157).

LAZURITE

$(Na,Ca)_8(Al,Si)_{12}O_{24}(SO_4,S)$

Northwest Territories

25 K/13 Lazurite (lapis lazuli) is intimately associated with white diopside in crystalline limestone at a locality 14 km north-northeast of the settlement of Lake Harbour on Baffin Island. The lazurite-bearing limestone is exposed on the west side of the Soper River about 8 km from its entrance into Soper Lake. The exposure is about 360 m from the shore of the river (W.L. Davison, 1958: Geol. Surv. Can., Prelim. Map 29-1958. Ann P. Sabina, 1964: Geol. Surv. Can., Misc. Report 8. Rock and Mineral Collecting in Canada, Vol. 1, p. 26).

LEAD

Pb

Ontario

52 A/5 Thin stringers of native lead are reported to occur in quartz in the Thunder Bay district at Dog Lake on the Kaministikwia River (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 42T).

Yukon

106 D/4 Native lead has been identified with litharge in a mineral concentrate from Dublin Gulch (X-ray Laboratory, Geol. Surv. Can.).

116 B/3 Native lead has been identified from Hunker Creek, near Dawson City (X-ray Laboratory, Geol. Surv. Can.).

LEIFITE

$Na_2(Si,Al,Be)_7(O,OH,F)_{14}$

The mineral karpinskyite has been shown to be a mixture of leifite and zinc-bearing clay (H. Micheelsen and O.V. Petersen, 1972: Am. Mineralogist, 57, p. 1006).

Quebec

31 H/11 Karpinskyite has been identified by X-ray powder pattern in specimens from the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Haris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109).

LEMOYNITE

$(Na,K)_2CaZr_2Si_{10}O_{26}.5\text{-}6H_2O$

Quebec

31 H/11 The new mineral, lemoynite, was discovered in specimens of nepheline-sodalite syenite from the Desourdy quarry on the northeast slope of Mont St-Hilaire. Chemical analysis by A.V. Bikova: SiO_2 47.32, ZrO_2 23.23, TiO_2 0.43, Nb_2O_5 2.18, RE oxides 1.18, Fe_2O_3 1.61, MnO 0.10, CaO 5.06, Na_2O 4.75, H_2O 13.33, total 99.19 (Guy Perrault, E.I. Semenov, A.V. Bikova, and T.A. Capitonova, 1969: Can. Mineralogist, 9, pp. 585-596).

A chemical analysis of lemoynite from Mont St-Hilaire by V. Kubat gave: SiO_2 55.40, Al_2O_3 0.22, ZrO_2 20.30, Nb_2O_5 0.87, TiO_2 0.49, CaO 4.40, MnO 0.04, Fe_2O_3 0.57, ZnO 0.19, CuO 0.08, SrO 0.07, MgO 0.16, K_2O 3.70, Na_2O 3.02, Rb_2O 0.03, H_2O 9.50, total 99.04, leading to the revised formula $(Na,K)_2CaZr_2Si_{10}O_{26}.5\text{-}6H_2O$ (Y. LePage and Guy Perrault, 1976: (Can. Mineralogist, 14, p. 132).

LEONHARDTITE

$MgSO_4.4H_2O$

Manitoba

63 J/13 Coatings of white leonhardtite and pale yellow sulphur were noted on specimens from the property of Stall Lake Mines Limited, located about 2.4 km east of Stall (Miller) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 62).

63 K/13 The secondary sulphate minerals, leonhardtite and rozenite were identified coating sulphides and associated minerals and rocks at the Pine Bay Mine on the shore of Sourdough Bay at the north end of Athapapusko Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 43).

63 K/16 Powdery coatings of leonhardtite and jarosite were found on ore specimens from the Chisel Lake Mine. The ore deposit lies below the southern end of Chisel Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 65).

Newfoundland

12 H/16 Ore specimens coated with rozenite, siderotil, leonhardtite and goethite are present at the site of the old Terra Nova Mine. The mine dumps are at the side of Highway 410 opposite the junction with the road to Bai Verte village (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 119).

Northwest Territories

120 C/13 Leonhardtite has been identified by means of spectrographic analyses and X-ray powder patterns in samples of efflorescent salts from Lake Hazen, Ellesmere Island (X-ray Laboratory, Geol. Surv. Can.).

Quebec

31 K/2 A white coating on specimens from the Squaw Lake molybdenite mine has been identified as leonhardtite. The deposit is located along a slope above the eastern end of Squaw Lake in Huddersfield Township about 7.2 km north northwest of Otter Lake village (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 98).

32 C/12 Leonhardtite and gunningite have formed on ore specimens on the dumps of the Barvue Mine at Barville, 61.8 km from Val d'Or via Highway 64 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 110).

LEPIDOCROCITE

FeO(OH)

New Brunswick

21 P/5 Lepidocrocite in the form of dull black, tiny, mammillary and botryoidal masses is associated with pale yellow, fine-grained sphalerite at the Bathurst iron mine at Austin Brook. The deposit may be reached via the road to Grand Falls from Highway 331, 26 km from Bathurst (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 115).

Nova Scotia

11 K/3 Iron-stained concretions measuring 5 to 7.5 cm in diameter occur in shale in cliffs just north of the wharf at Finlay Point, Cape Breton Island. The interior of the concretions is composed of a mixture of iron minerals, including goethite, lepidocrocite and glauconite, with quartz (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 20).

Yukon

105 M/14 Lepidocrocite has been identified in a specimen of oxidized ore from the property of Mayo Mines Limited, in the Keno Hill-Sourdough Hill area, Mayo mining district (X-ray Laboratory, Geol. Surv. Can.).

LEPIDOLITE

$$K(Li,Al)_3(Si,Al)_4O_{10}(F,OH)_2$$

Lepidolite is a lithium-bearing mica occurring in granite pegmatites, usually in association with other lithium minerals such as spodumene and amblygonite. It is also found in some granite gneisses. In physical characteristics it resembles the other micas but its colour is often a rather distinctive rose red, violet or lilac. It may, however, be yellowish, greyish white, or white. It is used as a source of lithium.

British Columbia

82 L/16 Pegmatite dykes on the northeast slope of Mount Bigbie close to the snowfield are reported to contain lepidolite, tourmaline, beryl and garnet (A.G. Jones, 1959: Geol. Surv. Can., Memoir 296, p. 162).

82 N/5 Pearly scales of lepidolite occur with calcite and rust-stained quartz on the Gold Hill claim located 16 km northeast of Illecillewaet, in the West Kootenay district (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 29R).

Manitoba

52 L/5 At Bernic Lake, a lithium ore containing lepidolite along with spodumene and amblygonite has been mined (R. Brinsmead, 1960: Precambrian, vol. 33, No. 8, p. 19).

52 L/6 A massive lilac-coloured rock occurring at the Bear claims, lot 17, range 16, township 16, on the Winnipeg River about 4.8 km southeast of Lamprey Falls, is composed almost entirely of lepidolite. Associated minerals are quartz and cleavelandite. Chemical analysis of a pure sample of lepidolite by R.J.C. Fabry: Li_2O 3.39, Fe_2O_3 0.24, MnO 0.90, Cs_2O 0.21, F_2 4.30, SiO_2 49.06, Al_2O_3 27.22, CaO 0.44, MgO 0.52, Na_2O 1.92, K_2O 11.03, H_2O 1.95, less O for F 1.81, total 99.37. A purplish, silvery grey lithian mica occurs as veinlets several cm wide in albite, and as borders surrounding large spodumene crystals between the spodumene and the enclosing albite. It has a radiating, narrow, fan-shaped structure normal to the vein wall, and the cleavage surfaces show a fine radiating wrinkling parallel to the long direction of the fans. It sometimes occurs as rosettes with fine wrinkling radiating from the centres. Chemical analysis by R.J.C. Fabry: SiO_2 47.18, Al_2O_3 31.80, Fe_2O_3 0.07, FeO 0.16, MgO 0.28, CaO 0.40, Na_2O 2.94, K_2O 10.50, H_2O 2.40, MnO 2.05, F 2.15, Li_2O 1.06, total 100.99, less O for F 0.89, total 100.10 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, pp. 155, 156).

63 J/10 The pegmatite dykes, west of Cross Island, Cross Lake area, contain spodumene and lepidolite (C.K. Bell, 1961: Geol. Surv. Can., Paper 61-22, p. 17).

Nova Scotia

21 A/9 Violet coloured lepidolite occurs in an albite pegmatite segregation at New Ross in Lunenburg County. It is associated with durangite, cassiterite, scheelite, wolframite, monazite, and beryl. The following analysis was made by E.W. Todd: SiO_2 49.28, Al_2O_3 24.36, K_2O 11.24, Li_2O 5.36, Fe_2O_3 0.63, MgO 0.73, MnO 0.87, Rb_2O 0.32, Na_2O 0.66, H_2O 0.87, total 99.74; S.G. 2.869 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 256).

Ontario

52 P/9 Three pegmatite dykes containing appreciable amounts of lepidolite, spodumene and pink tourmaline outcrop just north of Lily Pad Lakes in the Fort Hope area (51°38'N, 88°16'W) Kenora district (V.K. Prest, 1942: Ont. Dept. Mines, Ann. Rept., Vol. 51, Pt. III, p. 27).

Quebec

31 G/12 Lepidolite is reported to occur near the Lièvre River in the County of Papineau (H.S. De Schmid, 1913: J. Can. Mining Inst., pp. 376, 377).

Lepidolite is abundant at the old Leduc Mine on range VII, lot 25, Wakefield Township, where it occurs in a pegmatite as platy masses up to 30 cm across. It was analyzed by R.A.A. Johnston who found that it contained somewhat more iron and manganese than usual. The results of the analysis are as follows: SiO_2 47.89, Al_2O_3 21.16, K_2O 10.73, Li_2O 5.44, MnO 4.19, Fe_2O_3 2.52, Na_2O 1.34, H_2O 1.90, MgO 0.36, F_2 7.41, less O for F 3.12, total 99.82; S.G. 2.86 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 239).

31 H/11 The polylithionite variety of lepidolite is reported to occur in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire. (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, pp. 109-123). Chemical analysis (partial) of polylithionite from St-Hilaire: SiO_2 60.7, TiO_2 2.5, Al_2O_3 10.4, MgO 0.0, CaO 10.3, K_2O 11.9, Li_2O 7.5, total 93.3 (G. Perrault, 1966: Can. Mineralogist, 8, p. 671).

32 C/5 Lepidolite occurs as irregular masses and disseminations in a pollucite rich zone in a dyke on the Valor property, Lacorne Township (R.W. Mulligan, 1961: Geol. Surv. Can., Paper 61-4, p. 4).

32 D/8 Lepidolite and the spodumene mineral, hiddenite, are found together on lot 36, range II, of Figuery Township, Abitibi-East County. Other minerals present are quartz, microcline, albite, and muscovite (W.W. Weber, 1959: Que. Dept. Mines, Prelim. Rept., 257, p. 15).

LEPIDOMELANE

$$K(Fe,Mg)_{4-6}(Si,Al,Fe)_8O_{20}(OH)_4$$

Lepidomelane, or iron mica, is a black to brown mica containing a high percentage of ferric iron. It characteristically occurs in iron-rich feldspathic igneous rocks.

Ontario

31 C/12 Lepidomelane has been reported to occur on lot 11, conc. IX, of Marmora Township, Hastings County (G.M. Dawson, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 123A). Two other localities in the same township are lot 14, conc. X, and lot 16, conc. XI. An analysis of a specimen from the first of these was performed by Wait. His results are as follows: SiO_2 32.79, Al_2O_3 14.34, Fe_2O_3 4.52, FeO 26.32, MnO 0.29, CaO 1.45, MgO 4.68, K_2O 7.24, Na_2O 2.00, TiO_2 0.92, H_2O (at 100°) 1.38, H_2O (above 100°) 3.68, total 99.61; S.G. 3.19 (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, pp. 14R 15R).

31 D/16 The following results were obtained from an analysis by Egelston of lepidomelane from an essexite body in Monmouth Township: SiO_2 31.48, TiO_2 2.50, Al_2O_3 17.23, Fe_2O_3 5.85, FeO 27.96, MgO 2.99, MnO 1.61, CaO 1.33, K_2O 4.17, Na_2O 1.68, H_2O 3.94, total 99.74; S.G. 3.25 (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 21).

31 E/1 Black lepidomelane is present in nepheline syenite on lot 32, conc. XV, Faraday Township, Hastings County. It is associated with apatite, plagioclase, fluorite, magnetite, and pyrite and is rather unusual for its high fluorine and magnesia content. An analysis by Rickaby gave the following results: SiO_2 34.04, TiO_2 1.48, Al_2O_3 15.60, Fe_2O_3 4.22, FeO 23.60, MgO 7.46, MnO 0.99, K_2O 8.99, Na_2O 0.88, H_2O 1.26, F 2.02, total 100.44; S.G. 3.16 (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 20).

31 F/4 Large crystals of lepidomelane, nepheline, and albite are found in pegmatite rocks on lot 10, conc. XIII, Dungannon Township (Louis Moyd, 1949: Am. Mineralogist, 34, p. 743). In the same township, lepidomelane and sodalite are reported to occur together. These minerals have been found on lot 25, conc. XIV, and lot 29, conc. XIII (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Rept., VI, p. 15R).

41 I/2 Six-sided lepidomelane crystals occur in a nepheline syenite belt in Bigwood Township. The syenite rock strikes in a northerly direction for about 8 km from a point on the French River about 6.4 km below French River Station. The mica sheets are up to 7 cm in diameter and so darkly coloured that only very thin flakes will transmit light. An analysis by H.C. Rickaby is as follows: SiO_2 31.64, TiO_2 0.33, Al_2O_3 15.34, Fe_2O_3 8.38, FeO 31.78, MnO 0.28, MgO 0.90, Na_2O 0.67, K_2O 8.70, H_2O 1.93, F 0.13, O for F 0.05, total 100.08; S.G. 3.294 (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 8).

41 I/6 Lepidomelane is reported to occur in conc. II, lot 2, of Drury Township (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 15R).

LESSINGITE

$Ca_2Ce_4Si_3O_{13}(OH)_2$

Quebec

31 F/15 Colourless grains of lessingite occur with uranian thorianite and thorite in a calcite-diopside-phlogopite rock on the property of Yates Uranium Mines Limited, range V, lot 20, Huddersfield Township (S.C. Robinson and A.P. Sabina, 1955: Am. Mineralogist, 40, p. 627).

LEUCITE

$KAlSi_2O_6$

Leucite is a rather rare mineral occurring only in silica-deficient igneous rocks, usually those of recent volcanic origin. It is never associated with primary quartz and is not found in plutonic rocks.

British Columbia

93 A/6 Grey, subtranslucent crystals of leucite occur at the Horsefly Mine on the Horse Fly River, about 11 km from its entry into Quesnel Lake (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, pp. 13R, 14R).

Yukon

115 O/4
115 O/5 Leucite has been found on the north fork of Spotted Fawn Creek, a tributary of the Twelvemile River (R. Bell, 1902-03: Geol. Surv. Can., Ann. Rept., XV, p. 40AA).

LEUCOPHANE

$(Ca,Na)_2BeSi_2(O,F,OH)_7$

Quebec

31 H/11 At the Desourdy quarry on the northeast slope of Mont St-Hilaire, leucophane occurs as short prismatic to tabular crystals in silicated vugs in nepheline syenite. It is usually associated with analcime and serandite. Chemical analysis: SiO_2 49.72, Al_2O_3 0.80, BeO 8.91, Na_2O 11.78, CaO 18.69, F_2 7.35, H_2O^+ 0.84, total 98.09 (G.Y. Chao, 1967: Can. Mineralogist, 9, p. 286).

LEUCOPHOSPHITE

$(K,NH_4)Fe_2(PO_4)_2(OH).2H_2O$

Leucophosphite is a rare mineral found originally in Western Australia as fine-grained chalk-like masses, and apparently formed by the action of solutions derived from bird guano upon serpentine.

British Columbia

93 B/16 A single hollow nodule of leucophosphite has been found in a clay bank at the mouth of Narcosli Creek on the west side of the Fraser River. The nodule is about 2.5 cm in diameter and consists of a dark brown botryoidal outer crust grading towards the centre into yellowish white crystal groups about a millimetre in diameter (R.M. Thompson, 1960: private communication).

LEUCOSPHENITE

$Na_4BaTi_2B_2Si_{10}O_{30}$

Quebec

31 H/11 Pale blue crystals of leucosphenite have been found in small amounts in pegmatite and in wall-rock inclusions in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire. Electron microprobe analysis by D.H. Watkinson and Be_2O_3 determination by B. Ingram: SiO_2 53.66, Al_2O_3 0.11, Be_2O_3 6.6, Nb_2O_5 0.77, TiO_2 14.52, BaO 11.98, CaO 0.06, FeO 0.04, Na_2O 11.61, K_2O 0.51, total 99.86 (G.Y. Chao and D.H. Watkinson, 1972: Can. Mineralogist, 11, p. 851).

LEVYNE

$(Ca,Na_2,K_2)_3Al_6Si_{12}O_{36}.18H_2O$

British Columbia

82 L/5 Basalts cut by logging roads south of Monte Lake contain the zeolite minerals levyne, cowlesite, analcime, thomsonite, ferrierite, stilbite, heulandite and chabazite (W.S. Wise and R.W. Tschernich, 1975: Am. Mineralogist, 60, p. 951).

Levyne with striking overgrowths of offretite has been found southwest of Westwold along the road to Douglas Lake. Electron microprobe analyses of the levyne: SiO_2 47.91, Al_2O_3 23.31, Fe_2O_3 0.0, MgO 0.0, CaO 9.98, Na_2O 2.03, K_2O 0.48, total 83.71 (W.S. Wise and R.W. Tschernich, 1976: Am. Mineralogist, 61, p. 853).

LIEBIGITE

$Ca_2UO_2(CO_3)_3.10H_2O$

Saskatchewan

64 L/4 The uranyl carbonates liebigite and bayleyite were found as coatings on the northern wall of the pit at the fourth level of the Rabbit Lake uranium mine at 58°11'00"N, 103°42'36"W, west of Wollaston Lake (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1C, p. 95).

73 P/8 Becquerelite and liebigite have been identified on specimens from the LaRonge concession of LaRonge Uranium Mines Limited near Nistowiack Lake (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 307).

74 N/8 The secondary uranium minerals liebigite, zippeite and cuprosklodowskite have been found at the No. 4 zone of Consolidated Nicholson Mines Limited located about 450 m north of the head of Nicholson Bay, Lake Athabasca (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 18).

LIMONITE

$Fe_2O_3.nH_2O$

Limonite is the name given to yellow-brown to brown ferric iron oxides, often largely goethite but commonly partly amorphous and of undetermined composition. It is an abundant material always occurring as a secondary product of the alteration of other iron minerals including sulphides, oxides, and ferrous silicates. It is often formed in bogs as bog iron ore, in some sedimentary deposits with limestone, or as gossan in the weathered zones of metallic mineral deposits. Large tonnages of residual limonite are mined as iron ore, as at Steep Rock Lake, Ontario, and along the Labrador trough. The list of occurrences of limonite presented here is restricted to a very few localities from which good specimens have been obtained.

British Columbia

82 G/6 Pseudomorphs of limonite after pyrite, collected along the Ball River about 10 km above its confluence with the East Kootenay River, are represented in the National Mineral Collection.

Nova Scotia

11 E/5 Limonite specimens from Acadia Mines near Londonderry, are present in the National Mineral Collection.

11 E/7 Fine specimens of botryoidal and stalactitic limonite, found at Bridgeville, Pictou County, have been donated to the National Mineral Collection.

Ontario

31 C/6 Earthy limonite, or ochre, occurs in the Kane Mine on lot 9, conc. XIV, Huntingdon Township, Hastings County (National Mineral Collection).

41 N/15 Specimens of stalactitic limonite from the Helen Iron Mine in the Michipicoten area, have been presented to the National Mineral Collection.

LINARITE

$(Pb,Cu)_2SO_4(OH)_2$

Linarite is an uncommon constituent of copper-lead deposits. It forms deep blue monoclinic crystals, and is of secondary origin.

British Columbia

82 N/3 Prismatic and tabular crystals of linarite are associated with anglesite at the Beaver Claim Group in the Slocan mining camp. The two minerals line cavities in a sulphide ore consisting of galena and chalcopyrite (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 123).

An analysis by Johnston of linarite from the above locality is as follows: $PbSO_4$ 75.17, CuO 19.88, H_2O 4.73, total 99.78; S.G. 5.23 (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., pp. 260, 261).

104 B/1 Linarite and brochantite were identified as crusts on specimens from the Silbach Premier Mine at 56°03.5'N, 130°01'W, on the west slope of Bear River Ridge about 0.8 km north of the Alaska-British Columbia boundary (X-ray Laboratory, Geol. Surv. Can.).

104 N/12 An occurrence of linarite has been reported from the Atlin district. The mineral lines a small cavity in a mineralized quartz-calcite vein exposed on a group of two claims located on the southeastern corner of Table Mountain, 5.6 km northwest of Taku Landing. Vein minerals are galena, chalcopyrite, pyrite, malachite, and azurite (D.D. Cairnes, 1913: Geol. Surv. Can., Mem. 37, p. 107).

LINDSTROMITE

$Cu_3Pb_3Bi_7S_{15}$

Ontario

31 M/5 A specimen from the Smithsonian Institution collection (NMNH 106760) labelled "aikinite" and reported to be from the Silver Miller Mine, Cobalt, has been found to be lindstromite, a member of the aikinite-bismuthinite series. Electron microprobe analysis: Cu 6.90, Pb 22.33, Bi 53.07, Sb 0.44, S 18.09, total 100.83 (D.C. Harris and T.T. Chen, 1976: Can. Mineralogist, 14, p. 194).

LINNAEITE

Co_3S_4

Linnaeite is a member of a group of relatively rare sulphides that have a spinel-type structure. Other member of the series are: polydymite, Ni_3S_4; siegenite $(Co,Ni)_3S_4$; carrollite, Co_2CuS_4; and violarite, Ni_2FeS_4.

British Columbia

94 C/12 A pinkish cream mineral detected in a polished section of vein material from the Shell property, located 21 km north of Aiken Lake, has been identified by X-ray diffraction as a linnaeite group member. It occurs with magnetite, pyrite, and chalcopyrite (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 435).

New Brunswick

21 P/5 Linnaeite is closely associated with pyrite and chalcopyrite at the Captain deposit situated on the headwater of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland Counties, about 14 km east of Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can., Paper 66-18, p. 11).

Ontario

31 M/12 The siegenite variety of linnaeite, $Co_{1.6}Ni_{1.2}S_4$, occurs intimately associated with cobalt pentlandite at the Langis Mine, Casey Township, Cobalt-Gowganda area. Electron probe microanalysis by D.C. Harris: Co 33.0, Ni 23.5, S 44.0, total 100.5. (W. Petruk, D.C. Harris and J.M. Stewart, 1969: Can. Mineralogist, 9, p. 597-616.)

41 I/16 Linnaeite was reported to be a constituent of pyrite ore mined at the Temagami (Copperfields) Mine located on the south shore of the isthmus joining the northern and southern parts of Timagami Island in Timagami Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 12).

52 L/7 Siegenite, a variety of linnaeite, occurs in a small replacement deposit, together with pyrite, cobaltite and carbonate at the Werner Lake Cobalt Mine near the west end of Werner Lake, north of Kenora. Identification was by X-ray powder diffraction pattern (X-ray Laboratory, Geol. Surv. Can.).

Quebec

21 L/9 Linnaeite has been identified from an X-ray powder pattern of a specimen from the Eastern Metals property in Rolette Township, Montmorency County (E.W. Nuffield and D.H. Gorman, 1960: private communication).

32 D/6 Cuprian linnaeite has been identified in specimens from the Vauze Mine, located about 24 km north of Noranda. It contains oriented lamellae of cobalt pentlandite. Electron probe microanalysis gave: Co 44.9, Cu 12.1, Fe 1.5, Ni 0.4, S 39.2, total 98.1 (E.F. Stumpfl and A.M. Clark, 1964: Neues, Jahr. Min., 8, 240-245).

LITHARGE

PbO

Yukon

106 D/4 Litharge has been found with native lead at Dublin Gulch (X-ray Laboratory, Geol. Surv. Can.).

LITHIOPHILITE

$Li(Mn,Fe)PO_4$

Lithiophilite is a manganese-rich orthophosphate of lithium. A small amount of iron is always present and as this quantity increases, a gradation into triphylite occurs. Optical properties vary with the composition. When the Fe content reaches 26.6 per cent the optic sign changes from positive (lithiophilite) to negative (triphylite). Lithiophilite occurs in pegmatites and pegmatitic granites in association with other lithium-bearing minerals.

Manitoba

52 L/6 Compact cleavable masses of lithiophilite occur on the Bear claims, 4.8 km southeast of Lamprey Falls and 12.8 km upstream from Pointe du Bois, on the Winnipeg River. Chemical analysis by Fabry, of this salmon-pink to orange mineral, is as follows: MnO 45.18, P_2O_5 44.47, H_2O 1.39, CaO 1.03, FeO 0.24, Li_2O 6.99, Na_2O 0.50, MgO 0.04, total 99.84 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 156).

Pink to brownish aggregates of lithiophilite are associated with cleavelandite, quartz, and spodumene in pegmatite at the Montgary Mine, at Bernic Lake in the Bird River area (M.H. Frohberg, 1960: private communication).

LITHIOPHOSPHATE

Li_3PO_4

Manitoba

52 L/6 The Tanco pegmatite at Bernic Lake contains the rare mineral lithiophosphate as crystals up to 5 cm long filling cavities lined with quartz, cookeite and cesian analcime (P. Černý, 1972: Can. Mineralogist, 11, p. 721).

LOKKAITE

$(Y,Ca)_2(CO_3)_3.1.58\ H_2O$

Quebec

31 G/13 A white powder which coats exposed surfaces, fracture openings and cavities at the Evans-Lou mine near Wakefield Lake has been found to contain lokkaite and tengerite. The locality is about 40 km north of Ottawa (D.D. Hogarth, 1972: The Min. Record, 3, p. 69).

LÖLLINGITE

$FeAs_2$

Löllingite is found with various sulphides in vein deposits, often in a carbonate gangue.

New Brunswick

21 G/7 Löllingite is a rare constituent of the Fire Tower Zone at the Mount Pleasant property of Brunswick Tin Mines and is usually associated with arsenopyrite (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

Ontario

31 D/15 Löllingite and pyrrhotite occur with quartz on lot 16, conc. XIV, Galway Township, Peterborough County. Chemical analysis of löllingite from this locality, by Johnston: As 70.85, S 0.81, Fe 24.67, Co 2.88, Ni 0.79, total 100.00; S.G. 7.028 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 19R).

31 M/4 Löllingite and safflorite have been found in the Keeley Mine in the Cobalt district. Niccolite, cobalite, and skutterudite are also present (J.M. Bell and E. Thomson, 1924: Univ. Toronto Stud., Geol. Ser., 17, pp. 26, 27, 31).

31 M/5 Veins bearing löllingite and a wide variety of other metallic minerals occur at the M.J. O'Brien property, 3.2 km southeast of Cobalt on the shore of Cross Lake (E. Thomson, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 41).

Löllingite occurs in the La Rose Mine, near Cobalt (T.L. Walker and A.L. Parsons, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 9).

A calcite vein in the Kerr Lake Mine contains löllingite which exhibits a marked fibrous structure, the fibres roughly perpendicular to the vein walls (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 221).

41 P/8
41 P/10 Radiating and sheaf-like growths of löllingite are found embedded in calcite at the Castle-Tretheway Mine, near Gowganda (E.W. Todd, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. III, p. 67).

41 P/10 Löllingite occurs in comparative abundance with a wide variety of other metallic minerals in the calcite-quartz veins at the Miller Lake O'Brien Mine, near Gowganda (E. Thomson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 61).

42 E/10 Minute prisms and dendrites of löllingite are found replacing pyrite, arsenopyrite, pyrrhotite, sphalerite, and chalcopyrite in the MacLeod-Cockshutt Mine in Ashmore Township, Thunder Bay District (H.C. Horwood and E.G. Pye, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. V. p. 43). Löllingite is closely associated with arsenopyrite, pyrrhotite, and pyrite at the Magnet Consolidated property and other localities in the Little Long Lac district (H.S. Armstrong, 1944: Am. Mineralogist, 29, p. 311).

Quebec

22 A/7 Spectrographic and X-ray analyses have identified löllingite in specimens of serpentine rock from conc. XII, south half of lot 28, Port Daniel Township, on the Gaspé Peninsula. The occurrence is on the west bank of the Port Daniel River about 10 km from its mouth (D.A. Moddle, 1960: private communication).

23 B/14 A mineral of the löllingite-safflorite series has been identified by X-ray diffraction pattern as a constituent of the ore at the Quebec Cobalt property in the Mount Wright area. Other metallic minerals present in the sample examined were bismuth, bismuthinite, and arsenopyrite (X-ray Laboratory, Geol. Surv. Can., samples submitted by S. Duffell, 1956).

31 H/11 Löllingite has been identified from Mont St-Hilaire. (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

LUDLAMITE

$(Fe,Mg,Mn)_3(PO_4)_2.4H_2O$

Yukon

117 A/9 Ludlamite is one of a suite of phosphate minerals collected from a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Other minerals found at the locality include kulanite, lazulite, wardite, vivianite, childrenite, metavivianite, arrojadite, augelite and brazilianite (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

LUDWIGITE

$(Mg,Fe)_2FeBO_5$

Ludwigite is isostructural with paigeite, the Fe dominant member of the series. The members of the ludwigite-paigeite series are high temperature minerals found in contact metamorphic deposits.

Quebec

31 G/12 Ludwigite occurs in serpentine marble at the Stephen Cross quarry near Wakefield. It occurs as black, striated, slended prisms commonly 0.5 cm long, and as finely fibrous and granular masses. Magnetite, pyrrhotite, brucite and pyroaurite are associated with the massive ludwigite (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

Yukon

105 B/3 Fine needles of ludwigite are present in a magnetite-pyrrhotite deposit near the eastern bank of the south fork of Swift River and about 1.6 km north of the Source Lakes. The ludwigite occurs in intimate association with magnetite (R.M. Thompson and J.A. Gower, 1954: Am. Mineralogist, 39, p. 522).

MACKINAWITE

FeS

Newfoundland

12 H/9 Mackinawite has been found as discrete grains in chalcopyrite, along grain boundaries between chalcopyrite and pyrrhotite, and also with marcasite in polished sections of ore from the Whalesback Mine located about 4 km west of Little Bay and 11.2 km northeast of Springdale (K. Kanehira and D. Bachinski, 1968: Can. Jour. Earth Sci., 5, p. 1387).

Northwest Territories

86 J/14
86 O/3 Mackinawite occurs as a replacement in pentlandite and is invariably associated with that mineral in serpentine-bearing dunite and pyroxenites of the central layered series of the Muskox intrusion in the Coppermine River area (J.A. Chamberlain and R.N. Delabio, 1965: Am. Mineral., 50, p. 682).

Ontario

52 A/3 A mineralized gabbro east of Mount Mollie in Crooks Township contains nickeliferous pyrrhotite, chalcopyrite, pentlandite and ilmenite. Mackinawite, nickeline and marcasite are also present (J.J.C. Geul, 1973: Ont. Div. Mines, GR 102, p. 36).

52 A/4 Mackinawite has been identified in polished sections of ore from the Great Nickel Corporation mine at 48°05'N, 89°37'W, in the east-central part of Pardee Township (J.J.C Geul, 1970: Ont. Div. Mines, GR 87, p. 36).

Quebec

32 D/6 Minor amounts of mackinawite are reported to be present in the ore of the Millenbach Mine. The mine is located on Highway 46, 8.3 km from Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 52).

MADOCITE

$17PbS.\ 8(Sb,As)_2S_3$

Ontario

31 C/6 Madocite is named for the town of Madoc, the locality from which the mineral was first identified. It occurs with 7 other minerals in a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed Taylor of Madoc. Average of 3 electron probe microanalyses by G.R. Lachance: Pb 55, Sb 22.8, As 3.1, S 19,9, total 100.8 (J.L. Jambor, 1967: Can. Mineralogist, 9, pp. 7-24).

MAGNESIOCHROMITE

$(Mg,Fe)(Cr,Al)_2O_4$

Magnesiochromite, also known as chrompicotite, is a spinel mineral with theoretical composition $MgCr_2O_4$. All natural magnesiochromites contain considerable iron replacing magnesium, and aluminium replacing chromium.

British Columbia

92 I/14 Magnesiochromite, referred to as chrompicotite, occurs at Scottie Creek, about 32 km north of Ashcroft. The results of an analysis by Johnston, of a specimen from this locality are as follows: Cr_2O_3 55.90, Al_2O_3 13.83, FeO 14.64, MgO 15.01, SiO_2 0.60, total 99.98; S.G. 4.239 (G.C. Hoffmann, 1900: Geol. Surv. Can., Ann. Rept., XIII, pp. 11R, 12R).

104 N/11 Magnesiochromite has been found at the Doulton property on Ruby Creek in the Atlin district (National Mineral Collection).

Quebec

21 L/3 Magnesiochromite occurs with magnetite at the Caribou pit in Coleraine Township. An analysis of the magnesiochromite is as follows: SiO_2 0.24, TiO_2 0.17, Al_2O_3 14.03, Cr_2O_3 55.51, MgO 14.83, CaO 0.11, Fe_2O_3 3.79, FeO 11.35, MnO 0.14, H_2O^+ 0.07; H_2O^- 0.02, total 100.26 (A.L. Parsons, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 75).

magnesiohastingsite

(see HORNBLENDE)

magnesiosussexite

(see SZAJBELYITE)

MAGNESITE

$MgCO_3$

Magnesite is a member of the calcite group. It forms a complete series with siderite through substitution of iron for magnesium. Intermediate members of the series have been called breunnerite. Calcium and manganese substitute for magnesium to a small extent only. Magnesite rarely forms sedimentary rocks and is much less common than calcite. It is of commercial value as a source of magnesia and magnesium metal.

British Columbia

82 F/6 A bed of high-grade magnesite occurs near Marysville, in the Nelson area. It forms part of the Cranbrook Formation, is from 15 to 30 m thick, and has been traced for about 7 km (H.M.A. Rice, 1937: Geol. Surv. Can., paper 37-27, p. 17).

82 J/13 A bedded deposit of magnesite occurs at an elevation of 1300 m on the west flank of Mount Brussilof at 50°47'N, 115°40'W, 32 km northeast of Radium Junction (B.C. Dept. Mines and Pet. Res.; Geol., Exp. and Mining in B.C., 1970, p. 503).

92 J/15 Magnesite occurs in association with serpentinized peridotite at the northwest end of Liza Lake, Bridge River map-area, Lillooet district (G.W. Drysdale, 1916: Geol. Surv. Can., Sum. Rept., 1915, pp. 75-85).

105 P/5 White columnar masses of magnesite are reported at the Cassiar Asbestos Mine on the western flank of McDame Mountain (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 26).

Newfoundland

2 C/5 Breunnerite occurs in talc-quartz-carbonate schists on the east side of an ultrabasic belt that extends north from 800 m north of the Trans-Canada Highway in the Terra Nova and Bonavista map-areas (S.E. Jenness, 1965: Geol. Surv. Can., Mem. 327, p. 89).

Nova Scotia

11 E/14 Small crystals of magnesite are associated with anhydrite at Malagash in Cumberland County. They are usually prismatic although sometimes tabular, and may be grey, brownish, or colourless, either transparent or translucent. An analysis is as follows: MgO 42.52, CaO 3.84, FeO 0.75, CO_2 47.02, SO_3 5.60, SiO_2 0.22, H_2O 0.38, total 100.33; S.G. 3.02 (H.C. Rickaby, 1923: Univ. Toronto Stud., Geol. Ser., 16, p. 50).

11 F/14 Euhedral crystals of magnesite, varying from dark brown to almost colourless, occur on a farm on the Point Road near Orangedale, in Inverness County. Colourless rhombohedral crystals of dolomite are associated with the magnesite (L.M. Dobbel, 1923: Am. Mineralogist, 8, p. 223).

Ontario

41 I/10 Breunnerite, an iron-bearing variety of magnesite occurs in a number of quartz veins outcropping on the east shore of Wanapitei Lake or, more specifically, on lot 6, conc. III of Rothburn Township. Similar material is found in considerable quantity on a dump in lot 6, conc. IV, of Scadding Township (L.F. Kindle, 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. IV, p. 42).

42 A/6 Veinlets of almost pure magnesite are found in a serpentine-carbonate rock claim P.P. 57, in the southern part of Deloro Township, Cochrane district (A.G. Burrows, 1924: Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. II, p. 39).

42 B/1 The mineral collection at the Royal Ontario Museum includes magnesite in serpentinite from the Reeves Mine in the south-central part of Reeves Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 216).

Quebec

21 E/5 Quartz, barite and magnesite are gangue minerals at the Aldermac Moulton Hill Mine, located south

of Highway 1, about 5 km east of Sherbrooke (Ann P. Sabina, 1967: Geol. Surv. Can., paper 66-51, p. 29).

21 L/3 Nodules of magnesite about 6 mm in diameter occur in talc at the Broughton soapstone quarry about 2.4 km from St-Pierre (West Broughton). Magnesite occurs as cleavable and fibrous masses with fibres several cm long at the East Broughton (Fraser) mine, 2.4 km from East Broughton along 13th Street West (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 56, 58).

31 G/10 Magnesite occurs with dolomite in two elongated north-south trending zones arranged en echelon in Harrington Township about 16 km north of Grenville (M.E. Wilson, 1934: Can. Mining J., vol. 55, pp. 239-241). White, granular, cleavable masses of magnesite are present in lot 18, conc. II, Grenville Township (National Mineral Collection).

31 G/15 White to grey granular magnesite is intimately associated with dolomite at Kilmar Mines near Kilmar (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 72).

31 H/1 Orange-yellow streaks and translucent light brown nodules of magnesite occur in massive talc at the Van Reet Mine of Baker Talc Limited, located 600 m south of the road from Eastman to Bolton Centre to Knowlton, 19.9 km from Eastman. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 10.)

31 H/1 Two specimens of magnesite from Bolton Township, conc. IX, lot 17, have been analyzed by Hunt. His results are as follows: I. $MgCO_3$ 59.13, $FeCO_3$ 8.32, insol. 32.20, total 99.65; II. $MgCO_3$ 59.72, $FeCO_3$ 10.31, insol. 29.90, total 99.93 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 457).

31 H/2 Analyses of magnesite from conc. VII, lot 12, Sutton Township are as folows: I. $MgCO_3$ 83.35, $FeCO_3$ 9.02, insol. 8.03, total 99.40; II. $MgCO_3$ 33.00, $FeCO_3$ 19.35, insol. 45.90, Al_2O_3 0.50, total 98.75 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 457).

31 I/16 The magnesium-iron carbonate, breunnerite, has been reported to occur in Montauban Township on range I, lot 33-41 and 312-322, and on range II lot 38-41 (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 30).

MAGNETITE

Fe_3O_4

Magnetite is a common accessory mineral in igneous rocks. It also occurs as segregated masses formed by magmatic or metamorphic processes. Magnetite is an important ore mineral or iron.

Alberta

82 G/9
82 H/4 Titaniferous magnetite beds of detrital origin are known near Burmis and in the Dungarvin Creek area. The beds are up to 6 m thick but are commonly 1 to 1.5 m (E.R. Rose, 1969: Geol. Surv. Can., Econ. Geol. Rept. No. 25, p. 128).

British Columbia

The following occurrences of magnetite in British Columbia have been compiled from G.A. Young and W.L. Uglow, 1926: Geol. Surv. Can., Econ. Geol. Ser. 3.

82 F/2 A bed of very pure magnetite occurs in the sedimentary rocks just west of the Kootenay Lake valley and slightly north of the International Boundary. The magnetite horizon appears to be conformable with the surrounding rocks and is quite extensive.

82 F/4 Magnetite occurs on the Lord Roberts Group between Sullivan and Murphy creeks and about 6.4 km from Birchbank.

82 F/6 Near the village of Beasley.

92 C/9 The Conqueror property on Bugaboo Creek, a tributary of the Gordon River, southern Vancouver Island, comprises a magnetite body that forms a bluff over which the creek drops for a distance of about 10 m. Other magnetite deposits occur along the length of Bugaboo Creek and the Gordon River; and along Harris Creek which flows into the San Juan River, 9.6 km above its mouth, on the west coast of Vancouver Island.

92 C/14 The southeastern side of Tzartus or Cooper Island, in Barkley Sound, on the west coast of Vancouver Island.

92 C/15 The south shore of the Sarita River, 1.6 km from its mouth, west coast of Vancouver Island.

92 E/8 Both sides of Hesquiat Lake and about 3.2 km from its lower end, western Vancouver Island.

92 E/15 In an extensive deposit on a ridge on the southwest side of the valley of Tlupana Arm and about 1.6 km from Head Bay.

92 E/16 As isolated vein-like bodies cutting limestone on the northwest side of the Sucwoa River valley on Vancouver Island.

92 F/2 The Defiance deposit near the headwaters of Handy Creek in the Alberni Canal area of Vancouver Island.

On a mountain top 2.4 km north-northeast of Kildonan on Uchucklesit Harbour, Vancouver Island.

The Darbey and Joan deposit, 540 m east of Smiths Landing about 19 km from Port Alberni.

92 F/3 The property of Brynnor Mines Limited, about 5 km north of Maggie Lake, near Ucluelet, Vancouver Island. The magnetite deposit is in a belt of andesite, tuff and limestone and is surrounded by quartz diorite intrusions and cut by numerous feldspar porphyry and granitic dykes. The southwest side of Henderson Lake; the Sunshine claim group of Cascade Creek on Uchucklesit Harbour; and 4.8 km north of the east arm of Kennedy Lake.

92 F/10 Texada Island, 80 km north of Vancouver.

92 F/12 Iron Hill near Quinsam Lake on the east side of Vancouver Island; 90 m east of the outlet of Bacon Lake, a small body of water near Upper Campbell Lake, Vancouver Island.

92 F/13 The west side of the Iron River, about 2.4 km from its mouth.

92 H/7 At Lodestone Mountain, 11 km southwest of Tulameen.

92 I/4 10 km southeast of Lytton.

92 I/5 37 km above Lytton, on the Fraser River.

92 I/6 800 m below Thompson on the Thompson River.

92 I/9 11 km southwest of Kamloops.

92 I/10 At the Glen Iron Mine, on the south shore of Kamloops Lake and 800 m east of Cherry Creek Station.

92 K/7 On the north side of the West Redonda Island near the shore of Pryce Channel.

92 K/11 Near Fanny Bay on Phillips Arm.

92 L/2 In the basin at the head of Fault Creek, a tributary of the Zeballos River, and on the northwest side of Zeballos River, near the headwaters of Black Creek, 8 km from tidewater.

92 L/5 At two points along the Ingersol River on the northwestern part of Vancouver Island. One of these is situated on the eastern side about 800 m from its mouth, and the other on the southwest valley slope, 8 km from the mouth.

92 L/6 The June deposit situated from 6 to 10 km east of June Landing on the southeast arm of Quatsino Sound, and on the eastern slope above Alice and Victoria lakes, Vancouver Island.

92 L/7 11 km up the Nimpkish River from Nimpkish Lake, Vancouver Island.

92 M/2 On the west side of Seymour Inlet, 11 km from its head, and on a stream entering the east side of Seymour Inlet about 8 km from its head.

92 P/8 The variety of magnetite known as lodestone has been found on the Windpass claim group near Chu Chua, north of Kamloops. The National Mineral Collection contains specimens donated in 1921 by D.A. Nichols.

93 D/4 At the head of Evans Arm on King Island.

93 D/11 At a mining property from which some ore has been produced, on the northwest shore of Dean Channel.

93 M/11 At a mining property at Rivers Inlet in Kilbella Bay.

103 B/5 At the Jedway Iron Ore property, Harriet Harbour, Moresby Island. The orebody, about 2.4 km from the mine camp, outcrops at an elevation of from 230 m to 320 m above sea level.

103 B/6 2.4 km inland from a bay on the southeast shore of Burnaby Island in the Queen Charlotte Islands and a number of localities in the vicinity of Harriet Harbour on Moresby Island.

At the Plunger claim near Huston Inlet; on the Thunder Group at Collision Bay; and in the vicinity of Ikeda Bay, Moresby Island.

103 B/12 On the Apex claim group located 2.4 km east of the head of Botany Bay, Moresby Island.

103 B/13 On the south arm of Tasu Harbour.

103 G/4 At the Iron Duke claim on the northern shore of Louise Island.

103 G/16 On the east coast of Pitt Island and near its northern end, associated with schists of sedimentary origin.

103 H/12 On the shore of Kumelon Inlet, 40 km south of Prince Rupert.

103 I/2 With chalcopyrite, a few km above the mouth of the Kitimat River.

103 J/1 Outcrops on the eastern shore of Porcher Island, about 27 km south of Prince Rupert.

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92 B/5 Titaniferous magnetite reported to contain one per cent vanadium occurs sporadically in a gabbroic intrusion exposed south of East Sooke on the peninsula which forms the southwest tip of Vancouver Island (E.R. Rose, 1973: Geol. Surv. Can., Econ. Geol. Rept. No. 27, p. 56).

103 C/16 Magnetite and chalcopyrite ores are mined at the Tasu Mine at 52°45.5'N, 132°03'W, on the south side of Tasu Sound, Moresby Island, at elevations from sea-level to 900 m above sea-level (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 494).

Manitoba

63 I/12 Vanadian magnetite occurs as massive lenses and as disseminations in a sequence of rocks between gabbro-lava and intrusive anorthosite along the southwest shore of Pipestone Lake in the Cross Lake area (C.K. Bell, 1962: Geol. Surv. Can., Paper 61-22, p. 21).

New Brunswick

The following occurrences of magnetite in the province were listed in The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick by the New Brunswick Research and Productivity Council (1965).

21 G/2 In schist at Lepreau, and in rhyolite at Lords Cove, Charlotte County.

21 H/12 At Bull Moose Hill, King's County.

21 J/7 Rocky Brook, York County.

21 P/5 Austin Brook, and at the Drummond Iron Mine, in Gloucester County.

21 P/12 At Nicholas Denys (Sturgeon River), and at Millstream Brook (Ellis Iron) in Gloucester County.

Newfoundland

12 B/8 Massive, coarsely crystalline magnetite occurs at the Bishop North deposit on the Bishop claim near the headwaters of Sheep Brook, 15 km to the southeast of the Village of St. Georges. Two other magnetite deposits are present on the Bishop property. They are the Bishop South and the Bishop III deposits located 600 and 1,130 m respectively to the southwest of the first occurrence.

12 B/8 A magnetite deposit occurs about 800 m north of Flat Bay Brook and midway between Surveyor Brook and Hells Gulch. It is known as the Hayes prospect.

Magnetite occurs on the Hudson prospect on the south side of Flat Bay Brook. The magnetite is in contact with fine-grained anorthosite and contains a considerable amount of pyrite (D.M. Baird, 1954: Geol. Surv. Can., Bull. 27, pp. 30-39).

12 B/9 A number of magnetite deposits are known in the vicinity of Indian Head on the northwest shore

of St. George's Bay about 6.4 km west of Stephenville Crossing (A.V. Heyl and J.J. Ronan, 1954: Geol. Surv. Can., Bull. 27, pp. 42-61).

Northwest Territories

33 M/15
34 D/2 Magnetite occurs in various parts of the Kipalu Iron Formation on the Belcher Islands in eastern Hudson Bay. Although most of the iron oxide is hematite, magnetite is fairly common in the Fairweather Harbour area (G.D. Jackson, 1960: Geol. Surv. Can., Paper 60-20, p. 9).

36 B/8
36 B/9 Magnetite is reported to occur in southern Baffin Island at Chorkbak Inlet (R.B. Blackadar, 1960: Can. Mining J., vol. 81, No. 4, p. 110).

37 C/9 The Eqe Bay iron deposits on west-central Baffin Island at the northeast end of Foxe Basin extend east-northeast from the southern shore of Grant-Suttie Bay to within 1.6 km of the western shore of Eqe Bay. The deposits consist of bands of magnetite, hematite, jasper and specular hematite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 139; Dept. Indian and Northern Affairs).

47 A/4
47 A/5
47 A/6
47 B/2
47 B/7 During the 1968 to 1970 field seasons, Borealis Exploration Limited delineated nine deposits of iron formation on the western part of Melville Peninsula and five deposits on the eastern part. The iron formation varies from thinly laminated to massive and consists of alternating bands of magnetite or quartz-magnetite with fine-grained quartzite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 125; Dept. Indian and Northern Affairs).

Ontario

31 C/5 Magnetite is presently being mined from a large open pit situated on the site of a conspicuous magnetic anomaly about 1.6 km southeast of Marmora. The deposit lay beneath about 38 m of Paleozoic sedimentary rocks which had to be removed before mining could begin. It is lenticular in shape and dips steeply towards the southwest, its presence being controlled by banding, shearing and brecciation in a skarn and possibly by a steeply dipping fold in the metamorphosed sedimentary rocks.

A magnetite zone about 4.5 m wide occurs on lot 2, conc. II, of Madoc Township, Hastings County. It is exposed just west of Bankers Lake in the old workings of the Dominion Mine.

Magnetite occurs in three open pits at the Blairton deposit, lots 7 and 8, conc. I, Belmont Township, on the south shore of Crowe Lake.

Diamond drills have intersected magnetite beneath the Paleozoic sedimentary rocks in lots 24, 25, and 26, conc. XIX, Seymour Township, Northumberland County (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45).

31 C/9 Titanium-rich magnetite was mined during the 1850s and 1860s, from the Chaffey property in lot 27, conc. VI of South Crosby Township. The workings are on an island near the northwest shore of Newboro Lake and are now partly flooded. An analysis of the ore indicated 50 per cent iron, 10 per cent titanium, 7 per cent silica, 5 per cent alumina, and 1 per cent sulphur. Traces of vanadium, phosphorus, chromium, and manganese were also detected.

A body of titanium-bearing magnetite occurs at the Mathews deposit, lot 1, conc. VI, North Crosby Township, near the northwestern shore of Newboro Lake (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45, p. 12).

31 C/10 A high-titanium, magnetite deposit known as the Blessington Mine occurs in lots 29 and 30 of the first concession of Hinchinbrooke Township. Over 45,000 tonnes of magnetite have been shipped (1958) from the Glendower Mine, lot 6, concs. II and III, Bedford Township. The ore occurs at the contact between crystalline limestone and metamorphic pyroxenite. It is massive and from medium-to coarse-grained. Interstitial hematite and ilmenite are present as are small amounts of pyrite and chalcopyrite. Apatite is fairly abundant.

Magnetite is present in a pit on a hill in lot 3, conc. I, South Sherbrooke Township, Lanark County. An analysis indicated from 59.55 to 62.95 per cent iron, 6.59 per cent insolubles and negligible phosphorus and titanium (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45, pp. 29-39).

31 C/12 Magnetite in disseminations, bands and stringers has been mined at the Mag iron property in lot 20, conc. IV, Lake Township, on the eastern side of Whetstone Lake.

At the Belmont or Ledyard deposit on lot 19, conc. I, of Belmont Township, 800 m to the south of Cordova Mines, magnetite occurs both disseminated in gabbro-diorite rocks and concentrated in lenses at the contact between igneous rocks and crystalline limestone. Three magnetite deposits are known to occur in the sheared crystalline limestones on conc. I, lot 19, and on conc. II, lots 18 and 19, of Madoc Township. Workings at these localities were known as the Hobson, Nelson, and Knob mines, respectively (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45).

31 C/12
31 C/13 Magnetite occurs in conc. XII, lots 16 and 17 of Lake Township on what is known as the Ricketts property.

Magnetite mixed with dark ferromagnesian minerals is present in the Orton Mine on lots 56 and 57 of Tudor Township, about 32 km northwest of Madoc.

Magnetite occurs on lots 41, 42, 54, 55, west of the Hastings Road in Tudor Township, and on lot 54 east of the road (J.E. Thompson, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. III).

31 C/13 Magnetite iron ore has been mined from the Coehill deposit in lots 15 and 16, conc. VIII, of Wollaston Township, west of Coehill Station.

Magnetite occurs at the Jenkins deposit, about 1.6 km west of Coehill, on lots 17 and 18 of Wollaston Township (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45, p. 34).

A magnetite deposit occurs at the Emily Mine on lot 7, conc. XIX, Tudor Township.

The magnetite deposit at the St. Charles Mine, conc. XI, lot 19, Tudor Township, is situated at the contact between diorite and crystalline limestone.

The magnetite ore of the Lee Mine, conc. XVIII, lot 22, Tudor Township occurs along the contact between granite and limestone. It contains a considerable proportion of sulphide.

Fine-grained magnetite containing pyroxene and chlorite gangue was mined at the Baker Mine, just east of Steenburg Lake, in lot 18, conc. XVIII, Tudor Township (J.E. Thompson, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. III).

31 C/15 A band of magnetite-bearing hornblende gneiss is exposed in a rock-cut on the north side of highway 7, about 3.2 km east of Maberly. Both coarse- and fine-grained magnetite form irregular masses, clots, crystals, and veinlets at the Robertsville and Mary mines on conc. IX, lots 3 and 4, respectively, Palmerston Township (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45).

31 C/16 On the southeast shore of Little Silver Lake, in lot 16, conc. IV, South Sherbrooke Township, is a small pit known as the Silver Lake Mine. Some magnetite occurs near it as well as in lots 13, 14, and 15 of the same concession and township.

Magnetite has been mined from a number of pits in lot 14, conc. I, South Sherbrooke Township.

Road-cuts on the Canadian Pacific railway line on the northern shore of Christie Lake, South Sherbrooke Township, expose several narrow bands of magnetite striking in a northeasterly direction (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45).

31 D/15 Two water-filled pits, about 38 m apart, comprise the workings at the Paxton magnetite deposit in lot 5, conc. VI of Lutterworth Township. The ore in the larger pit occurs as magnetite-bearing hornblende gneiss in a band 10 m wide at the contact between granite on the hanging-wall and hornblende gneiss on the footwall.

Magnetite occurs at the Victoria deposit, lot 20, conc. I, Snowdon Township, in a zone at the contact between crystalline limestone and hornblende-feldspar gneiss.

Two shafts were sunk at the Howland Magnetite Mine on lot 26, conc. IV, Snowdon Township. The ore occurs in the contact zone between a band of crystalline limestone and a gneissic gabbro or amphibolite (E.R. Rose 1958: Geol. Surv. Can., Bull. 45).

31 D/16 A number of magnetite-bearing veins cut the pink biotite granite gneiss just north of Stormy Lake, on lot 27, conc. XV, of Glamorgan Township. Vein material in one of the deposits consists of calcite, feldspar, biotite and apatite in addition to the magnetite, some of which is lodestone (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45, p. 55).

31 E/1 Large crystals of magnetite have been found on lot 30, conc. XV, of Faraday Township (National Mineral Collection).

31 E/13 Magnetite occurs in amphibolite at the Magnetawan Mine on lot 17, conc. III, Lount Township. Specimens are included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 220).

31 F/2 Lenses of magnetite near the contact between pink granite and crystalline limestone were worked during the early part of this century at the Wilbur Mine on lot 4, concs. XII and XIII, Lavant Township, Lanark County.

Ore at the Yuill deposit, lot 25, conc. V, Darling Township, consists of a fine-grained aggregate of magnetite, with a silica gangue. Pyrrhotite grains are also present as are veinlets of carbonate and silicates. The workings consist of an open-cut about 27 m long by 9 m wide, about 2.4 km south of White Lake.

Four magnetite-bearing lenses have been outlined at the Radenhurst and Caldwell workings in lot 22, cons. III and IV, Lavant Township, Lanark County (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45).

31 F/4 Magnetite is present in a dump near a test pit in Dungannon Township, lots 48 and 49, conc. XI. A dip needle survey in the immediate vicinity detected an anomaly about 360 m long and 180 m wide. Lenses of magnetite in the metamorphosed sedimentary rocks of the Dungannon Formation formed the orebodies of the old Bessemer Mine in Mayo Township, about 3.2 km west of Mayo Lake (D.F. Hewitt and W. James, 1955: Ont. Dept. Mines, Ann. Rept., vol. 64, Pt. VIII, p. 47).

A small magnetite-hornblende zone has been exposed by stripping about a mile west of Boulter, on lot 17, conc. V, Carlow Township, and about 800 m to the north, on conc. VI of the same lot.

On lots 11 and 12, conc. IX, Mayo Township, are three small pits from which magnetite was mined in 1913.

Magnetite has been exposed in a number of excavations west of Bow Lake in lot 21, concs. X and XI, Faraday Township, Hastings County (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45).

Magnetite is present in the workings at the Rankin property, conc. IX, lot 10, and Stevens property, conc. IX, lot 13, Mayo Township.

Magnetite is present in some old mine workings in lot 3, conc. XII, and in lot 21, conc. XI, of Faraday Township (J.E. Thompson, 1943: Ont. Dept. Mines, Ann. Rept., vol 52, Pt. III).

31 F/6 Magnetite occurs at the Radnor Mine, an abandoned mining operation on lot 16, conc IX, Grattan Township, Renfrew County, about 13 km southeast of Eganville. Similar occurrences have been reported from lot 16, conc. VIII and lot 17, conc. X, of the same township (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45, pp. 49-50).

31 F/7 Disseminations, stringers, and bands of magnetite occur at the Bluff Point workings on lot 16, concs. X and XI, Bagot Township, just north of Grasse Bay on Calabogie Lake. Ore was produced from three shafts and several pits at around the turn of the century.

A magnetite-bearing skarn zone at the contact between crystalline limestone and diorite-amphibolite occurs at the Williams or Black Bay deposit, 3.2 km northwest of Calabogie, on lot 21, conc. VII, Bagot Township.

Magnetite occurs in workings at the Culhane deposit, lot 22, conc. XI, Bagot Township.

Magnetite bodies, known as the Caldwell and Campbell deposits, are located about 1.6 km east of the village of Calabogie. From 10 to 15 thousand tonnes of ore are said to have been shipped from this locality during the last years of the 19th century. Recent drilling has outlined a zone of magnetite about 82 m thick and 915 m long. Most of the magnetite is in fine stringers but coarse crystals have been found. Hematite and sulphides are also present.

4.8 km south of Calabogie on the right-of-way of the Kingston-Pembroke branch of the Canadian Pacific railway is an exposure of high-titanium magnetite. An analysis showed 40 per cent iron, 3 per cent titanium, and traces of phosphorus and sulphur (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45).

31 L/2 Vanadium-bearing magnetite, known as coulsonite, is reported to occur in concs. V and VI, Papineau Township (W.D. Harding, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. VI, p. 48).

31 L/5 Octahedral crystals of magnetite have been found on Iron Island in Lake Nipissing (National Mineral Collection).

32 D/4 The ore at the Adams Mine consists of alternating layers of massive magnetite and dark grey to dark red chert. The mine is 10.3 km east of Dane on Highway 650 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 8.).

41 I/1 Magnetite is mined in the Moose Mountain district about 56 km north of Sudbury. The magnetite occurs as narrow bands in relatively pure quartzite and in relatively small quantities in nonbanded masses with epidote (E.W. Geist and S.A. Mahon, 1962: Bull. Can. Inst. Mining Met., vol. 55, No. 598, p. 109).

41 I/4 Magnetite is present in concretionary masses of radiating crystals in serpentinized peridotite at the J.F. Owen prospect, lot 11, conc. VI, Mangowin Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 221).

43 D/2 Magnetite is the ore mineral at the Anaconda Iron Ore Limited workings at Skibi Lake, 48 km northwest of Nakina, in northern Ontario. The ore occurs in a host rock of quartz-biotite schist and irregular intrusive pegmatite. It has been highly metamorphosed and recrystallized (Unknown, 1961: Precambrian, vol. 34, No. 10, p. 20).

52 H/16 Vanadium-bearing titaniferous magnetite is present in iron formation at 49°59'N, 88°00'W, 6.4 km north of the mouth of Onaman River, Thunder Bay District (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 221).

Quebec

21 E/5 Irregular veins of magnetite occur in chloritic schists at the Belvedere Mine in Ascot Township, range IX, lot 8. Ore at the Smith Mine in lot 21, range VI, Ascot Township, consists of slaty rocks impregnated with magnetite. An analysis showed 54.074 per cent iron, 0.660 per cent phosphorus and 0.024 per cent sulphur (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, pp. 1,2).

21 E/12 Serpentines on the north side of Nicolet Lake, in lot 21A, range I, of South Ham Township, are cut by a vein of magnetite varying in width from about 2 to 5 m (H. W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, pp. 6 and 7). Specimens of magnetite pseudomorphous after fibrous picrolite have been found at the following asbestos deposits.

21 E/13 Jeffrey Mine at Asbestos

21 L/3 Bennett-Martin and Bell pits at Thetford Mines.

21 L/7 Golden Age Mine on the east side of Highway 23, just south of the bridge over the des Plantes River (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 26, 53, 62).

21 L/3 Magnetite and magnesiochromite occur together at the Caribou pit in Coleraine Township (A.L. Parsons, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 75). A series of lenticular magnetite layers are found in schistose rocks on range V, lots 7a ,7b, Leeds Township (H. W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173 pp, 3,4).

21 L/7 Magnetite occurs at and near the contact of an acidic tuff and a peridotite intrusion in the Beauceville area 430 m north of Rivière de Plantes. Cr_2O_3 is present in considerable quantities (B.R. Mackay, 1921: Geol. Surv. Can., Mem. 127, p. 85).

22 D/11 Titaniferous magnetite occurs at the St. Charles Mine on range I, lots 44, 45, Bourget Township, Chicoutimi County. It forms as large segregated masses in anorthosite and is of two types, coarse grained and fine grained. Both have distinctive compositions. Comparative analyses are as follows: coarse-grained material: Fe 48.18, Ti 13.45, P 0.404; fine-grained material: Fe 33.77, Ti 7.44, P 3.85 (H.W. McGerrigle and H. Girard, 1950: Que, Dept. Mines, Prelim. Rept., 173 (rev), p. 18).

22 P/8 The Magpie Mountain deposits of titaniferous magnetite outcrop along a massive, serrated, hog-back ridge at 51°25'N, 64°05'W, about 3.2 km west of Rivière St-Jean near its headwater south of the Labrador-Quebec boundary (E.R. Rose, 1969: Geol. Surv. Can., Econ. Geol, Rept. No. 25, p. 102).

31 F/9 Magnetite is the main ore mineral at the Hilton Mine in lots 21 and 22, range II, Bristol Township, Pontiac County. It is medium grained, rimmed in places with hematite, and sometimes altered to martite. The host rocks are mainly foliated amphibolites occurring in a steeply inclined shear zone with a northeasterly strike (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45, pp. 27-29).

31 F/10 Dodecahedral crystals of magnetite up to 2 cm in diameter occur in crystalline limestone in road-cuts on Highway 8 just east of the turn-off to Bryson. Massive magnetite and well-formed octahedral crystals have been noted in a road-cut on the Bryson to Grand Calumet road just south of the Bryson bridge, 0.8 km from Highway 8 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, P. 99, 101).

31 G/5 Irregular discountinuous seams of magnetite occur in a shear zone in crystalline limestone at the Forsythe Mine, also known as Hull Iron Mines. Interstitial hematite is present with the magnetite in the ore. Gangue minerals include amphibole, calcite, talc, chlorite, graphite, pyrite, and quartz. The workings are located on lots 11 and 13 of range VII, Hull Township, on the Mine Road 3.2 km west of Ironside and about 6.4 km northwest of Hull (E.R. Rose, 1958: Geol. Surv. Can., Bull. 45, p. 35). In the immediate vincinity of the Forsythe workings are two other long abandoned excavations from which magnetite has been obtained. They are the Baldwin Mine, lot 14, range VI; and the Lawless Mine, lot 14, range VII; both in Hull Township (H. W. McGerrigle, 1943: Que. Dept. Mines, Prelim. Rept., 173 (rev.), p. 31).

31 G/8
31 G/9 Chemical analyses of magnetites from the Oka Complex, located 32 km west of Montreal on the north shore of the Lake of Two Mountains. Analyst, H. Soutar. I, from monticellite-calcite rock, 900 m southeast of mine: SiO_2

7.45, TiO_2 3.18, Al_2O_3 5.17, Fe_2O_3 54.30, FeO 17.23, MnO 5.36, MgO 5.42, CaO 1.83, P_2O_5 0.47, total 100.41. II, from okaite, Dufresne Hill: SiO_2 2.21, TiO_2 3.85, Al_2O_3 7.25, Fe_2O_3 56.98, FeO 21.60, MnO 1.49, MgO 3.91, CaO 1.54, P_2O_5 0.39, total 99.22. III, from pyroxene-pyrochlore-calcite rock, St. Lawrence Columbium and Metals Corp.: SiO_2 0.83, TiO_2 3.71, Al_2O_3 0.15, Fe_2O_3 64.28, FeO 24.52, MnO 3.71, MgO 0.60, CaO 1.58, P_2O_5 0.31, total 99.69 (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 G/12 Magnetite and specularite are the ore minerals at the Haylock Mine, lots 27, 28, range VI, Templeton Township, Papineau County (H.W. McGerrigle and H. Girard, 1950: Que, Dept, Mines, Prelim. Rept., 173 (rev.), p. 22).

31 H/13 Titaniferous magnetite occurs 4 km west of St. Jerome, north of the road to St Canut, on the north concessional of Rivière-du-Nord Township, lots 461 to 464 (H. W. McGerrigle and H. Girard, 1950: Que, Dept, Mines, Prelim. Rept., 173 (rev.), p. 16).

31 I/10 Titaniferous magnetite is present in St Boniface Township, range VII, lots 22 and 23 (H. W. McGerrigle and H. Girard, 1950: Que, Dept, Mines, Prelim, Rept., 173, p. 18).

32 D/15 Magnetite occurs in the area comprising range IV, lots 18 to 20, range V, lots 17 to 24, and range VI, lots 21 to 28, Ligneris Township, Abitibi East County (H. W. McGerrigle and H. Girard, 1950: Que. Dept. Mines, Prelim. Rept., 73, p. 26).

32 G/16 An occurrence of vanadiferous titaniferous magnetite in anorthosite has been explored in Lemoine and Rinfert Townships southeast of Lake Chibougamau (E.R. Rose, 1969: Geol. Surv. Can., Econ. Geol. Rept. 25, p. 108).

33 F/12 Magnetite-bearing iron formation on the property of Duncan Range Iron Mines Limited extends for 24 km northeast of the southeast corner of Duncan Lake about 80 km southeast of Fort George.

33 G/12 Considerable concentrations of magnetite sand occur along the shore of Fort George River at about 53°44'N, 75°51'W.

33 K/16
33 N/1
33 N/2 Magnetite-bearing iron formation is of economic interest on the properties of Great Whale Iron Mines Limited at 55°05'N, 76°50'W; 55°02'N, 76°27'W; and 54°56'30"N, 76°12'30"W (K.E. Eade, 1966: Geol. Surv. Can., Memoir 339, p. 69-74).

Yukon

105 D/11 Magnetite is present with hematite in a number of the workings in the Whitehorse copper belt near Whitehorse (G.A. Young and W. L. Uglow, 1926: Geol. Surv. Can., Econ. Geol, Ser., 3, p. 15).

115 H/1 Magnetite is present at the property known as Macks copper claim near the Nordenskiöld River about 56 km west of the Whitehorse-Dawson Road (G.A. Young and W. L. Uglow, 1926: Geol. Surv. Can., Econ. Geol. Ser., 3, p. 14).

115 H/2 A magnetite deposit has been discovered near Giltana Lake (G.A. Young and W.L. Uglow, 1926: Geol. Surv. Can., Econ. Geol. Ser., 3, p. 14).

115 I/6 Several magnetite deposits occur on the sides of Freegold Mountain between Seymour and Stoddard creeks and about 8 km south of the latter's confluence with Big Creek, a tributary of the Yukon. They are of contact metamorphic origin and have been mined for gold (H.S. Bostock, 1936: Geol. Surv. Can., Mem. 189, pp. 52, 53).

MALACHITE

$Cu_2Co_3(OH)_2$

A secondary ore mineral of copper, malachite is a common constituent of the oxidation zones of copper deposits. It is a distinctive green colour and usually occurs either in the massive form or as incrustation.

British Columbia

82 E/1
82 E/2 Malachite is found in the vicinities of Copper and Boundary creeks in the Greenwood mining division. It occurs as crystals and in massive form with iron and copper minerals in the limestones and porphyritic rocks of the area (G.C. Hoffmann, 1900: Geol. Surv. Can., Ann Rept., XIII, p. 21R).

82 F/6 Malachite occurs at the Eureka Mine located east of Eagle Creek, in the Kootenay River area west of Nelson (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 151).

82 N/5 Malachite and azurite occur with anglesite, cerussite and minor smithsonite in oxidized lead-zinc ores on the Waverley property located just north of Tangier Pass and accessible from Albert Canyon (J.O. Wheeler, 1963: Geol Surv. Can., Paper 62-32, p. 28).

92 H/9 Specular hematite and malachite occur at two showings in a fault zone in granitic rocks at 49°36.3'N, 120°21.5'W, along Hayes and Finnegan Creeks, 22.5 km northeast of Princeton (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 125).

92 H/15 Showings of malachite are common in Nicola Group volcanic rocks in the vicinity of Aspen Grove (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 135).

92 I/2 Radiating groups of acicular malachite crystals have been observed at Iron Mountain in the Nicola mining division. They are reported to occur with specularite, chalcopyrite, and pyrite in veins cutting volcanic rocks (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, P. 80A).

92 I/2 Quartz-calcite veins containing malachite, azurite, chrysocolla, chalcocite, bornite and chalcopyrite occur at 1680 m elevation on Iron Mountain, 8 km south-southeast of Merritt. A similar occurrence is reported at 880 to 1200 m elevation on Clapperton Creek 16.8 km northeast of Merritt (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 142, 144).

93 A/12 Malachite, chrysocolla, cuprite and covellite are present at an elevation of about 960 m surrounding Bootjack Lake at 52°33.5'N, 121°38.5'W, 8 km southwest of Likely (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 208).

94 K/11 A bright green encrustation of malachite occurs on vein minerals and associated rocks at the Churchill Mine. The mine is located at the headwaters of Delano Creek about 4 km southwest of Yehde Lakes and 8.8 km northwest of Mount Roosevelt (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 16).

103 I/9 Malachite and limonite staining is widespread and bornite occurs in fractures and as disseminations in the rock at the ALVIJA claims at 54 34'N, 128 09'W, on the north side of Kleanza Creek 16 km east of Highway 16 between 488 m and 762 m elevations (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 82).

104 G/12 Malachite and azurite occur with chalcopyrite and chalcocite in tabular bodies and discontinuous veins up to 60 cm wide and 30 m long at 57 31.5'N, 131 31.6'W, on Strata Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 534).

104 P/3 Malachite and azurite occur with chalcopyrite, pyrite, and hematite at two deposits in the McDame map-area: at a locality about 2.4 km south of the mouth of Nizi Creek on the east side of the trail along Four Mile River; and at the Carlick Group, 3.2 km north of McDame (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 113).

114 P/10 Stains and crusts of malachite and azurite are present at copper deposits on Mineral Mountain and Copper Butte located northwest and north, respectively, of the hairpin turn at Mile 52 (83.5 km) Haines Road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

Manitoba

63 K/12 The secondary copper minerals malachite, chalcanthite, brochantite and posnjakite occur with primary chalcopyrite at the Mandy Mine located on a peninsula in the Northwest Arm, Schist Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 38).

New Brunswick

21 P/15 Copper-bearing fossil plant beds are exposed at low tide in the sandstone cliffs at Pigeon Hill. Malachite is common as crusts and coatings on the plant remains (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 123).

Newfoundland

1 M/10 Malachite has been observed with bornite at Blue Cliff on Fortune Bay, and on the Terrenceville road on the opposite side of the valley from Black Duck Brook. The copper mineralization occurs in a fault zone (D.A. Bradley, 1962: Geol. Surv. Can., Mem. 321, p. 53).

1 N/12 Bright green fibrous malachite occurs with chrysocolla as crusts on covellite and on rock surfaces exposed in a road-cut on the Trans-Canada Highway 1.6 km north of the turn-off to Chance Cove (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 83).

Northwest Territories

58 B/15 Malachite and azurite have been observed in fissures and along bedding planes over a length of 800 m along a fault in carbonate rocks at 72 50'45"N and 93 42'45"W in the northern part of Somerset Island (P. J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 156; Dept. Indian and Northern Affairs).

78 B/7 Malachite has been found in the Volcanic rocks of the Shaler Mountains on Victoria Island (R. Thorsteinsson and E.T. Tozer, 1962: Geol. Surv. Can., Mem, 330, p. 77).

85 J/8 Specimens of malachite have been obtained from outcrops of vein material in the Yellowknife Bay area. Limonite and azurite are associated (L.C. Coleman, 1953: Am. Mineralogist, 38, p. 521).

Nova Scotia

11 D/14 Massive malachite lenses, about 1.2 by 5 cm, have been found in the dumps of the Dunbrack Mine, 4.5 km from Musquodoboit Harbour along the road to Meaghers Grant, Halifax County (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 7).

11 E Nodules of malachite occur in Pictou County. The mineral is also found in association with plant remains in the Permian sandstones of the same county (H.S. Poole, 1901: Geol, Surv, Can., Ann Rept., XIV, p. 37M).

21 H/1 Malachite is one of the supergene minerals occurring at the Magnet Cove lead-barium-zinc-silver deposit, 4 km southwest of Walton (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104).

21 H/8 Malachite has been noted at Two Islands, Cumberland County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 151)

Ontario

32 D/4 Malachite has been found on claim L.L. 4868, in Morrisette Township, Timiskaming district (D.G. Wright, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. VI, p. 62).

41 J/5 Specimens of malachite in the mineral collection at the Royal Ontario Museum are from: Rock Lake Mine, south half of lot 3, conc. I, Aberdeen Township; and Bruce Mines, Plummer Additional Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 222).

41 P/9 Malachite has been reported to occur in intermediate volcanic rocks in the northwest part of Bryce Township. It has been noted on conc. II, lot 10, and on conc. III, lots 10 and 11. A few narrow seams of malachite and calcite occur on the Paragon-Hitchcock property in lot 10, conc. I, Tudhope Township (W.W. Moorhouse, 1941: Ont. Dept. Mines, Ann, Rept., vol 50, Pt. IV, p. 41).

41 P/12 An occurrence of malachite has been reported from the eastern shore of Mesomikenda Lake, in the Three Ducks Lake area (H.C. Laird, 1932: Ont. Dept. Mines, Ann, Rept., vol. 41, Pt. III, p.27).

41 P/15 Malachite is common as a coating on sulphide-bearing quartz at the Ethel deposit which is exposed by pits and trenches on the south side of a bluff 300 m west of Highway 566, 4.8 km west of Matachewan. Bright green botryoidal and platy malachite has also been found on the dumps at the Ryan Lake Mine on the west side of Highway 566, 6.6 km from Matachewan (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 104, 105).

Quebec

21 L/3 Malachite occurs in conc. II, lot 4, Inverness Township, Megantic County (National Mineral Collection).

21 L/12 Fibrous masses of malachite are found with drusy calcite at Black River Mines in Lotbinière

County (G.C. Hoffmann, 1888-89; Geol. Surv. Can., Ann. Rept., p. 44T).
Specimens of copper sulphides coated with malachite and other secondary minerals have been found at the following localities:

22 A/7 A pit in cliffs above the beach on the north side of Anse-à-Blondel,

22 A/13 Needle Mountain and Copper Mountain deposit of Gaspé Copper Mines Limited, Murdochville,

31 H/2 Sweet's Mine, 4.8 km north of Sutton,

31 H/8 Les Marbles Waterloo quarry at South Stukely; and Bolton (Canfield) Mine, 3.9 km from Eastman on the road to Bolton Centre,

31 H/9 St-Francis Mine on the H.B. Lanchard farm, about 7 km northwest of Richmond,

31 H/10 Acton Mine, at Acton Vale (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51).

32 C/4 Specimens coated with malachite and brochantite were found on the dumps at the Rainville Mine. The mine is located 1.9 km south of Colombière. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 115).

32 D/9 The secondary copper minerals malachite and chrysocolla have been reported at the New Formaque Mine. The property is 7.2 km by road northeast of Amos. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 82)

Saskatchewan

73 P/6 Azurite and malachite are conspicuous as powdery to finely-crystalline encrustations on gneiss at the Anglo-Rouyn Mine located on the northwest shore of Lac La Ronge between Waden and Pipestone Bays about 26 km northeast of La Ronge village (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5).

74 N/8 Malachite, aragonite and uranium oxidation products are found lining vugs and veinlets at the Nicholson Mine, near Goldfields, on the north shore of Lake Athabasca (D.D. Hogarth, 1951: Am. Mineralogist, 36, p. 412).

Yukon

105 B/1 The Fiddler-West of Wolframite showing of the LUCK group (60°07'N., 130°26'W.), located along Boulder Creek north of 8 km from its junction with the Rancheria River, consists of quartz veins containing wolframite, cassiterite, chalcopyrite, galena, malachite, azurite, limonite, fluorite and minor beryl (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p.134).

105 D/11 Malachite is widely distributed throughout the Whitehorse copper belt (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 377).

105 D/14 Vividly coloured malachite, chrysocolla and azurite occur half way up a steep-road cut on the left side of the Alaska Highway 3.8 km north of the cut-off to Whitehorse (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 52).

105 M/14 Small amounts of malachite are present in zones of surface oxidation in the Keno Hill-Sourdough Hill area. At the Bellekeno Mine, malachite has been found in oxidized ore 120 m below the surface (R.W. Boyle, 1955: Geol. Surv. Can., Paper 55-30, p. 51).

115 A/3 Abundant malachite and azurite staining is present on the property of Jack Pat Copper Mines Limited at 60°03'N., 137°07'W., 10 km southwest of Dalton Post and 5 km north of the Yukon-British Columbia border (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol 1, Dept. Indian Affairs and Northern Development, p. 108).

115 F/15 Malachite, brochantite and chrysocolla form coatings on specimens collected from the dumps of the Canalask Mine on the east side of the White River overlooking Miners Ridge and the Nutzotin Mountains (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 73).

115 G/6 Malachite-stained basalts containing disseminated bornite, chalcocite and native copper have been found at several localities near the headwaters of Quill Creek (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 53).

115 G/6 Malachite is common and is associated with pyrite, chalcopyrite, molybdenite and minor magnetite and hematite along a contact zone between feldspar porphyry and Triassic volcanics on the Cork claims situated at the head of Johnson Creek, a southeast flowing tributary of Tetamagouche Creek, 24 km west of Burwash Landing (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p, 101).

115 H/7 Colourful specimens of chalcopyrite and malachite are found in skarn near Hopkins Lake at 61°17'N, 136°58'W (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 54).

115 I/6 Malachite and azurite are associated with massive and disseminated chalcopyrite at the Yukon Revenue property (62°21'N., 137°12'W.) on Revenue Creek on the south side of the valley of Big Creek, 56 km northwest of Carmacks (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 79).

115 I/7 Mineralized outcrops in which malachite is the most common mineral are found on the Williams Creek property (62°22'N., 136°43'W.) situated 1.6 km southwest of the Yukon River, 11 km west of Yukon Crossing, on the northeast flank of the Dawson Range (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 92).

MANGANITE

$MnO(OH)$

British Columbia

92 P/4 The Clinton manganese deposit is located about 16 km northwest of Clinton on one of the foothills of Marble mountains, about 3.2 km north of Clinton creek. Psilomelane, manganite and pyrolusite occur as nodules, narrow stringers and irregular masses in quartzites and chloritic schists of the Cache Creek group (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p.18).

103 K/2 A deposit containing manganite and pyrolusite has been found on Klaskwun Point on the north side of Graham Island. The manganite and pyrolusite are present as cementing material in pods up to 9 m long in a shear zone breccia (W. Petruk, 1963: Can. Mineralogist, 7, p. 670).

New Brunswick

The following occurrences of manganite have been cited by the New Brunswick Research and Productivity Council in the Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, Record 2, Pt. B, 1965.

21 H/5 Quaco Head, Saint John County.

21 H/10 Albert Village, Albert County.

21 H/11 Upham property, Markhamville, King's County.

21 H/14 Jordan Mountain, King's County, and Gowland Mountain, Albert County.

21 H/15 Turtle Creek and Shepody Mountain, Albert County.

21 P/12 Tetagouche Falls, Gloucester County.

Nova Scotia

11 E/5 Pyrolusite, manganite and psilomelane occur as nodules and pockets in conglomerate at an old mine (operated 1880 to 1900) near Tenecape, and in cliffs exposed along the west side of the mouth of the Tennycape River, Hants County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10).

11 E/6 Manganite occurs with pyrolusite, limonite and hausmannite in veins up to 18 cm wide in dark grey limestone at the Black Rock deposit, exposed along the shore of Minas Basin at mid-tide level. Access to the shoreline is through the Edgar Nelson farm, located about 16 km southwest of Truro, along the Clifton - Black Rock road (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10).

11 E/6 Nodules of pyrolusite and manganite up to 10 cm across occur in limestone and conglomerate at the East Mountain manganese mine on the property of Mrs. Daniel McMasters located about 10.8 km northeast of Truro. Veins containing pyrolusite, manganite and calcite cut sandstone at an old mine on the farm of Mrs. H. Coulter, about 12.4 km from Truro (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10).

11 E/6 Manganite occurs in veins on the east bank of the Shubenacadie River in the Truro area, Colchester County (I.M. Stevenson, 1958: Geol. Surv. Can., Mem. 297, p. 110).

11 E/7 Manganite has been found at Bridgeville in Pictou County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 152).

11 F/15 Manganese minerals, mainly pyrolusite and some manganite, occur in Horton-Windsor rocks of Mississippian age as nodular masses in limestone and as fracture fillings in shale, in the Loch Lomond area. Associated minerals are calcite, hausmannite, rhodochrosite, barite and selenite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 52).

21 A/9 At New Ross, Lunenburg County, pyrolusite, manganite and psilomelane, with calcite, barite, manganiferous carbonate, iron oxides and country rock occur as lenticular veins in faults or crushed zones in Devonian granite (A.G. Johnston and W.D.McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 48).

21 A/9
21 A/16 The occurrence of manganite near Wollaback Lake, Lunenburg County, has been reported (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74 p. 152).

21 H/1 Manganite occurs at Walton, Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 44T).

21 H/1 At Bishop's Brook, 3.2 km south of Kentville, an intergrowth of pyrolusite, manganite and psilomelane with hematite forms beds, lenses and concretions interstratified with bands of grey phyllite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 47). Manganite and pyrolusite occur in pockets and joint planes in limestone at the Stephens Mine, about 800 m southwest of Walton. Minor amounts of manganite are found in the Magnet Cove Barium Corporation Quarry, about 5 km southwest of Walton. Pyrolusite, manganite and psilomelane occur as nodular masses and crystal aggregates with white to brown calcite at the Macumber mine on the shoreline southwest of the wharf at Cheverie (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10).

21 H/8 Manganite, pyrolusite and psilomelane occur as seams, veinlets and small pockets in volcanic rocks, sandstone and shale near Parrsboro, Cumberland County (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 43).

Ontario

41 K/9 Manganite, quartz, calcite, and fluorite occur in a vein in trap rocks at Batchawana Bay in the Algoma District (W.E.Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 751).

41 K/16 Manganite, psilomelane and manganese carbonates,along with quartz, calcite and fluorite occur in closely spaced stringers in a reddish lava flow at a deposit in Ley Township, Batachawana Bay (A.G. Johnstone and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 29).

52 B/13 The mineral collection at the Royal Ontario Museum includes manganite from the Falls Bay Mine located within Falls Bay of former Steep Rock Lake in Schwenger Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 223).

Quebec

11 N/5
11 N/11
11 N/12 Manganite occurs on Amherst and Grindstone Islands (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept. IV, p. 44T).

21 E/13 Black, shiny prismatic crystals up to 7 mm long on vesuvianite have been identified as manganite on specimens from the Jeffrey Mine at 45°46'25"N, 71°57'12"W, on lots 9 and 10, ranges II and III, Shipton Township, Richmond County (J.D. Grice and R.Williams, 1979: Mineralogical Record, 10, p. 69).

Yukon

105 M/14 A specimen of oxidized ore from Mackeno Mines Limited, in the Galena Hill area, has been found to contain manganite as a supergene mineral (X-ray Laboratory, Geol. Surv. Can.).

MANGAN-NEPTUNITE

$Na_2KLi(Mn,Fe)_2Ti_2Si_8O_{24}$

Quebec

31 H/11 Mangan-neptunite, the rare manganese analogue of neptunite, has been identified by X-ray diffraction in specimens from the Desourdy

Quarry on the northeast slope of Mont St. Hilaire. It varies in colour and composition from dark reddish brown ($Mn_{.87}Fe_{.10}Zn_{.03}$) to yellow ($Mn_{.84}Zn_{.15}Fe_{.01}$). (J.A. Mandarino, D.C. Harris and J. Bradley, 1965: Can. Mineralogist, 8, p. 398).

MANGANOTANTALITE

$(Mn,Fe)\ (Ta,Nb)_2O_6$

Manitoba

52 L/6 Electron microprobe analyses of five tantalite specimens from the Tanco Pegmatite, Bernic Lake, showed that the minerals were of manganotantalite composition.

	(1)	(2)	(3)	(4)	(5)
MnO	13.7	14.5	11.3	13.5	14.6
FeO	0.4	0.4	3.3	0.5	0.2
SnO_2	0.5	0.2	0.0	0.7	0.1
TiO_2	1.5	0.2	0.2	0.3	0.4
Ta_2O_5	69.3	70.0	83.5	67.0	64.2
Nb_2O_5	16.0	17.5	4.0	16.0	21.0
Total	101.4	102.8	102.3	98.0	100.5

(J.D. Grice, P. Cerny and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 609)

MARCASITE

FeS_2

Marcasite is an orthorhombic polymorph of the more common cubic form of iron sulphide, pyrite. The two minerals are quite similar in appearance. Marcasite appears to form under near-surface conditions and from acidic solutions. It is frequently found as concretions in sedimentary rocks.

British Columbia

103 P/11 Rounded pellets of marcasite occur in a replacement sulphide deposit north of Trout Creek and 800 m from the Kitsault River, 31 km from Alice Arm, Vancouver Island. Associated minerals are sphalerite, galena, tetrahedrite, pyrite, barite, jasper, calcite and quartz (George Hanson, 1935: Geol. Surv. Can., Mem. 175, p. 58).

103 P/12 Marcasite, pyragyrite and native silver occur in a quartz-calcite-barite gangue in the Kitsol vein located at 55°41'N, 129°31'W, close to the Kitsault River, immediatly north of the confluence of Evindsen Creek and the Kitsault River at about 360 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 489).

104 P/5 Excellent examples of the replacement of pyrrhotite by colloform marcasite occur in a sulphide-bearing vein on the Contact claim group between the headwaters of McDame Creek and the Cottonwood River in the Liard mining division (R.M.Thompson, 1954: Am. Mineralogist, 39, p. 528).

Manitoba

63 B/13 Nodules of marcasite are found in boulders of white sandstone on Pemmican Island in Lake Winnipegosis (J.B. Tyrrell, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 153E).

63 K/6 Marcasite is found in the sulphide ore of the Chisel Lake Mine (A.E. Bence and L.C. Coleman, 1963: Can. Mineralogist, 7, p. 663).

63 N/3 The ore at the Sherritt-Gordon Mine at Sherridon contained small amounts of marcasite (Ann P. Sabina, 1972: Geol. Sruv. Can., Paper 71-27, p. 48).

63 P/12 The nickel ore at the Thompson Mine consists of pyrrhotite and pentlandite with lesser amounts of pyrite, chalcopyrite, marcasite and gersdorffite (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 74).

New Brunswick

21 G/7 Marcasite is a constituent mineral of the tin deposits at Mount Pleasant. It is associated with stannite, arsenopyrite, pyrite, and pyrrhotite (K.F.G. Hosking, 1963: Precambrian, vol, 36, No. 4, p. 20).

21 I/14
21 J/1 Small elongated concretions of marcasite and of pyrite occur in sandstone beds of the Minto coalfield. The Minto coal area is about 55 km from Fredericton via Highway 10 (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 129).

21 O/8 Heath Steele Mine

21 P/5 Key Anacon and Brunswick No. 6 Mines.

21 P/12 Nigadoo River Mines.

Marcasite is reported to be a minor constituent of the orebodies at the mines noted above (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51).

Newfoundland

12 B Marcasite and pyrite are present in the red, green, and black highly fissile shales of the Humber Arm Group, Stephenville map-area (G.C. Riley, 1962: Geol. Surv. Can., Mem. 323, p. 24).

12 B/10 Crystal aggregates of marcasite are associated with barite and celestine at the Aguathuna quarry. The quarry extends for about 1.6 km parallel to the south shore of East Bay, Port au Port Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 155).

12 H/9 Marcasite is present in the ore at the Whalesback Mine at Whales Back Pond northeast of Springdale (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 112).

12 I/6 A minor amount of marcasite is associated with coarsely crystalline sphalerite at the Newfoundland Zinc Mine, 11.2 km inland from Daniel's Harbour (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 138).

Northwest Territories

85 B/16
85 G/1 Sphalerite, galena, and marcasite occur as disseminated grains, masses, or veinlets replacing calcite, or dolomite, in the Pine Point area, south of Great Slave Lake. Colloform and stalactitic masses of sulphides are not uncommon (Western Miner & Oil Review, vol. 36, No. 8, 1963: p. 26).

85 H/11
85 H/12 Massive and twinned marcasite occurs with pyrite and chalcopyrite in shear zones traversing micaceous quartz on the Outpost Islands in Great Slave Lake (J.E. Hawley, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 63).

85 J/8 Marcasite is found in appreciable amounts in the Yellowknife Bay area on the northern shore of Great Slave Lake (L.C. Coleman, 1953: Am. Mineralogist, 38. p. 520).

Nova Scotia

11 F/11 Aggregates of marcasite and dogtooth spar have been found at the abandoned Lennox limestone quarry located near the lighthouse about 1.6 km from Martinique, Richmond County (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 40).

Ontario

30 M/3 The mineral collection at the Royal Ontario Museum includes specimens of marcasite associated with sphalerite and pyrite in dolomite from the Walker Brothers quarries, lots 31 and 32, conc. X, Stamford Township (J.Satterly, 1977: Ont. Geol. Surv., MP70, p. 226).

30 M/5 Specimens of marcasite in the mineral collection at the Royal Ontario Museum were collected from: Dundas South Quarry, lots 10 and 11, conc.II, and Dundas North Quarry, lots 10 and 11, conc. III, West Flamborough Township (J.Satterly, 1977: Ont. Geol. Surv. MP70, p. 226).

31 B/12 Dark brown-stained marcasite nodules averaging 1.2 cm across are common in a quarry about 10 km north of Brockville, off Highway 29 (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 49).

31 C/6 Specimens of marcasite associated with fluorite and barite are present in the mineral collection at the Royal Ontario Museum from the following localities in Hastings County: Noyes Mine, lot 13, conc. XII, Huntingdon Township; Milwood (probably Keene) Mine, west half of lot 9, conc. XIV, Huntingdon Township; Bailey Mine, lot 1, conc. IV, Madoc Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 224, 225).

31 C/7 At the Frontenac Lead Mine, lots 15 and 16, conc. IX, Loughborough Township, marcasite occurs with pyrite and galena in calcite veins. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 224).

The X-ray Laboratory of the Geological Survey of Canada has identified marcasite in specimens from the following mining properties in the Bancroft area.

31 D/16 Blue Rock Cerium Mines Limited, conc. V and VI, lots 18, 19, and 20, Monmouth Township, Haliburton County.

Dyno Mines Limited, conc. VIII, lot 12, Cardiff Township, Haliburton County.

31 E/1 The Croft property of Bicroft Uranium Mines Limited, located in Cardiff Township, near the Faraday Township line, about 1.6 km, northeast of Centre Lake.

Nu-Age Uranium Mines Limited, lot 8, conc. XXI, Cardiff Township, Haliburton County.
Halo Uranium Mines Limited, conc. XVII, lots 4 and 5, Cardiff Township, Haliburton County.

The Centre Lake property of Bicroft Uranium Mines Limited, conc XI, lots 26 and 27, Cardiff Township, Haliburton County.

Fission Mines Limited, lot 5, conc. XXI, Cardiff Township, Haliburton County.

31 F/4 The Can-Quirk-Mellish property, conc. I, lot 5, Monteagle Township, Hastings County.

Greyhawk Uranium Mines Limited, lot 10, conc. XII, Faraday Township, Hastings County.

Faraday Uranium Mines Limited, conc. XI, lots 16 and 17, Faraday Township, Hastings County.

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31 F/8 Marcasite is associated with galena at the Kingdon Mine lots 22-24, conc. VI, Fitzroy Township, 2 km north of Galetta. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 224).

31 G/5 Marcasite, as radiating, platy, and granular patches, is associated with calcite, barite, celestine and strontianite at the Fraser Duntile Quarry on Clyde Avenue in Ottawa (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 85).

31 M/4 Marcasite forms mammillary radiating incrustations on glassy white quartz at the Trout Lake Mine in South Lorrain Township. Specimens from the mine dump are often altered to limonite on the surface but where the mineral occurs in closed cavities unaffected by weathering, it may occur as brilliant brassy crystals (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 70).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16

Marcasite is a common mineral in the Cobalt-Gowganda ores. It occurs in faults, in late calcite veins, in the ore veins, and in Keewatin interflow rocks. Electron microprobe analyses:

Occurrence	Fe	Co	S	Total
intergrown with pyrite	46.50	nd	53.52	100.04
in veinlets	46.51	0-0.3	53.57	100.08
in veinlets	45.97	nd	52.57	98.54
in veinlets	46.98	0-0.07	53.92	100.90
inclusions in galena	47.08	0-0.03	54.56	101.64

(W. Petruk et al., 1971: Can. Mineralogist, 11, p. 222)

32 D/4 Disseminated marcasite occurs with magnetite in cherty quartzite at the Adams Mine 10.3 km east of Dane via Highway 650 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 80).

40 J/1 The Kettle Point Formation, Kettle Point, contains concretions of marcasite now replaced by pyrite. These concretions occur at many horizons distorting the regularity of the laminations. Sizes vary to a maximum diameter of 7.5 cm. Feather-like aggregations also occur (W.D. MacDonald, 1960: Bull. Can. Inst. Mining Met., vol. 53, No. 583, p. 844).

41 I/6 Marcasite is a relatively minor constituent of the Sudbury ores. It has three modes of occurrence: as an alteration or replacement of nickeliferous pyrrhotite; in offset deposits associated with nickeloan pyrite; as seams or nodular masses in late veins cutting normal sulphide ore or wall-rocks usually associated with nickel-poor pyrite, sphalerite, nickeloan, galena, calcite, and quartz (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7, p. 41)

41 I/10 Marcasite has been found in vugs and crustiform masses along a post ore vertical fault at the Falconbridge Mine in the Sudbury district (J.E. Thompson, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. VI, p. 25).

41 J/2 The conglomerates of the Elliot Group in the Blind River area contain some marcasite (P.J. Pienar, 1963: Geol. Surv. Can., Bull. 83, p. 69).

41 P/14 A vein of massive marcasite containing local high concentrations of gold and silver is reported at the Stairs gold mine at 47°54'N, 81°04'W, in Midlothian Township (E.G. Bright, 1970: Ont. Dept. Mines, GR79, p. 26).

42 L/6
42 L/7 Marcasite occurs at Kupfer Lake in the O'Sullivan Lake area, Thunder Bay district (W.W. Moorhouse, 1955: Ont. Dept. Mines, Ann. Rept., vol. 64, Pt. IV, p. 22).

52 A/4 At Silver Mountain Mines, lots 10, 11 and 12, conc. II, Lybster Township, marcasite is present in silver bearing calcite-quartz-barite veins. A specimen is included in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 225).

52 A/5 The Beaver Mine in O'Conner Township, Thunder bay district, is reported to contain some marcasite (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 153).

52 A/6
52 A/7 Marcasite has been observed on Silver Islet, in western Lake Superior (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol 9. p. 203).

52 B/8 The mineral collection at the Royal Ontario Museum includes marcasite from the Gopher Mine on the south half of lot 11, conc. IV, Strange Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 226).

52 L/16 A base-metal sulphide deposit in Mulcahy Township about 32 km west of Red Lake and 1,200 m south-southwest of the south end of Trout Bay consists mainly of pyrrhotite, sphalerite and chalcopyrite, with lesser amounts of galena, marcasite, arsenopyrite, cobaltite, pyrargyrite, paracostibite, gudmundite, stannite, argentian tetrahedrite, antimonial silver, allargentum, ilmenite, breithauptite, cassiterite, and nisbite (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 232).

Quebec

32 D/6 Marcasite, specular hematite and chalcopyrite are associated with auriferous pyrite at the Powell Rouyn Mine, 4.8 km northwest of Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 50).

Saskatchewan

63 K/12 Marcasite is a minor constituent of the orebody at the Coronation Mine. The mine is situated near the shore of Phil (McNally) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

Yukon

105 K/6 Marcasite is reported to be one of the constituents of the ore at the Anvil Mine. The mine is at 62°21.5'N, 133°22'W, near Faro Creek, a tributary of Rose Creek, at an elevation of about 1200 m (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 87).

105 M/14
106 D/4 In the Keno Hill - Galena Hill area, small amounts of marcasite occur in the country rocks and lodes. Good specimens of radiating marcasite were obtained from some of the pyrite-jamesonite veins in the Dublin Gulch area, and from the Silver King Mine (R.W. Boyle, 1965: Geol. Surv. Can., Bull. 111, p. 160).

115 F/15 Pyrrhotite, pentlandite, chalcopyrite, sphalerite, pyrite and marcasite occur as fine disseminations and small massive lenses at the Canalask Mine on the east side of the White River overlooking Miners Ridge and Nutzotin Mountains (Ann P. Sabina 1973: Geol. Surv. Can., Paper 72-32, p. 73).

MARGARITE

$CaAl_4Si_2O_{10}(OH)_2$

British Columbia

82 K/2 Margarite has been identified in pink marble near the mouth of Schroeder Creek about 14.4 km north of Kaslo. Electron microprobe analyses show the crystals to be strongly zoned within the following extreme compositions - central part of the crystal reported first: SiO_2 36.70, 30.63; TiO_2 0.25, 0.25; Al_2O_3 46.50, 49.95; FeO 1.15, 1.15; MnO <0.01, <0.01; MgO 0.24, 0.24; CaO 8.10, 11.40; Na_2O 2.92, 0.99; K_2O 0.27, <0.06;total 96.14, 94.68. (J.W. Jones, 1971: Can. Jour. Earth Sci., 8. 1145)

MARICITE

$NaFePO_4$

Yukon

117 A/9 The new mineral maricite was found as nodules in sideritic ironstones exposed on the Big Fish River at about 68°30'N, 136°30'W, about 15 km east of the phosphate occurrence on Cross-Cut Creek that yielded the new minerals kulanite, baricite and penikisite. Average of six electron microprobe analyses: Na_2O 16.5, MgO 0.8, CaO 0.0, MnO 3.1, FeO 37.4, P_2O_5 42.5, total 100.3 (B.D. Sturman, J.A. Mandarino and M.I. Corlett, 1977: Can. Mineralogist, 15, p. 396).

mariposite

(see MUSCOVITE)

MATILDITE

$AgBiS_2$

British Columbia

93 L/2 Matildite has been identified as a minor constituent of a Cu-Pb-Ag-Zn ore from a prospect near Owen Lake northwest of the west end of Francois Lake (D.C. Harris and D.R. Owens, 1973: Can. Mineralogist, 11, p. 1016).

93 L/14 Matildite occurs as the second most abundant ore mineral (after tetradymite) at Glacier Gulch. Sphalerite, chalcopyrite, and calaverite are present as subordinate minerals. The ore is found in a white rock containing sericite, carbonates and kaolin, that is believed to be an altered tip of a tongue of granodiorite intruded into argillites (G. M. Pratt, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 55).

Northwest Territories

86 E/9 Large irregular grains of matildite occur with an assemblage of Co-Ni arsenides, native bismuth and silver at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay on Great Bear Lake, and 6.4 km downstream from the earlier known Camsell River Silver Mines property. Electron probe microanalysis by D.C. Harris: Ag 27.3, Bi 56.0, S 16.9, total 100.2. D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, pp. 655-662).

86 F/12 Specimens from the Camsell River Silver Mines property, How Group, consist of a dolomite-quartz gangue with disseminated galena, chalcopyrite, pyrite, bismuth, and bismuthinite which carries considerable silver. A microscopic feature of this ore is a fairly abundant galena-matildite exsolution intergrowth which exhibits a Widmanstatten texture. Associated with the above are sphalerite, chalcopyrite, traces of tetrahedrite, silver, argentite, marcasite, and minute zoned crystals of an undetermined iron-cobalt-nickel-arsenic sulphide (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 546).

Ontario

31 M/4
31 M/5 Matildite was identified in samples from the Silverfields and Canadian Keeley Mines. It occurs as lamellae and grains within galena, and as an intergrowth with pavonite. Electron probe microanalysis of matildite co-existing with pavonite: Ag 26.4, Bi 55.7, S 16.7, total 98.8 (W.Petruk, et al., 1971: Can. Mineralogist, 11, p. 216).

31 M/5 Two types of matildite occur at the O'Brien Mine near Cobalt. One is very fine grained, lead grey in colour, and breaks with a conchoidal fracture, while the other is more cleavable and galena grey in colour. Analysis of the first type by E.W.Todd: Bi 33.58, Ag 17.54, Pb 30.65, S 15.82, Fe 0.49, Sb 0.84, Cu 0.92, insol. 0.26, total 100.00; S.G. = 7.07. The analysis corresponds to a mixture of 61.5% matildite, and 34.7% galena with the balance chalcopyrite, silver, and tetrahedrite. This type of matildite occurs as a complex intergrowth with galena.

The second type is more complex and is composed of a galena-matildite intergrowth which has larger masses of galena. Considerable amounts of silver, chalcopyrite, arsenopyrite and tetrahedrite are present. This type of matildite was studied by H.V. Ellsworth (Ont. Bur. Mines, Ann. Rept., 1916, vol. 25, Pt. I, p. 232) whose analysis is as follows: Pb 54.35, Bi 20.26, Ag 10.11, S 14.68, Sb 0.45, Fe 0.20, total 100.05; S.G. 7.201 (Univ. Toronto Stud., Geol. Ser., 12, 1921, p. 70).

31 M/5 A specimen of matildite in the mineral collection of the Royal Ontario Museum is from the Foster Mine, southeast quarter of the north half of lot 4, conc. IV, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 228).

MATTAGAMITE

$CoTe_2$

Quebec

32 F/12 Ferroan mattagamite has been found in the telluride zone of a massive sulphide deposit at the Mattagami Lake Mine in Galinee Township 8 km southwest of the town of Matagami. Other minerals in the telluride zone are magnetite, altaite, cobaltite, pyrrhotite, pyrite, hessite and tellurantimony. Electron microprobe analysis, average of 3 grains: Co 10.3, Fe 6.7, Te 82.4, total 99.4 (R.I. Thorpe and D.C. Harris, 1973: Can. Mineralogist, 12, p. 55).

MAUCHERITE

$Ni_{11}As_8$

Newfoundland

2 E/13 Tilt Cove Mines, Newfoundland's oldest copper producers, are located at Tilt Cove on the northeast shore of Notre Dame Bay, The West Mine also contained nickel ore consisting of maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann. P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Ontario

31 M/5 Specimens of maucherite from the following mines in the Cobalt area are in the mineral collection at the Royal Ontario Museum: Seneca Superior Mine under Cart Lake, lots 5 and 6, conc. V, Coleman Township; City of Cobalt Mine, southeast quarter of south half of lot 4, conc. VI, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 229).

31 M/12 Small irregular grains of maucherite were found in calcite at the Langis Mine, Casey Township, Cobalt-Gowganda area. The maucherite contains inclusions of siegenite and is associated with an assemblage of arsenides and sulphides that includes the new mineral langisite and the rare minerals cobalt pentlandite, parkerite and bravoite. Electron probe microanalysis of maucherite from the Seneca Superior Mine: Ni 46.9. Co 3.9, As 49.0, Sb 0.3, total 100.1 (W.Petruk, D.C. Harris and J.M. Stewart, 1969: Can. Mineralogist, 9, pp. 597-616)

41 I/6 Maucherite is associated with but less common than niccolite in the nickel deposits of Sudbury. Chemical analysis of maucherite by Peacock, calculated to 100 per cent: Ni 51.75, Cu 0.21, Fe 0.24, As 47.52, and S 0.28. Later analyses have shown minor Co and traces of Sb, Bi, Ag, and Pd. Maucherite has been reported from the Worthington, Frood and Garson mines(J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7, p. 81).

41 P/9 Maucherite has been identified in material from the Moose Horn Mine, Elk Lake. Timiskaming district (A.S. Dadson, 1936: Univ. Toronto Stud., Geol. Ser. 40, p. 119). The mineral was also known as temiskamite and timiskamite. Chemical analysis by Ellsworth: As 46.34, S 1.03, Ni 49.07, Co 1.73, Fe trace, Bi 0.55, total 98.72; S.G. 7.901 (T.L. Walker, 1914: Am. J. Sci., Ser. IV, vol 37, p. 170).

41 P/10 A specimen from the Coleroy Mine, Gowganda, consists of a bronze-coloured material resembling niccolite occurring in veins of calcite. The metallic material has faint radiating structure in hand specimen. It was identified in polished section as temiskamite, a synonym for maucherite. Some niccolite occurs along fractures in the temiskamite, and isolated, well-formed crystals of cobaltite and smaltite occur in the niccolite and temiskamite. An analysis by Todd is as follows: Fe 0.62, Ni

40.33, Co 5.77, As 50.33, Sb 0.72, S 1.66, total 99.63 (E.W. Todd, 1926: Ont Dept. Mines, Ann. Rept., vol. 35, Pt. III, p. 76).

52 A/3 Traces of maucherite are reported in a gabbro zone east of Mount Mollie in Crooks Township associated with nickeliferous pyrrhotite (J.J.C. Geul, 1973: Ont. Div. Mines, GR102, p. 36).

Quebec

21 E/13 Maucherite and heazlewoodite are associated with grossular and diopside at the Jeffrey Mine on lots 9 and 10, ranges II and III, Shipton Township, Richmond County, at 45°46'25"N, 71°57'12"W (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

31 H/8 Maucherite has been identified by X-ray powder pattern in a specimen from Orford (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Yukon

115 F/15 A stringer of massive maucherite with minor magnetite and millerite, about 1.5 m long and 5 cm wide, lies on the lower contact of a serpentinized peridotite dyke. The dyke cuts a series of silicified tuffs and limestones of probable Carboniferous age. The rocks near the veinlet are brecciated and strongly altered to serpentine and carbonates (V.S. Papezik, 1955: Am. Mineralogist, 40, p. 693).

MAWSONITE

$Cu_6Fe_2SnS_8$

New Brunswick

21 G/7 Mawsonite has been found in a sample from Brunswick Tin Mines Limited. It occurs as irregular grains in tennantite, arsenopyrite and gangue (W. Petruk, 1973: Can. Mineralogist, 12, p. 46).

Ontario

42 A/11 Mawsonite and stannoidite are widely distributed in minor amounts in a bornite-rich ore zone on the 1200 level at the Kidd Creek Mine north of Timmins. The mine is 25.7 km north of Highway 101 via Highway 655. Electron microprobe analysis of the mawsonite. Cu 42.3, Fe 13.1, Sn 14.5, As 0.15, Se 1.3, S 28.5, total 99.85 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

MCKELVEYITE

$(Na,Ca)(Ba,Y,U)_2(CO_3)_3 \cdot 1\text{-}2H_2O$

Quebec

31 H/11 Mckelveyite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

MCKINSTRYITE

$(Ag,Cu)_2S$

Northwest Territories

86 K/4 Mckinstryite occurs as a late-stage primary mineral at the Echo Bay Mine on the east shore of Great Bear Lake adjacent to the old Port Radium Mine at 66°05'N, 118°02'W. Average of electron microprobe analyses: Cu 21.64, Ag 65.06, S 13.69, total 100.39 (B.W. Robinson and R.D. Morton, 1971: Econ. Geol., 66, p. 342).

Ontario

31 M/5 The new mineral, mckinstryite, was found in 1966 on a specimen collected in 1907 at the Foster Mine, lot 4, concession IV, Coleman Township and donated to the mineral collection of the Geological Survey of Canada. X-ray fluorescence analysis by H.J. Rose and F. Cuttitta: Cu 24.9, Ag 60.0, S 15.1, total 100.0 (Brian J. Skinner, John L. Jambor and Malcolm Ross, 1966: Econ. Geol. 61, p. 1383).

melaconite

(see TENORITE)

MELANOCERITE

$(Ce,Ca)_5(Si,B)_3O_{12}(OH,F).nH_2O$

Ontario

The X-ray powder pattern of melanocerite has been obtained from specimens taken from the following properties (X-ray Laboratory, Geol. Surv. Can.).

31 D/9 Pole Star Mines, conc. XII, lot 25, Burleigh Township, Peterborough County.

31 D/16 Blue Rock Cerium Mines Limited, concs. V and VI, lots 18-20, Monmouth Township, Peterborough County.
Cavendish Uranium and Mining Company, conc. VII, lots 14, 15, Cavendish Township, Peterborough County.
Windover property, conc. III, lot 3, Cavendish Township, Peterborough County.

31 E/1 Centre Lake property, Bicroft Uranium Mines Limited, conc. XI, lots 26,27, Cardiff Township, Haliburton County.

Croft property, Bicroft Uranium Mines Limited, at the intersection of Cardiff, Herschel and Faraday townships.

Fission Mines Limited, conc. XXI, lot 5, Cardiff Township, Haliburton County.

31 F/4 Carr-Quirk-Mellish property, conc. I, lot 5, Monteagle Township, Hastings County.

MELANTERITE

$FeSO_4.7H_2O$

British Columbia

92 O/15 Melanterite is found in a ledge between Big Creek and Chilcotin River (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 154).

Manitoba

62 C/14 Melanterite occurs on township 44, range XXVIII, west of the first meridian (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 154).

63 K/12 Cuprian melanterite, also known as pisanite, occurs as a coarsely crystalline crust up to 6 mm thick on sulphide ores beneath the overburden, and also as vugs within the ore and near the bedrock surface, at the Cyprus Mine, 19 km east of Flin Flon (L.F. Keating and L.G. Berry, 1953: Am. Mineralogist, 38, p. 501).

Nova Scotia

11 J/4 Melanterite has been found in heaps of shale and slack coal at Glace Bay Coal Mines, Cape Breton County (G.C. Hoffmann, 1888: Geol. Surv. Can., Ann. Rept., IV, p. 45T).

11 J/4
11 K/8 Hydrated sulphates identified at the No. 26 Colliery, Glace Bay, include: melanterite, sideronatrite, epsomite, rozenite, pickeringite, aluminocopiapite and halotrichite. Melanterite, rozenite and fibroferrite have been identified at the Prince Mine, Point Aconi (E.L. Zodrow and K. McCandlish, 1978: Can. Mineralogist, 16, p. 17).

Ontario

41 I/6 The National Mineral Collection includes specimens of melanterite from a location 6.4 km west of Sudbury Junction of the Canadian Pacific Railway, District of Algoma.

52 B/13 A specimen of melanterite from Steep Rock Iron Mine, former Steep Rock Lake, Freeborn Township, is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol, Surv., MP70, p. 231).

52 J/4 Sulphides in the country rock on lot 32, conc. I, Drayton Township, Kenora district, have been oxidized to form limonite and melanterite (M.E. Hurst, 1932: Ont. Dept. Mines, Ann. Rept., vol 41, Pt. VI, p. 30).

Quebec

22 G/1 Melanterite occurs as a soft, white, powdery coating on pyrite at the Candega Mine located in a protected forest area about 19 km south of Marsoui (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 75).

31 I/1 R.P.D. Graham and J. Riddell have identified melanterite in Utica shale stored in the Redpath Museum, McGill University, for study of associated graptolite fossils. The specimen is from the south bank of the Bécanour River, about 4.8 km down stream from Daveluyville, Arthabasca Township (Mrs. J.S. Stevenson, 1960: private communication).

31 J/4 Melanterite was found in limestone in the neighbourhood of a sphalerite vein on lot 36, range II, Northfield Township. Associated minerals are: galena, pyrite, pyrrhotite, limonite, graphite, diopside, serpentine, apatite, and tremolite (E.A. de la Rue, 1956: Que. Dept. Mines, Geol. Rept., 67, p. 24).

MELILITE

$(Ca,Na)_2(Mg,Fe^{++},Fe^{+++},Al,Si)_3O_7$

The name melilite is used as a group name for a solid solution series extending between akermanite ($Ca_2MgSi_2O_7$) and gehlenite ($Ca_2Al_2SiO_7$), and as a mineral name for intermediate composition members of the series, most of which also contain appreciable amounts of iron and sodium. The melilites are tetragonal: akermanite-rich varieties are optically positive and gehlenite-rich members of the series are optically negative.

Quebec

31 G/8
31 G/9 Melilite-bearing rocks of the okaite and jacupirangite series and melilite-carbonate rocks form part of the Oka Complex located about 32 km west of Montreal on the north shore of the Lake of Two Mountains. Chemical analyses by W.H. Herdsman (III, V, VI) and H. Ulk (IV): III, melilite from okaite, Dufresne Hill, SiO_2 39.78, Al_2O_3 10.33, Fe_2O_3 2.02, FeO 1.44, MnO 0.38, MgO 7.06, CaO 33.02, Na_2O 3.69, K_2O 0.24, P_2O_5 0.69, H_2O^+ 0.38, H_2O^- 0.06, CO_2 nil, SrO 0.88, BaO 0.09, ZrO_2 0.18, total 100.24, S.G. 2.990; IV melilite from nepheline okaite, Husereau Hill, SiO_2 38.68, Al_2O_3 10.60, Fe_2O_3 0.45, FeO 1.81, MnO 0.35, MgO 7.66, CaO 34.28, Na_2O 3.92, K_2O nil, P_2O_5 0.11, H_2O^+ 0.36, H_2O^- 0.01, CO_2 1.14, SrO 0.44, total 99.81, S.G. 2.988; V. melilite from calcite-melilite rock, Bond zone, SiO_2 39.64, Al_2O_3 6.62, Fe_2O_3 1.47, FeO 2.01, MnO 0.91, MgO 7.72, CaO 34.32, Na_2O 3.35, K_2O 0.24, P_2O_5 1.21, H_2O^+ 0.88, H_2O^- 0.24, CO_2 nil, SrO 1.00, BaO 0.44, ZrO_2 0.21, total 100.26, S.G. 3.127; VI, melilite from niocalite-calcite rock, Bond zone, SiO_2 39.98, Al_2O_3 4.47, Fe_2O_3 1.89, FeO 2.59, MnO 1.21, MgO 7.29, CaO 34.86, Na_2O 3.08, K_2O 0.12, P_2O_5 2.14, H_2O^+ 0.86, H_2O^- nil, CO_2 nil, SrO 1.59, BaO 0.01, ZrO_2 0.30, total 100.39, S.G. 3.041. (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, pp. 102-126).

31 G/9 Electron microprobe analyses of five melilites from the Oka carbonite:

	(1)	(2)	(3)	(4)	(5)
SiO_2	42.3	41.5	41.1	41.8	43.7
Al_2O_3	8.21	8.86	9.08	8.91	6.25
FeO	2.72	2.49	2.81	1.93	2.27
MnO	0.25	0.17	0.23	0.42	0.82
MgO	7.07	6.84	6.83	6.61	7.66
CaO	33.5	33.6	33.1	32.1	32.5
SrO	1.03	1.04	1.00	1.11	1.30
Na_2O	3.95	3.88	4.08	4.81	4.18
K_2O	0.19	0.22	0.26	0.13	-
Total	99.22	98.60	98.04	97.82	98.68

(1) Husereau Hill. Jacupirangite containing titanaugite, melilite, hauyne, biotite, perovskite, magnetite, apatite and trace interstitial calcite.

(2) Husereau Hill. Fine-grained okaite containing melilite, hauyne, biotite, perovskite, magnetite, apatite.

(3) Husereau Hill. Coarse-grained okaite containing melilite, biotite, hauyne, perovskite, magnetite, apatite and interstitial calcite.

(4) Bond zone. Carbonatite containing calcite, melilite, biotite, perovskite, magnetite, apatite and garnet.

(5) Bond zone. Carbonatite containing calcite, melilite, garnet, niocalite, apatite, magnetite, amphibole, trace perovskite and monticellite (David H. Watkinson, 1972: Can. Mineralogist, 11, p. 457).

31 H/5 Adams reports an occurrence of a melilite-bearing rock (alnoite) at Ste. Anne de Bellevue, Jacques Cartier County. The alnoite is found as a dyke cutting the Potsdam sandstone at the bottom of the Ottawa River opposite Ste. Anne de Bellevue (F.J. Adams, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 240).

MELONITE

$NiTe_2$

Ontario

41 I/10
41 I/11 Palladian and bismuthian melonites have been identified at the Strathcona and Falconbridge

Mines. Electron probe microanalyses: Strathcona - Ni 11.3, Pd 7.4, Pt. 3.7, Te 65.2, Bi 14.4, total 102.0; Falconbridge - Ni 17.1, Pd 2.1, Pt 1.5, Te 72.5, Bi 9.1, total 102.3 (J. Rucklidge, 1969: Can. Mineralogist, 9, pp. 617-627).

42 A/1 Melonite, altaite, calaverite, coloradoite, and petzite are found at all depths in the Wright-Hargreaves Mine, Teck Township. These tellurides are usually associated with native gold in nests and stringers in gangue and wall-rocks (H.Hopkins, 1948: Ont. Dept. Mines, Ann. Rept., vol. 57, Pt. V, p. 166).
At the Toburn (Tough-Oakes) Mine, melonite is associated with altaite and petzite (R.M. Thompson, 1959: Am. Mineralogist, 34, p. 360).

42 C/4 X-ray powder patterns have served to identify melonite in specimens found at Macassa Creek, Thunder Bay District (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Quebec

32 D/6 Melonite is associated with tellurides, sulphides, and free gold in rich ore from the Robb-Montbray Mine, Montbray Township, Abitibi County (M.A. Peacock and R.M. Thompson, 1946: Univ, Toronto Stud., Geol. Ser., 50, p. 63).

MENEGHINITE

$Cu_2S.26PbS.7Sb_2S_3$

British Columbia

82 F/3 Investigation of a specimen of steel grey galena from the Durango Mine showed that it contained blebs of chalcopyrite, lenses of covellite, and a few beaded stringers of a grey anisotropic mineral which proved to be meneghinite. The mine is located near Ymir in the Nelson mining division (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 506).

82 F/4 Meneghinite occurs at the Bluebird-Mayflower workings of Rossland Mines Limited, Trail Creek mining division. The several samples studied consisted of a massive complex of sulphides and sulpho-salts including pyrite, arsenopyrite, pyrrhotite, sphalerite, galena and boulangerite as major constituents, and minor amounts of tetrahedrite, owyheeite, meneghinite, chalcopyrite and gold. The meneghinite occurs as slightly greenish grey, anistropic laths in galena (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 547).

82 M/1 A sample of a small quartz vein in limestone, from the Mastodon claims, Revelstoke mining division, contained visible sphalerite and calcite. Under the microscope, tetrahedrite and meneghinite were observed mixed with bournonite as well as minor amounts of galena, chalcocite, covellite, gold and probably arsenopyrite (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser. 51, p. 75).

93 E/6
93 E/10 Samples collected from the Silver Bell claim, California Group, Chikamin Mountain, Whitesail Lake, consisted of limonite-stained quartz, and minor siderite with bands of galena, yellow sphalerite, tetrahedrite, and silvery grey needles and prisms of meneghinite up to 1 centimetre in length. Polished sections showed small rounded areas of bournonite in contact with tetrahedrite, and associated with galena, sphalerite, and chalcopyrite, while the meneghinite laths were usually free (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

93 M/5 At the Silver Standard Mine, near New Hazelton in the Omineca mining division, meneghinite occurs as fine laths and fibrous masses in close association with argentiferous tetrahedrite, galena, pyrargyrite, and polybasite. Traces of bournonite are associated with the meneghinite and sphalerite. Pyrite, pyrrhotite, marcasite, arsenopyrite, chalcopyrite, covellite, and limonite are also present in the ore (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 506).

Manitoba

63 K/16 Meneghinite occurs in the sulphide ore at Chisel Lake (A.E. Bence and L.C. Coleman, 1963: Can. Mineralogist, 7, p. 663).

Northwest Territories

85 J/8 Meneghinite has been identified in samples from the Yellowknife Bay area containing considerable galena or boulangerite, or both (L.C. Coleman, 1953: Am. Mineralogist, 38, p. 516).

Ontario

31 C/5 Meneghinite is reported to occur near South Emmons, Marmora Township, Hastings County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 155).

31 C/14 Massive meneghinite was found in quartz and dolomite at Marble Lake, Barrie Township, Frontenac County. An analysis by Harrington (1882) expressed in atoms per unit cell is as follows: Fe 0.11, Cu 1.90, Ag 0.07, Pb 26.31, Sb 14.11, S 46.52 (L.G. Berry and D.A. Moddle, 1941: Univ. Toronto Stud., Geol. Ser., 46, pp. 5 and 15).

31 C/14 Flattened and somewhat distorted galena-white, columnar masses of meneghinite up to 10 millimetres long and 5 millimetres wide occur embedded in vein quartz on lot 8, conc. II, Anglesea Township, Lennox and Addington counties (L.G. Berry and D.A. Moddle, 1941: Univ. Toronto Stud., Geol. Ser., 46, p. 5).

31 C/14 Meneghinite is found with quartz and dolomite on lots 5 and 9, conc. IX, Barrie Township (W.G. Miller, 1900: Ont. Bur. Mines, Rept., vol. 9, p. 203). An analysis by Harrington is as follows: S 16.81, Sb 19.37, As tr., Pb 61.45, Cu 1.36, Fe 0.07, Ag 0.08, total 99.14; S.G. 6.33 (B.A. Harrington, 1907: Roy. Soc. Can. Trans., vol. I, sec. 3, p. 79).

31 C/14 The mineral collection at the Royal Ontario Museum includes meneghinite from the Helena Mine, lot 20, conc. VI, Barrie Township. (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 232).

Yukon

105 M/14 Meneghinite has been identified by X-ray diffraction pattern (X-ray Laboratory, Geol. Surv. Can.) associated with galena in a specimen from the vein fault on the Helen fraction, Keno Hill-Sourdough Hill area, Mayo mining division (R.W. Boyle, 1955: Geol. Surv. Can., Paper 55-30).

MERCURY

Hg

Native mercury is a rare mineral, usually associated with cinnabar in volcanic regions. It is liquid under natural conditions.

82 L/13 The National Mineral Collection includes a specimen of mercury from Shuswap.

92 C/14 Mercury occurs as minute globules scattered through a thin vein of cinnabar that cuts a greenish felsite at the eastern entrance to Seshart Channel, Barclay Sound, Vancouver Island (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 65R).

92 H/6 Some parts of the silver ore of Silver Peak, near Hope, contain globules of mercury (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, P. 65R).

92 O/2 Cinnabar, mercury and stibnite are reported in conglomerate on the Mugwump claims at 51 04'N, 122 49'W, on Relay Creek, 3.2 km above Tyaughton Creek at about 1200 m elevation (B.C.Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 266).

New Brunswick

21 J/16 Mercury has been found with cinnabar in specimens from Devil's Brook, Souchesk Parish, Northumberland County (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Ontario

31 M/5 Mercury is found in the silver-cobalt ores at the Nippissing-O'Brien Mine, Coleman Township, Timiskaming district (-,1911: Eng. & Min. J., XCLI, p. 649)

MERENSKYITE

$PdTe_2$

Ontario

41 I/16 Merenskyite occurs with temagamite, stutzite and hessite as inclusions in chalcopyrite at the Temagami copper deposit on Temagami Island in Temagami Lake. Electron microprobe analysis: Pd 29.2, Te 67.8, Sb 0.3, Bi 2.6, total 99.9. The identifications of merenskyite and stutzite were based on optical properties and electron microprobe analyses (L.J. Cabri, J.H.G. Laflamme and J.M. Stewart, 1973: Can. Mineralogist, 12, p. 193).

52 L/7 Nickeloan merenskyite has been found in a specimen of drill core through massive sulphides, from Werner Lake. Electron probe microanalysis: Ni 5.9, Pd 18.3, Pt 0.37, Te 65.6, Bi 10.8, total 101.0 (J. Rucklidge, 1969: Can. Mineralogist, 9, pp. 617-627).

MESOLITE

$Na_2Ca_2Al_6Si_9O_{30}.8H_2O$

Mesolite is one of the rarer members of the zeolite group. The group is characterized by the ability to undergo cation exchange and to lose water without loss of crystal structure. Mesolite is very similar in appearance and chemical composition to scolecite and natrolite but thermal studies have confirmed that the three are independent species.

92 I/3 A specimen of mesolite was obtained from near Zakwaski Mountain in the Nicola River area, Kamloops district.

92 I/15 The National Mineral Collection contains a specimen of mesolite found about 400 m above the mouth of Criss Creek, which flows into Deadman's River in the Ashcroft mining division.

Nova Scotia

21 A/12
21 A/13
21 A/14
21 B/8
21 B/9
21 H/1
21 H/2
21 H/3

Specimens of mesolite were collected by Walker from Long Point, Kings County, southwest as far as Mink Cove on Digby Neck, Digby County, Mesolite was also found as snow white beach pebbles around Horseshoe Cove, Cap d'Or. Other localities are Cape D'Or, Isle Haute, Blomidon shore opposite Cape Sharp, Scot's Bay, Gates Mountain, Port George and North Mountain. Analyses by How, are as follows: from Cape d'Or - SiO_2 46.01, Al_2O_3 26.66, Fe_2O_3 0.38, CaO 9.88, Na_2O 4.66, K_2O 0.20, H_2O 12.69, total 100.48; S.G. 2.26; from the shore opposite Gates Mountain - SiO_2 46.04, Al_2O_3 26.32, Fe_2O_3 0.02, CaO 9.72, Na_2O 5.32, K_2O 0.40, H_2O 12.48, total 100.30; S.G. 2.257; from Port George - SiO_2 46.84, Al_2O_3 25.92, CaO 9.63, Na_2O 5.21, H_2O 12.11, total 99.71; and from North Mountain - SiO_2 46.48, Al_2O_3 27.04, CaO 9.63, Na_2O 4.45, H_2O 12.40, total 100.00 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 57 and H. How, 1858: Am. J. Sci., Ser. II, vol. XXVI, p. 32).

21 H/3 Mesolite from Cape d'Or, Cumberland County, and from Peter's Point, near Margaretsville, Annapolis County, have been examined by static and differential thermal analysis techniques (C.J. Peng, 1955: Am. Mineralogist, 40, p. 834).

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Mesolite has been found at numerous localities in the basalts of the Minas Basin - Bay of Fundy area. The following list of localities and associated zeolites is taken from Geol. Surv. Can., Paper 64-10, Rocks and Minerals for the Collector, Bay of Fundy Area, by Ann P. Sabina.

21 A/14 Port Lorne, Annapolis County; with stilbite, thomsonite, apophyllite and laumontite.

21 H/2 Canada Creek, Black Rock, Kings County; with stilbite, mordenite, heulandite, apophyllite, laumontite, prehnite and gyrolite.

Harbourville and Ogilvie, Kings County; with stilbite, heulandite and laumontite.

Morden, Kings County; with stilbite, laumontite, mordenite, apophyllite, analcime and heulandite.

21 H/3 Margaretsville, Annapolis County; with heulandite, laumontite, analcime, apophyllite, gyrolite, stilbite, scolecite and natrolite.

Port George, Annapolis County with stilbite, heulandite, analcime, apophyllite, laumontite, gyrolite and thomsonite.

21 H/7 Horseshoe Cove, Cape D'Or, Cumberland County; with analcime, stilbite, laumontite, apophyllite, chabazite, thomsonite, natrolite and heulandite.

21 H/8 Cape Blomidon to Cape Split, Kings County; with apophyllite, heulandite, natrolite, stilbite, chabazite, analcime, gmelinite, laumontite and thomsonite.

Scots Bay, Small Cove and Big Cove, Kings County; with stilbite, natrolite and heulandite.

Ontario

41 N/2 Mesolite is found with epidote at Mamainse Harbour, Lake Superior (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 203).

Quebec

21 M/10 Vugs in the ore at the St. Urbain Titanium Mines deposit are partly filled with pyrite, limonite, hematite and with pale green chlorite, pinkish white zeolites and calcite crystals. The zeolites - pale pink, radiating, platy mesolite and greenish white massive laumontite - are associated with calcite and dark mica and occur on the host rock and on the ore (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 96).

METACINNABARITE

HgS

British Columbia

92 K/3 Metacinnabarite, the cubic polymorph of HgS, is found with cinnabar in cavities in quartz on the west side of Read Island, Nanaimo mining division. The National Mineral Collection includes specimens from this locality (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 66R).

metadomeykite

(see DOMEYKITE)

METAVIVIANITE

$Fe_3(PO_4)_2.8H_2O$

Yukon

117 A/9 Metavivianite is one of a suite of phosphate minerals collected from a rock exposure at 68 34'N, 136 50'W on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Other minerals found at the locality are kulanite, lazulite, wardite, vivianite, childrenite, arrojadite, augelite and brazilianite (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

METAZEUNERITE

$Cu(UO_2)_2(AsO_4)_2.8H_2O$

This grass green secondary mineral is found in the oxidized zones of some uranium deposits. It fluoresces yellow-green.

British Columbia

92 I/4 Metazeunerite has been reported on a property owned by F. Paquet about 11.2 km north of Lytton on the Lillooet Highway (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol Surv. Can., Econ. Geol. Ser., 2nd ed., p. 234).

104 N/12 Metazeunerite has been identified by its X-ray powder diffraction pattern in a specimen from Atlin (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Saskatchewan

74 N/8 Metazeunerite is found on the property of Nicholson Mines Limited, on the north shore of Lake Athabasca. It occurs as small green plates up to 1/4 millimetre in diameter in vugs and crevices to the east of the high-grade area in close proximity to sulphides, silver and altered pitchblende (D.D. Hogarth, 1951: Am. Mineralogist, 36, p. 412).

meymacite

(see TUNGSTITE)

MICHENERITE

PdBiTe

Ontario

31 M/4 Michenerite is associated with chalcopyrite, pyrrhotite and sperrylite in specimens from the Kanichee (Cuniptau) Mine 6.4 km northwest of Timagami, Strathy Township, in the mineral collection at the Royal Ontario Museum. (J. Satterly, 1977: Ont. Geol Surv., MP70, p. 233).

41 I/6 Electron microprobe analysis of nickel-bearing antimonian michenerite from the Copper Cliff South Mine: Pd 23.8, Ni 0.6, Sb 5.4, Bi 39.1, Te 29.9, total 99.80 (L.J. Cabri and J.H.G. Laflamme, 1974: Can. Mineralogist, 12, p. 275).

41 I/6
41 I/11 Electron microprobe analyses of michenerite from: (1), (2) surface dump, Vermilion Mine; (3) cubanite-rich ore, Frood Mine; (4), (5), (6) Copper Cliff Mine concentrate;

	(1)	(2)	(3)	(4)	(5)	(6)
Pd	24.0	24.6	24.1	24.6	24.8	24.8
Te	28.8	28.8	28.5	29.9	29.9	29.6
Bi	46.5	45.8	47.0	43.3	43.0	43.1
Sb	0.4	0.9	n.d.	3.3	3.3	3.0
Total	99.7	100.1	99.6	101.1	101.0	100.05

(L.J. Cabri, D.C. Harris and R.I. Gait, 1973: Can. Mineralogist, 11, p. 903)

microcline

(see POTASSIUM FELDSPAR)

microlite

(see PYROCHLORE GROUP)

MILLERITE

NiS

Millerite commonly occurs as capillary crystals, needle-like to finer than a hair, often in tiny radiating groups and tufted coatings. Similar in colour to pyrite, it has been referred to as nickel pyrites and capillary pyrites.

British Columbia

92 H/10 An occurrence of millerite with chromite, magnetite, chalcopyrite, sperrylite and asbestos in a breccia pipe in peridotite is reported on the D and R claims at 49 32'N, 120 54'W, at the junction of the Tulameen River and Britton Creek at about 850 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 148).

93 B/1 Small grains of millerite have been identified in an ankeritic carbonate zone that lies

immediately south of the east end of Williams Lake and is readily visible from the north side of the lake (S.S. Holland, 1957: Minister of Mines, British Columbia, Ann. Rept. for 1956, p. 34).

104 I/6 A small amount of millerite occurs disseminated in serpentinized peridotite at a deposit on Two Mile Creek 6.4 km south of its junction with the Turnagain River. The claims are at 58°20.8'N, 129°02.4'W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 39).

Newfoundland

2 E/13 Tilt Cove Mines, Newfoundland's oldest copper producers are located at Tilt Cove on the northeast shore of Notre Dame Bay. The West Mine also contained nickel ore consisting of maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Ontario

32 D/4 Large tufts of hair-like crystals of millerite up to 50 millimetres long occur on ankerite carbonate at the Kerr-Addison Mine, McGarry Township. The mineral was found in a crushed zone on the upper levels of the mine and yielded a number of large specimens of museum quality (M.H. Frohberg, 1960: private communication).

41 I/6 Millerite occurs in crystalline form at the Copper Cliff Mine, Sudbury district (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 13H).

41 I/7 Millerite is found in close association with violarite at the Vermilion and Levack mines, Sudbury (M.N. Short and E.V. Shannon, 1930: Am. Mineralogist, 15, p. 1).

41 I/11 The mineral collection at the Royal Ontario Museum includes millerite from the Strathcona Mine, lot 4, conc. IV, Levack Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 241).

41 I/16 Millerite occurs at the Timagami Mine, Timagami Lake, Nipissing district as crystals up to 30 millimetres long and 4 millimetres thick, and in massive aggregates weighing several kg. It is found in quartz veins at the periphery of lenses of massive chalcopyrite, accompanied by gersdorffite and chalcopyrite. It occurs rather rarely and in quantities without economic significance (M.H. Frohberg, 1960: private communication).

41 P/10 Good specimens of millerite were obtained in a prospecting pit 60 m south of the shaft on the Kell claim, Corkhill Township, Timiskaming district (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 45).

42 P/10 A millerite specimen in the mineral collection at the Royal Ontario Museum is from the Siscoe (Miller Lake O'Brien) Mine in the north-central part of Nicol Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 241).

41 P/16 The mineral collection at the Royal Ontario Museum includes a specimen of millerite from lot 7, conc. I, Smyth Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 242).

42 A/3 Millerite is associated with godlevskite, heazlewoodite and pentlandite in a sample of drill core from the Texmont Mine in Bartlett-Geikie Township about 32 km south of Timmins. Electron microprobe analysis: Fe 0.75, Ni 63.52, Co 0.19, S 34.85, total 99.31 (A.J. Naldrett, E. Gasparrini, R. Buchan and J.E. Muir, 1972: Can. Mineralogist, 11, p. 879).

42 A/6 The ore at the Langmuir Mine consists of disseminated pyrrhotite and millerite with minor chalcopyrite and pyrite. The mine is about 26 km south of South Porcupine (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 129).

52 B/9 The Shebandowan Mine is located at the southwest end of Lower Shebandowan Lake. The major sulphide minerals in the orebody are pyrrhotite, pentlandite, chalcopyrite and pyrite. Polydymite, bravoite, violarite and millerite are present in minor amounts (J.A. Morin, 1973: Ont. Div. Mines, GR 110, p. 21).

Quebec

21 L/9 Millerite occurs in aggregates of large crystals (up to 5 cm long) showing good cleavage, at the property of Eastern Metals Corporation Limited, Rolette Township, Montmagny County. This occurrence is unusual in that millerite is generally found in slender hair-like crystals or in very small masses replacing other minerals (J. Beland, 1957: Que. Dept. Mines, Geol. Rept., 76, p. 38).

31 H/1
31 H/2 The National Mineral Collection contains specimens of millerite from Sutton, Brome County.

31 H/8 Millerite, as small grains and prismatic crystals associated with chromiferous garnet, is found disseminated through calcite in a vein on lot 6, range XII, Orford Township, Sherbrooke County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 738).

32 D/8 Millerite, pentlandite and pyrite are the main sulphide minerals at the No. 2 mine of Marbridge Mines Limited in LaMotte Township, lots 9 to 13, range V, about 22.5 km north of Malartic. Single crystals of millerite up to 15 cm in diameter have been found. Electron microprobe analysis by J. Rucklidge: Ni 64.03, Fe 1.20, Co 0.03, S 34.73, total 99.99 (R. Buchan and J. H. Blowes, 1968: C.I.M.M. Bull. 61, p. 532).

MIMETITE

$Pb_5(AsO_4)_3Cl$

Mimetite usually occurs in globular, reniform, botryoidal, or wart-like forms. It is structurally similar to apatite and pyromorphite and grades into the latter species with substitution of phosphorus for arsenic.

Ontario

31 M/4
31 M/5 A specimen of mimetite was found at the Frontier Mine, South Lorrain Township, Timiskaming district (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 69).

Yukon

105 M/14 Mimetite occurs sparsely, associated with cerussite, in a specimen from the No. 9 vein fault, Keno Hill-Sourdough Hill area, Mayo district (X-ray Laboratory, Geol. Surv. Can.).

106 D/4 Mimetite was identified by X-ray diffraction pattern as a minor constituent of a gold placer deposit at Dublin Gulch, Mayo district (X-ray Laboratory, Geol. Surv. Can.).

MINNESOTAITE

$Fe_3Si_4O_{10}(OH)_2$

British Columbia

82 F/10 Chemical analysis of minnesotaite from the Bluebell Mine at Riondel: SiO_2 51.47, FeO 30.50, Fe_2O_3 3.23, Al_2O_3 1.57, CaO 0.00, MgO 5.10, H_2O^+ 5.88, H_2O^- 0.16, MnO 1.83, total 99.74 (Guy Perrault and Paul Hébert, 1968: Can Mineralogist, 9, p. 579).

Quebec

23 J Minnesotaite has been identified from the Knob Lake iron deposits by X-ray powder pattern (X-ray Laboratory, Geol. Surv. Can.); also from Howell's River (E.W. Nuffield and D.H. Gorman, 1960: private communication).

32 I/14 Minnesotaite has been found with stilphomelane in slate near Trout Point, Lake Albanel area, Mistassini Territory (L.N. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 22)

MIRABILITE

$Na_2SO_4.10H_2O$

Mirabilite, also known as Glauber salt, occurs as a deposit from saline lakes, playas and springs, and as an efflorescence on alkalic soils and shales.

British Columbia

94 A/2 Mirabilite occurs as an efflorescence with epsomite on cliffs of shale at Fort St. John, Peace River, Omineca mining division (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 47T).

Nova Scotia

21 A/16 Mirabilite was found associated with gypsum at the Clifton gypsum quarry, near Windsor, Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 47T).

21 H/1 Mirabilite occurs with rock salt, calcspar, aragonite, carbonate and iron oxide at the McDonald and Allison quarries at Avondale, Hants County (W.F. Jennison, 1910: Can. Dept. Mines, Mines Br., 84, p. 150).

MISERITE

$(Ca,K,Na,Al,RE)_3SiO$

Quebec

31 L/16 The rare silicate miserite is closely associated with hornblende, eudialyte and scapolite in a carbonatite vein exposed along the Kipawa River near Sairs Lake in Temiskamingue County. Chemical and electron microprobe analyses: SiO_2 50.05, 50.20; CaO 30.99, 33.4; K_2O 4.81, 6.65; Na_2O 0.84, 0.79; MgO 0.25, nd; MnO 0.50, 0.35; FeO 0.12, 0.16, Al_2O_3 0.60, nd; Y_2O_3 4.96, 2.53; La_2O_3 0.59, 0.50; CeO_2 1.00, 1.20; Pr_6O_{11} 0.21, 0.25; Nd_2O_3 0.86, 1.20; EuO 0.04, nd; Dy_2O_3 0.58, 0.70; Er_2O_3 0.31, nd; Tm_2O_3 0.03, nd; Yb_2O_3 0.47, nd; Lu_2O_3 0.04, nd; loss on ignition 1.15, totals 98.50, 99.08 (L.G. Berry, Hsi-che Lin and G.C. Davis, 1972: Can. Mineralogist, 11, p. 569).

MOLYBDENITE

MoS_2

Molybdenite is the only primary mineral of molybdenum known in nature and it occurs as an accessory mineral in certain granites, pegmatites, and aplites. It is also common as a vein mineral, associated with scheelite, wolframite, topaz, and fluorite, and in contact metamorphic deposits with lime-silicates, scheelite and chalcopyrite. Molybdenum is widely used in the chemical and metal (chiefly steel) industries, and molybdenite, as its principle ore mineral, is therefore important economically. As molybdenite is widely distributed throughout Canada, only a few typical occurrences are noted here. For a detailed listing of molybdenite occurrences see: F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser. 20.

Two polytypes of MoS_2 are known to occur in nature. They are identical in appearance but have different crystal structures. The common form, molybdenite-2H, has hexagonal symmetry and the second polytype, molybdenite-3R has rhombohedral symmetry. They are readily distinguished by their X-ray powder patterns.

British Columbia

82 F/4 Molybdenite occurs in a fine-grained massive form and as scaly aggregates in masses or veinlets, in the Rossland area (C.W. Drysdale, 1936: Geol. Surv. Can., Paper 36-20, p.8).

82 M/1 Molybdenite concentrates are produced at the Mount Copeland Mine 24.1 km northwest of Revelstoke at 51 08'N, 118 29'W. It may be reached by a 32 km gravel road which leaves the Trans-Canada Highway 3.2 km west of Revelstoke (E. Sadar, 1970: B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1970, p. 464).

82 M/8 Replacement bodies of molybdenite, pyrrhotite and pyrite disseminated in siliceous rock occur in schist on the Sterling property a few km north of Mars Creek. The same three minerals occur in a quartz vein on the Hard Pan occurrence a short distance north of the Sterling showings (J. O. Wheeler, 1965: Geol. Surv. Can., Paper 64-32, p. 34).

92 H/16 Molybdenite and chalcopyrite occur as fracture fillings in a quartz diorite host at the Brenda Mine, a major producer at 49 53'N, 120 00.5'W, 2.4 km southeast of Brenda Lake (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 126).

92 I/6 The main ore minerals at the Lornex Mine are chalcopyrite, bornite and molybdenite. The mine is at 50 27'N, 121 03'W, 42 km southeast of Ashcroft on the southern slope of Highland Valley (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1974, p. 135).

92 I/12 The Index property, west of the north fork of Texas Creek, Ashcroft area, contains high grade molybdenite ore in which molybdenite occurs in clusters up to 30 cm in width; and low grade ore, in which the molybdenite occurs as rosettes and flakes, uniformly distributed throughout a granitic gangue (C.W. Drysdale, 1971: Geol. Surv. Can., Sum. Rept. for 1916, pp. 44-63) (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20 p. 267).

92 P/9 Molybdenite showings are reported on the west side of Clearwater River 9.6 km north of Clearwater, and from Sands Creek, a small stream flowing into Clearwater River about 3.2 km north

of Clearwater Station. (R.B. Campbell and H.W. Tipper, 1971: Geol. Surv. Can., Memoir 363, p. 84).

Molybdenite occurs in pegmatite and quartz veins and lenses in an alkali-granite stock northeast of Tintlhohtan Lake, 19.3 km northwest of Little Fort in the North Thompson River valley. (R.B. Campbell and H.W. Tipper, 1971: Geol. Surv. Can., Memoir 363, p. 85).

93 A/2 Molybdenite in bladed aggregates up to 12 mm in diameter is reported at Boss (or Big Timothy) Mountain, Cariboo area. The molybdenite occurs in a series of en echelon quartz veins on the east side of the mountain (L. Reinecke, 1920: Geol. Surv. Can., Mem. 118, p. 91) (F.M. Vokes, 1963: Geol. Surv. can., Econ. Geol. Ser., 20, p. 246).

93 K/3 The Endako Mine located at 54°02'N, 125°06.5'W, north of the east end of Francois Lake accounted for about half of Canada's total production of molybdenite in 1976. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1976).

93 L/14 Molybdenite, scheelite-powellite, wolframite and chalcopyrite occur in quartz vein sheetings and stockworks cutting volcanic rocks in Glacier Gulch at 900 m to 1200 m elevation on the east side of Hudson Bay Mountain, 8 km northwest of Smithers (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 419).

103 P/6 The British Columbia Molybdenum Mine, a major producer of molybdenite, is located at 55°25'N, 129°25.5'W, on Patsy Creek, the east fork of Lime Creek, 8 km southeast of the head of Alice Arm inlet at an elevation of 600 m. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 94).

104 G/7 Chalcopyrite and molybdenite are the ore minerals at the Liard copper deposit in Triassic volcanics near the eastern contact of the Hickman batholith at about 57°22'N,130°59'W. (J.G. Souther, 1972: Geol. Surv. Can., Paper 71-44, p. 24).

104 K/7 Rosettes of coarse grained molybdenite up to 15 cm across have formed along the selvages of quartz veins on the Elaine claims south of Trapper Lake at about 58°19'N, 132°38'W. (J.G. Souther, 1971; Geol. Surv. Can., Memoir 362, p. 56).

104 N/11 Molybdenite is found as rosettes up to 2.5 cm in diameter that occur in clusters in otherwise barren quartz veins at the Adera property of Adanac Mining and Exploration Limited at 57°42.5'N, 133°24'W, on upper Ruby Creek some 33.6 km by road from Atlin via Pine Creek and Surprise Lake. (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1969, p. 29).

Manitoba

52 E/11
52 E/12 Molybdenite is found in township 9, range 16, just north of Falcon Lake. It occurs as crystals of varying sizes, up to 7 cm in diameter in pegmatite dykes, or as small hexagonal plates, in granitic dykes. Large clusters of radiating crystals weighing as much as 9 kg were cobbed from pegmatites (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 66).

52 L/5 Molybdenite is a minor constituent of the lithium-cesium ore at Bernic Lake (R. Brinsmead, 1960: Precambrian, vol. 33, no. 8, p. 25).

New Brunswick

21 G/7 Molybdenite occurs with tin mineralization at Mount Pleasant in Charlotte County (A.A. Ruitenberg, 1963: M.Sc. thesis, Univ. of New Brunswick).

21 G/8 Wolframite and molybdenite are found together at Square Lake, in Queen's County (J.C. Smith, 1960: New Brunswick Mines Br.).

21 G/14 Molybdenite occurs in quartz veins at Dumfries in York County (W.J. Wright, 1940: New Brunswick Mines Br., Paper 40-2).

21 J/3 Quartz veins containing molybdenite, chalcopyrite, and pyrite outcrop at Springfield in York County (W. L. Goodwin, 1928: Geol. and Minerals, of New Brunswick, 1st ed., Ind. Ed. Pub., Co., Gardenvale, Que.).

21 J/10 Some of the quartz veins in the vincinity of the confluence of Burnthill Brook and the main Southwest Miramichi River (Stanley Parish, York County) contain molybdenite. The molybdenite is foliated and is associated with quartz, muscovite, brown mica, feldspar, topaz, fluorite, wolframite, pyrrhotite, chalcopyrite and cassiterite (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 218).

Molybdenite occurs in quartz veins with wolframite at McKeil Lake; in sedimentary rocks at Sisters Brook; and in quartz monzonite at Rocky Brook; all in York County (W.H. Poole, 1960: Geol. Surv. Can., Paper 60-15).

21 P/12 Flakes and crystals of molybdenite, accompanied by beryl, are disseminated in a pinkish fine-grained Devonian granite at Pigeon (Pabineau) Lake, 15.3 km southwest of Bathurst, Gloucester County (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 215). Molybdenite occurs with Cu, Pb, and Zn mineralization, at Beresford Mines in Gloucester County (G.S. MaKenzie, 1951: New Brunswick Mines Br., Rept.). It also occurs in a contact zone on the Sturgeon River property at Nicholas Denys in Gloucester County (M.Tauchid, 1964: Geol. Surv. Can., Paper 64-31).

21 P/13 Molybdenite is found in quartz veins at Antinouri Lake, in Restigouche County (F.M. Vokes, 1963: Geol Surv. Can., Econ. Geol. Ser., 20).

Northwest Territories

55 K/2 Veinlets of massive molybdenite, 2.5 cm wide, are associated with aplite dykes on claims that extend north from Whale Cove along the peninsula to east of the mouth of Wilson Bay (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 26; Dept. Indian and Northern Affairs).

55 K/6 A granodiorite north of Whiterock Lake is cut by narrow quartz veins containing chalcopyrite, chalcocite, galena and molybdenite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 30; Dept. Indian and Northern Affairs).

56 D/11 Molybdenite showings are reported south of Tehek Lake at about 64°36'N, 95°26'W (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Volume 2, p. 80; Dept, Indian and Northern Affairs).

85 I Most of the reported occurrences of molybdenite in the Northwest Territories are concentrated in

an area northeast of Yellowknife between North Arm and McLeod Bay of Great Slave Lake (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 61).

85 J/8 Molybdenite-3R, a rare polytype of molybdenite has been identified as an accessory mineral in quartz-feldspar porphyry occurring at the Con Mine, Yellowknife district. This was the first reported occurrence of this polytype in nature (R.J. Traill, 1964: Can. Mineralogist, 7, pp. 524-526).

Nova Scotia

11 F/16 A specimen of foliated molybdenite from Cape Breton County, 3.2 km west of Mineral Spring Brook has been donated to the National Mineral Collection.

20 P/14 Molybdenite is associated with pale green beryl, colourless, pale pink and smoky quartz, black tourmaline and pale green apatite crystals in a quartz vein cutting biotite quartzite exposed in trenches on top of a hill about 5.8 km north of Jordan Falls, Shelbourne County, along the Lake John road (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 83).

Ontario

31 C/7 A specimen of crystallized molybdenite from Enterprise (village), Camden Township, Lennox and Addington County, has been donated to the National Mineral Collection.

31 F/6 At the old Jamieson Mine on lot 5, conc. VIII, Lyndoch Township, molybdenite is associated with pyrite and pyrrhotite in pegmatite dykes and along gneiss-limestone contacts (D.F. Hewitt, 1953: Ont. Dept. Mines, Ann. Rept., vol. 62, Pt. V, p. 73) (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 166).

Molybdenite associated with diopside, pyrrhotite, and scapolite occurs in large quantities on lots 30 and 31, conc. IV, Griffith Township. A specimen is included in the National Mineral Collection.

31 M/4 Rosettes of molybdenite up to 1 cm in diameter occur in quartz at an old mine on the west shore of Net Lake about 450 m from Highway 11 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 7).

32 D/4 Coarse flakes and crystals of molybdenite occur with pyrite and chalcopyrite in quartz at a deposit in Boston Township. Access to the property is by single-lane road north of Highway 564, 600m from its intersection with Highway 112 (Ann P. Sabina, 1974: Geol. Surv. Can.,Paper 73-30, p. 10).

41 P/15 Molybdenite and chalcopyrite were the ore minerals at the Ryan Lake Mine, a former producer of molybdenum, copper, silver and gold. The mine is on the west side of Highway 566, 6.6 km from Matachewan (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 105).

52 A/10 Crystals of molybdenite up to 13 cm in diameter occur in quartz stringers and in pegmatites at Loon Lake. Access to the property is by a 4.4 km road leading north from the East Loon road just east of the point where Anderson Creek enters Loon Lake. The East Loon road leaves Highway 17 at 6.8 km southwest of Pearl (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 25).

52 F/16 Well-formed crystals of molybdenite occur in pegmatite on the Pidgeon property near the east end of Lateral Lake. Access is by a road, 10.1 km long, leading west from Highway 72 at a point 32 km north of Dinorwic (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 39).

52 H/9 Molybdenite-bearing quartz veins are present at the No. 3 Vein on the Tyson properties in Dorothea Township, 2.6 km east of Bish Bay, Lake Nipigon. Spectacular masses of molybdenite up to 20 by 25 cm have been found (W.O. Mackasey, 1975: Ont. Div. Mines, GR 122, p. 71).

Quebec

21 E/10 Fine flaky masses of molybdenite are associated with massive galena, sphalerite, chalcopyrite, pyrite and dull black marcasite in quartz and feldspar on the farm of Joseph Grégoire, about 800 m from Ste-Cécile Station (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 43).

21 E/15 At the Copperstream-Frontenac mine, Mount St-Sébastien, molybdenite occurs as fine, flaky masses in quartz, associated with chalcopyrite, pyrite and pyrrhotite. Pockets of coarse molybdenite have been found in the quartz (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 41).

21 L/7 Molybdenite flakes and small flaky masses occur in quartz on the farm of François Jacques, located just north of the bridge over the des Plantes River on the east side of Highway 23 (Ann P. Sabina 1967: Geol. Surv. Can., Paper 66-51, p. 62).

22 A/13 Molybdenite is a minor constituent of the Needle Mountain and Copper Mountain deposits of Gaspé Copper Mines Limited at Murdochville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81).

31 F/9 Lots 9 and 10, range VII, Onslow Township, is the site of the Moss Mine which was the world's leading producer of molybdenite between 1916 and 1918, but which has not been worked since 1944. The ore at this mine consists of feldspar and quartz in which pyrite, pyrrhotite, red fluorite, magnetite and molybdenite occur partly in disseminated form and partly in aggregates or zones (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 186).

31 F/9 Scattered flakes, crystals, and pockets of molybdenite disseminated in a matrix of pyroxene, tremolite and phlogopite are to be found on lots 1, 2, and 3, range III and IV, Aldfield Township (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 171).

31 H/11 Both the 3R and 6H polymorphs of molybdenite have been identified in inclusions of greyish green hornfels in nepheline syenite at the Desourdy Quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

32 C/5
32 D/8 Numerous molybdenite deposits connected with the Preissac-Lacorne batholith, are to be found in Lacorne, Lamotte, Lapause, Malartic, Preissac, Feidmont and Vassan Townships, Abitibi County. The molybdenite occurs in pegmatitic quartz veins in and around the batholith (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 105).

Saskatchewan

63 L/9 The Moody prospect at Birch Lake, Amisk lake area, carries pyrite, chalcopyrite, galena, sphalerite, molybdenite and scheelite in a shear zone in a small boss of granite cut by stringers of vein quartz (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Ser., 20, p. 66).

Yukon

105 C/7 Canol Metal Mines Limited has a molybdenum property at the head of Upper Sheep Creek , 58 km south southeast of Ross River. The molybdenite showing is at the contact of a large granodiorite stock and limestone and phyllite of probable Middle and Upper Cambrian age (R.S. Skinner, 1961: Geol. Surv. Can., Paper 61-23, p. 41).

105 C/13
105 F/4 Molybdenite is associated with porphyritic intrusions on the Fox and Star claims of Boswell River Mines Limited, at 61°00'N., 133°45'W. The property is 80 km east-northeast of Whitehorse, on Slate Mountain, at the headwaters of Slate and Red Mountain creeks, two tributaries of Boswell River. Geochemical surveys have indicated molybdenum highs elsewhere in this area (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. Indian Affairs and Northern Development, p. 121).

105 F/1 Molybdenite occurs in diopside-garnet and wollastonite-garnet skarns on the Molly group of claims (Conwest Exploration Company Limited) at 61°10'N., 132°25'W., in the Quiet Lake area. The main showings are at an altitude of about 1,680 m on the south side of a small valley tributary to McNeil River. Specimens containing considerable powellite were collected from a second showing located about 1,040 m northwest of the main showing (L.H. Green and C.I. Godwin, 1964: Geol. Surv. Can., Paper 64-36, p. 45).

115 G/6 Pyrite, chalcopyrite and molybdenite with minor magnetite and specularite are associated with feldspar porphyry intrusive into sediments on the Cork claims situated at the head of Johnson Creek, a southeast flowing tributary of Tetamagouche Creek (61°23'N., 139°25'W) (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. Indian Affairs and Northern Development, p. 101).

115 G/8 Three areas of intense jointing, faulting and shearing with disseminated molybdenite, chalcopyrite, pyrrhotite and pyrite occur on property staked for the Phelps Dodge Corporation of Canada at 61°28'N, 138°10'W near the headwaters of Rockslide Creek, Alaskite Creek and an unnamed creek flowing south into the northern Gladstone Lakes, about 47 km east-northeast of Burwash Landing (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. of Indian Affairs and Northern Development, p. 105)

115 G/15
115 G/16 The 217 Max claims staked between the headwaters of Onion Creek and Rhyolite Creek (61°51'N, 138°34'W) about 80 km northeast of Burwash Landing cover a copper-molybdenum prospect in which molybdenite occurs in quartz veins and disseminations in a quartz monzonite plug, and as rosettes in quartz veins cutting quartzite (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. Indian Affairs and Northern Development, p. 106).

115 H/13
115 I/4 A porphyritic quartz diorite plug at the head of the south fork of Maloney Creek, 29 km from the confluence of Maloney Creek and the Nisling River (62 01'N, 137 54'W) has a central zone containing pyrite, chalcopyrite, molybdenite, jarosite, azurite, malachite, magnetite and hematite, and a southern zone in which pyrite with minor chalcopyrite and molybdenite is widespread (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. Indian Affairs and Northern Development, p. 77).

115 J/10
115 J/15 Diamond drilling has outlined a large, low-grade, copper-molybdenum deposit on the Casino property (62 43'N, 138 49'W) located 306 km northwest of Whitehorse in the Dawson Range. The property covers a watershed between Canadian Creek, a tributary of Britannia Creek which is a north-flowing tributary of the Donjek River. Chalcopyrite, chalcocite and molybdenite are the ore minerals (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. Indian Affairs and Northern Development, p. 57).

115 J/14 The Toni Tiger claim group lies in the Dawson Range on the Crest of a northeast trending ridge at the headwaters of the west fork of Coffee Creek (62 49'N, 139 28'W). Scheelite, molybdenite and chalcopyrite occur in quartz veins, in small streaks and blebs and as disseminations in a skarn zone in metasediments within the Klotassin batholith (D.B. Craig, and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Volume 1, Dept. Indian Affairs and Northern Development, p. 40).

MOLYBDOMENITE

$PbSeO_3$

Ontario

41 N/2 Molybdomenite is found as an alteration of clausthalite at the Ranwick Uranium Mine. north of Sault Ste. Marie, near Mile 72 (Km 115) on Highway 17. It occurs as small colourless, blade-like crystals and as pale yellow rounded aggregates of fine radiating fibres (J.A. Mandarino, 1965: Can. Mineralogist, 8, p. 149).

MONAZITE

$(Ce,La)PO_4$

In addition to its major content of rare earth elements monazite usually contains about 5 per cent thorium. It is a widespread accessory mineral in granitic rocks and forms commercial concentrations in detrital sands derived from the weathering of such rocks. Monazite recovered from beach sands is the main world source of rare earth elements and thorium.

Alberta

84 I/10
84 I/14 Several pegmatites in the Fort Chipewyan area are reported to contain monazite and some uraninite and cyrtolite. The occurrences include: the Chip-Chico-Kazan-Lassie groups, 10 to 16 km north of Fort Chipewyan; the Giaque discovery at the west end of Lake Athabasca on range 6, Township 113; and the Holman occurrence in the Flett Lake area, range 7, Township 115 (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ., Geol. Ser. 16, p. 228).

British Columbia

82 F/5 Monazite is reported with fergusonite, samarskite and thorite in pegmatite 1.6 km south of the Slocan River and 0.8 km west of Crescent Valley radio station (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 234).

Manitoba

52 L/5
52 L/6 Monazite from lot 33, range 15, township 16 (Shatford Lake, Lac du Bonnet district) has been identified by the Assay Laboratory of the Ontario Department of Mines (D.A. Moddle, 1960: private communication).

52 L/6 Monazite is a rare constituent of the central of three small pegmatites on the southeastern shore of Shatford Lake. Rusty coloured platy crystals of monazite up to 2.5 cm in diameter have been found in beryl-bearing pegmatites around Greer Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 561-2).

New Brunswick

21 G/7 A wolframite concentrate containing about 15 per cent monazite and 2 per cent xenotime was produced at CANMET from a sample of ore from the Fire Tower area of the Mount Pleasant deposit. The averaged electron microprobe analysis of 7 monazite grains gave: P_2O_5 29.7, Ce_2O_3 30.6, La_2O_3 14.3, Nd_2O_3 12.8, Gd_2O_3 4.1, Y_2O_3 1.4, Sm_2O_3 2.5, Fe_2O_3 0.1, U_3O_8 0.7, ThO_2 3.6, CaO 0.5, total 100.3 (W. Petruk and D. Owens, 1975: Can., Mineralogist, 13, p. 298).

Northwest Territories

75 L/8
76 D/14 Thorium-rich monazite occurs in slightly radioactive beach placers at Yamba Lake, 306 km northeast of Yellowknife (C.S. Lord, 1951: Geol. Surv. Can., Mem. 261, p. 58).

Ontario

31 E/1 Monazite occurs sparsely in calcite at the property of Desmont Mining Corporation Limited. Stillwellite and bastnaesite are associated (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 337).

31 E/4 The mineral collection at the Royal Ontario Museum includes monazite from the Brignall Mine, lot 7, conc X, Conger Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 255).

31 F/6 A wedge-shaped crystal of monazite, about 5 cm square and 12 mm thick, and several smaller crystals have been found in reddish microcline on lot 23, conc. XV, Lyndoch Township, Renfrew County (J.Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. III, p. 98).

31 F/12 Monazite occurs on lot 9, conc. 13, Dickens Township, in a dyke of quartz and microcline. The flat, reddish brown crystals have prominent cleavage in all sections, and they are associated with euxenite and samarskite. An analysis by F.A. Genth is as follows: $(La,Di)_2O_3$ 34.63, P_2O_5 27.89, Ce_2O_3 22.63, ThO_2 7.32, SiO_2 1.54, $(Yt,Er)_2O_3$ 4.66, U_3O_8 0.32, PbO 0.33, CaO 0.35, MgO 0.02, Fe_2O_3 0.08, Al_2O_3 0.10, H_2O 0.40, total 100.27; S.G. 5.270 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 192 and H.V. Ellsworth, 1932: Am. Mineralogist, 17, p. 19).

An occurrence of monazite in granitic pegmatite has been reported in conc. V, Dickens Township (D.F. Hewitt, 1960: private communication).

31 F/12 A specimen of monazite from the property of Canadian Flint and Spar Company on lot 27, conc. V. Dickens Township is included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 255).

41 H/14 Showings of monazite in granite pegmatite are reported on Philip Edward Island in Carlyle Township (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Min. Rept., 21, p. 65).

41 J/10 Monazite from township 1-A, 1.6 km west of Tenfish Lake, Algoma district, has been identified in the provincial Assay Laboratories. A rock sample from this locality was estimated to contain 75 per cent granular hematite and 5 to 10 per cent granular monazite in a silica matrix (D.A. Moddle, 1960: private communication).

42 I/4 Monazite has been identified at a property of Moneta Porcupine Mines Limited, also known as the Mosher discovery at Otter Rapids on the east shore of Abitibi River in Pitt Township (A. H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 276).

52 E/16 A pegmatite on the Cameron property, 3.2 km east of the south end of Vermilion Lake and about 24 km north of Kenora contains monazite and uraninite (A.H. Lang: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 118).

52 F/13 Uraniferous pegmatite has been described to the west and north of Richard Lake in MacNicol Township. Minerals identified on the property include uraninite, uranothorite, monazite, allanite, kasolite, uranophane and beta-uranophane (A.P. Pryslak, 1976: Ont. Div. Mines, GR130, p. 43,45).

Quebec

21 M/16 At the Lac du Pied-des-Monts Mine, Small amber-coloured monazite crystals occur sparingly in a pegmatite dyke cutting hornblende gneiss. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 97)

31 F/9 A pegmatite containing monazite and allanite is reported in Thorne Township, lot 19, range 2 (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 292).

31 F/15 Monazite, uranothorite and uranoan thorianite were found in calcite on lots 29 and 30, range VII, Grand Calumet Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 31).

31 F/15 Uranian thorianite, monazite and thorite were found at the Soma Duvernay deposit on lots 25 to 38, range 4, Huddersfield Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 288).

31 G/8 Monazite is reported with pyrochlore at the Bouscadillac deposit and with uraninite, betafite and pyrochlore-microlite at the Quebec Columbium deposit in the Oka district, Deux Montagnes County (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv, Can., Econ. Geol. Ser. 16, 2nd ed., p. 290, 291).

31 G/11 Monazite occurs sparingly at the Pedneaud Quarry near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 21).

31 G/13 Pegmatite dykes at the Villeneuve Mica Mine, lot 31, range I, Villeneuve Township, Papineau County, contain monazite, with uraninite, mica, tourmaline, spessartine, apatite, zircon, fluorite, beryl, and cerite. An analysis by F.A. Genth is as follows: SiO_2 0.91, Fe_2O_3 1.07, CaO 1.54, ThO_2 12.60, Ce_2O_3 24.80, $(La,Di)_2O_3$ 26.41, $(Yt,Er)_2O_3$ 4.76, P_2O_5 26.86, MgO 0.04, H_2O 0.78, total 99.77 (W.G. Miller and C.W. Knight, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 316) (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 244).

31 I/15 An occurrence of monazite in pegmatite is reported on lots 30-33, range 1, Mekinac Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 290).

31 J/7 Monazite grains have been identified in garnetiferous pegmatite at the McLean-McNicoll property on the west bank of the Rouge River about 800 m southeast of Labelle (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 61).

31 K/16 A uranium deposit containing monazite, allanite, thorite, uraninite, uranothorite and euxenite has been trenched about 8 km northwest of Lépine Depot in Briand Township by Copper-Uranium Limited (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 293).

Saskatchewan

63 L/15 Monazite and columbite-tantalite are reported to occur sparsely with beryl crystals in pink pegmatites at several localities near Birch Portage Indian Reservation. The occurrences extend along the west shore of the Sturgeon-Weir River for about 3.2 km north of Birch Rapids and also about 10.4 km north of the rapids (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 20).

73 P/1 Monazite occurs at Lac La Ronge, in association with uraninite (R.B. Ford, 1955: Econ. Geol., 50, p. 200).

73 P/1 Dark brown crystals of monazite up to 1 cm long occur with uraninite at the Lee Lake (Jahala) deposit on a hill facing the northeastern end of Lee Lake at 55°12'N, 104°17'W, east of Lac La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 10).

74 N/9 A radioactive deposit on the north bank of the Oldman River between Forget and McKay Lakes consists of scattered monazite and minor uraninite in biotite gneiss (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 40).

74 N/9 Monazite, allanite and cyrtolite have been found in pegmatite on the Chris-June claims of Minifee Uranium Mines Limited at Charlot Lake in the Beaverlodge Lake area (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 298).

74 N/10 Crystals of monazite up to 3 mm across occur with uraninite and thorite in feldspar, quartz and biotite pegmatitic or vein deposits near Gatzke Lake (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 31).

74 O/7 Monazite is reported at Bulyea River in the Grease Bay area of Lake Athabasca (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 297).

74 P/5 A sample collected near Fond-du-Lac River about 0.8 km west of Stony Rapids was found to contain monazite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 109).

MONTBRAYITE

Au_2Te_3

Quebec

32 D/6 This telluride mineral occurs at the Robb-Montbray Mine, Montbray Township, in association with altaite, tellurbismuth, frohbergite, melonite, petzite, chalcopyrite, pyrite, marcasite, sphalerite, chalcocite, covellite, and free gold. An analysis by Williams gave the following results: Au 44.32, Ag 0.55, Pb 1.61, Bi 2.81, Sb 0.90, Te 49.80, total 99.99 (M.A. Peacock and R.M. Thompson, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 345). An electron probe microanalysis of montbrayite from the Robb Montbray property confirmed the presence of small amounts of Bi, Pb and Sb, previously ascribed to impurities: Au 47.7, Ag 0.6, Sb 0.3, Pb 1.3, Bi 2.9, Te 47.0, total 99.8 (J. Rucklidge, 1969: Can Mineralogist, 9. p. 709-716).

montebrasite

(see AMBLYGONITE)

MONTICELLITE

$CaMgSiO_4$

Monticellite, an orthorhombic mineral structurally similar to olivine develops during progressive metamorphism of siliceous dolomites, in skarn zones, and as a rare consituent in ultrabasic rocks.

British Columbia

114 P/10 White monticellite is a constituent of skarn zones containing copper-silver and lead-zinc mineralization on Mineral Mountain and on Copper Butte, located northwest and north, respectively of the hairpin turn at Mile 52 (83.5 km), Haines Road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

Northwest Territories

58 D/11 Monticellite is present in variable quantities up to 50 per cent in the groundmass of kimberlite at the Elwin Bay diatreme about 1 km south of Elwin Bay at the eastern margin of Somerset Island. Representative electron microprobe analyses of the monticellite are as follows:

	(1)	(2)	(3)	(4)	(5)
SiO_2	35.70	36.83	36.65	36.84	36.64
FeO	3.09	3.73	5.67	6.41	7.47
MgO	24.71	24.09	24.11	23.07	22.50
CaO	34.77	34.06	33.06	32.04	32.11
Total	100.07	98.71	99.49	98.36	98.72

(R.H. Mitchell, 1978: Am. Mineralogist, 63, p. 47)

Ontario

31 F/4 Colourless and greenish to yellowish grey transparent grains of monticellite are associated with diopside, serpentine and mica in a tactite zone exposed on the east side of the York River 320 m north of Highway 500 at a point 11 km east of Bancroft (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p.337).

Quebec

31 G/8
31 G/9 Medium - to coarse-grained monticellite-calcite rock forms the core of the northern ring of the Oka Complex, located 32 km west of Montreal on the north shore of Lake of Two Mountains. The monticellite occurs as euhedral tabular prisms 0.1 mm to 5 cm long and may be altered to a blue serpentine-like mineral. Chemical analysis by H. Ulk: SiO_2 33.32, Al_2O_3 2.55, Fe_2O_3 0.92, FeO 6.25, MnO 2.87, MgO 21.50, CaO 32.14, Na_2O 0.16, P_2O_5 0.04, H_2O^+ 0.09, H_2O^- 0.01, CO_2 0.20, SrO 0.02, total 100.07, S.G. 3.173 (D.P. Gold 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

MONTMORILLONITE

$(Na,Ca)_{0.33}(Al,Mg)_2Si_4O_{10}(OH)_2.nH_2O$

British Columbia

92 I/2 Montmorillonite associated with cristobalite occurs in a bentonite which outcrops at Quilchena near Merritt in the Kamloops district. Chemical analysis after sodium saturation: SiO_2 71.60, Al_2O_3 15.75, Fe_2O_3 3.78, TiO_2 0.24, MnO tr., P_2O_5 0.04, CaO 0.07, MgO 0.97, Na_2O 1.88, K_2O 0.09, H_2O 5.34, total 99.76. Soluble SiO_2 29.90, soluble Al_2O_3 0.68 (J.W. Earley, B.B. Osthaus, and I.H. Milne, 1953: Am.Mineralogist, 38, p. 707).

Nova Scotia

11 F/14 Red to green to greensih white montmorillonite occurs in the Blue Mills area of Cape Breton (X-ray Laboratory, Geol. Surv. Can.,)

MOORHOUSEITE

$CoSO_4.6H_2O$

Nova Scotia

21 H/1 Moorhouseite is a new mineral species (1965) found at the Magnet Cove Barium Corporation Mine about 4 km southwest of Walton. It is closely associated with the tetrahydrate, aplowite. XRF analysis showed the mineral to be a nickeliferous-manganiferous variety having the following cation atomic ratios Co:Ni:Mn:Cu:Fe:Zn = 100:45:21:9:6:1. The name is for W.W. Moorhouse former Professor of Geology, University of Toronto (J.L. Jambor and R.W. Boyle, 1965: Can. Mineralogist, 8, p. 166-171).

MORDENITE

near $(Na_2,K_2,Ca)Al_2S_{10}O_{24}.7H_2O$

The name is after the locality near Morden, Kings County, Nova Scotia, where the mineral was first described. Synonyms included ptilolite, flokite, arduinite and ashtonite. Mordenite has been found in veins and amygdules in igneous rocks; also as a hydration product of volcanic glasses and as an authigenic mineral in sedimentary rock.

British Columbia

82 E/5 Ashtonite (mordenite) occurs as small radiating masses in basalt, near Penticton. Chemical analysis is as follows: SiO_2 63.30, Al_2O_3 11.74, Fe_2O_3 0.50, CaO 9.54, MgO 0.39, Na_2O 3.28, K_2O 0.42, BaO 0.21, H_2O 10.42, total 99.80 (E. Poitevin, 1932: Am. Mineralogist, 17, p. 120). Chemical analysis of ashtonite from the type locality: SiO_2 63.92, Al_2O_3 11.37, CaO 4.66, SrO 1.27, Na_2O 2.60, K_2O 0.46, H_2O 14.56, CO 1.28, total 100.12. The analysis and X-ray diffraction data confirmed that ashtonite is strontian mordenite (A. Reay and D.S. Coombs, 1971: Min. Mag., 38, p. 383).

Nova Scotia

21 A/12
21 A/13
21 A/14
21 H/1
21 H/2
21 H/3
21 H/8 Mordenite forms radiating masses of fibres with silky lustre at localities near Morden, Kings County, and Margaretsville, Annapolis County, and occurs as beach pebbles and in amydules in basalt along the Bay of Fundy shore from Harbourville to Chute Cove. An analysis by How of a specimen from Margaretsville is as follows:

SiO_2 67.08, Al_2O_3 11.85, Fe_2O_3 0.31, CaO 1.56, Na_2O 4.74, K_2O 2.08, H_2O 12.84, total 100.46, S.G. 2.148. Partial analysis of a specimen collected 1.6 km east of Morden: SiO_2 66.70, Al_2O_3 10.25, Fe_2O_3 0.25, CaO 3.36, MgO 0.16, H_2O 10.86, total 91.58, S.G. 2.193 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 59) (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 17).

21 H/1 Mordenite is of rare occurrence at Woodworth (Bennett) Bay, about 5 km east of Baxter's Harbour, Kings County. Other minerals present include: chalcedony, jasper, thomsonite, heulandite, analcime and stilbite (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 64).

21 H/2 An analysis by How of mordenite from Morden, Kings County, is as follows: SiO_2 68.40, Al_2O_3 12.77, CaO 3.46, Na_2O 2.35, H_2O 13.02, total 100.00, S.G. 2.08 (H. How, 1864: J. Chem. Soc., 11, p. 100).

21 H/2 Mordenite was found as radiating masses in blocks of reddish basalt in the vicinity of Hall's Harbour, Kings County. An analysis by E.W. Todd gave the following results: SiO_2 67.18, Al_2O_3 12.36, Fe_2O_3 0.24, CaO 3.42, Na_2O 3.34, K_2O 0.47, H_2O 13.23, total 100.24, S.G. 2.125 (T.L. Walker and A.L. Parsons, 1923: Univ.Toronto Stud., Geol. Ser., 16, p. 10).

21 H/2 Mordenite nodules up to 4 cm across, generally coated with a soft green mica mineral occur at Chipman Brook, Canada Creek and Black Rock in Kings County. Other zeolites include: stilbite, heulandite, laumonite, mesolite, apophyllite, prehnite and gyrolite. Large nodules of mordenite and abundant stilbite, heulandite and analcime are found at Morden, Kings County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 66-9).

21 H/8 Mordenite has been found embedded in red clay in cavities in trap at Cape Split, Kings County (G.C. Hoffmann, 1889-90: Geol. Surv. Can., Ann. Rept., IV, p. 60T).

Quebec

22 B/2 Mordenite, as greyish white, fine, fibrous aggregates, occupies cavities in volcanic rock in a quarry on the south side of a low ridge

facing Highway 6 about 800 m west of the junction road to Cross Point (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 66-51, p. 100).

31 H/12 Mordenite is rare at the lower level of the Francon quarry on Montreal Island. It occurs as very fine white matted fibres on dolomite crystals in vugs (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 17).

MORENOSITE

$NiSO_4.7H_2O$

This apple green, orthorhombic mineral occurs as efflorescent crusts of indistinct crystals and fibres formed by the oxidation of nickel bearing sulphides. Pure material dehydrates to retgersite ($NiSO_4.6H_2O$) but a tetrahydrate may be formed if significant amounts of iron are present in substitution for the nickel.

Ontario

41 I/4 Morenosite was observed by Hunt as an efflorescence of minute acicular, greenish white crystals on the nickel ores at the Wallace Mine, Bay of Islands, Lake Huron (G.C. Hoffmann, 1889-90: Geol. Surv. Can., Ann. Rept., IV, p. 48T).

41 I/6 Morenosite is reported to occur as a greenish white and pale apple green incrustation (a) on associated gersdorffite, niccolite, chalcopyrite, and pyrrhotite at the O'Connor claim on lot 12, conc. III, Denison Township; and (b) on nickeliferous ore at the Worthington mine on lot 2, conc. II, in Drury Township (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 27R). Partial analysis of the latter material by G.R. Lachance and J.L. Jambor yielded: FeO 17.3, NiO 13.0, and CoO 0.4, and the X-ray powder pattern of the tetrahydrate (X-ray Laboratory, Geol. Surv. Can.).

41 I/6 A specimen of morenosite from the Creighton Mine, lot 10, conc. I, Snider Township is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 256).

41 I/11 The mineral collection at the Royal Ontario Museum includes morenosite from the Murray Mine, lot 11, conc. V, McKim Township (J. Satterly, 1977, Ont. Geol. Surv., MP70, p. 256).

42 A/10 Morenosite has been found at the Alexo Mine, located on the township base line between Dundonald and Cochrane townships (M.B. Baker, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 258).

Quebec

32 D/8 Morenosite and retgersite occur together as alteration products of ore at the Marbridge Mine on lot 9, range 5, LaMotte Township. (R.C. Stavely, 1976: Mineralogical Record, 7, p. 174.)

MOSANDRITE

$NaCa_6Ce_2(Ti,Zr)_2Si_7O_{24}(OH,F)_7$

Quebec

31 L/16 Mosandrite is reported to occur with rinkite, eudialyte, vlasovite, britholite, miserite and agrellite in pyroxenite-amphibolite rocks in an alkalic complex, on the Kipawa River at 46°47'49"N, 78°29'31"W, Villedieu Township (H.M. Aarden and J.Gittins, 1974: Can Mineralogist, 12, p. 241).

MUSCOVITE

$KAl_3Si_3O_{10}(OH)_2$

Muscovite crystallizes in several polymorphic forms, but by far the most common structure is a two-layered monoclinic cell referred to as the $2M_1$ structure. X-ray data for the various muscovite polymorphs are given by Smith and Yoder, 1956: Mineral Mag., 31, p. 209. Chromian muscovites are generally called fuchsite or mariposite, and sericite is a term used to described fine-grained white mica. Other varietal names include: damourite, margarodite, pinite, gilbertite, hydromuscovite and phengite. As muscovite is a rock-forming mineral, individual occurrences are too numerous to record.

British Columbia

82 K/2 Chemical analysis of muscovite from quartz monzonite near Fry Creek at 50°05'N., 116°51'W., by G. Bender and S. Courville: SiO_2 47.8, Al_2O_3 32.4, Fe_2O_3 2.2, FeO 0.96, MgO 0.73, K_2O 10.1, Na_2O 0.76, CaO 0.05, H_2O^+ 4.40, F 0.28, total 99.68, less O for F 0.12, total 99.56 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull, 149, p. 10).

82 N/7 Damourite is a variety of muscovite which forms in small scales and fibres, and which is often derived from the alteration of such minerals as kyanite, topaz, and corundum. Folia are not as elastic as those of ordinary muscovite but specimens usually have their pearly lustre.

An analysis by Johnston of damourite found with quartz and dolomite in the Kicking Horse Pass, is as follows: SiO_2 44.28, Al_2O_3 33.60, Fe_2O_3 0.60, MgO 3.03, K_2O 9.87, Na_2 0.40, F 0.59, Cl 0.51, H_2O 6.25, total 99.13, less O for F 0.36, total 98.77, S.G. 2.657 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 20R).

82 N/10
82 N/11 Chemical analysis by Johnston of sericite from Waitabit Creek, Golden mining division, is as follows: SiO_2 46.05, Al_2O_3 38.36, Fe_2O_3 0.97, CaO 2.40, MgO 0.47, K_2O 6.19, Na_2O 2.98, Li_2O 0.34, Cs_2O 0.03, H_2O 2.48, total 100.27 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, pp. 21, 22R).

92 O/3 Masses of fine-grained sericite containing disseminated crystals of pyrite and tetrahedrite occur at the Taylor-Windfall Mine, 19.3 km west of Taseko Lake on Battlement Creek in the Clinton mining division. This fusible sericite contains minute reddish brown grains and hair-like inclusions of rutile. Average of two analyses: SiO_2 48.37, TiO_2 0.63 Al_2O_3 36.67, MnO tr., FeO and Fe_2O_3 tr., CaO tr., MgO 0.23, K_2O 8.93, Na_2O 0.45, H_2O 4.93, F tr., total 100.21, S.G. = 2.803 (J.M. Baker, 1936-37: Univ. Toronto Stud., Geol. Ser., No. 4, 103).

92 P/9 Muscovite crystals up to 30 cm in greatest dimension occur in pegmatite dykes on Clearwater Peak in the Lillooet district (L. Reinecke, 1920: Geol. Surv. Can., Mem. 118, p. 85).

93 A/11
93 A/13 A specimen of muscovite (var. mariposite) from the Peacock Mineral claim on Duck Creek, 4 km from Keithly was donated to the National Mineral Collection in 1927 by J.D. Galloway.

104 K/12 Fuchsite is a conspicuous consituent of gold-bearing quartz-carbonate veins at the Polaris-Taku Mine on the southern slope of Whitewater Mountain on the west side of Tulsequah River about 9.6 km upstream from its mouth on Taku River (Ann P. Sabina, 1973: Geol Surv. Can., Paper 72-32, p. 61).

Manitoba

52 L/6 Flakes of fuchsite, a green chromium-bearing variety of muscovite, were found disseminated through a narrow band of quartzose rock near Lamprey Falls on the Winnipeg River. In some places, notably on the Vernon claims in the southwest part of section B. range 15, township 16, the fuchsite forms bright green schistose lenses from which it has been mined for use in stucco (J.F. Wright, 1932: Geol. Surv. Can., Mem. 169, p. 129).

52 L/6 Muscovite is found in veinlets 2.5 cm or more in width, and as rosettes up to 5 cm in diameter at the Silver Leaf Mining Syndicates Mine, on range 16, township 16. The mineral is purplish grey in colour, and has a specific gravity of 2.87. Chemical analysis is as follows: SiO_2 47.18, Al_2O_3 31.80, Fe_2O_3 0.07, FeO 0.16, CaO 0.40, MgO 0.28, Li_2O 1.06, Na_2O 2.94, K_2O 10.50, H_2O 2.40, MnO 2.05, F_2 2.15, total 100.99 (E. Poitevin, R.J.C. Fabry, and C.H. Stockwell, 1926-27: Geol. Surv. Can., Unpublished file No. 21-P-2).

52 L/6 Muscovite on the Annie mining claim, 4.8 km southeast of Lamprey Falls, is characterized by curved faces that are sometimes almost hemispherical about the c axis. There are two colour varieties - one silvery grey, and the other faint lilac. The two varieties have been analyzed by R.J.C. Fabry with the following results: grey variety - SiO_2 45.36, Al_2O_3 33.21, K_2O 11.14, FeO 2.57, Fe_2O_3 2.20, F_2 1.84, H_2O 1.41, MnO 0.90, Li_2O 0.90, CaO 0.13, MgO 0.13, Na_2O 1.14, less O for F 0.77, total 100.16; lilac variety - SiO_2 46.56, Al_2O_3 29.53, K_2O 11.01, Na_2O 2.65, MnO 2.32, F_2 3.45, H_2O 3.12, Fe_2O_3 0.12, Li_2O 1.80, FeO 0.10, CaO 0.15, MgO 0.29, Cs_2O 0.33, less O for F 1.45, total 99.98 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 155).

52 L/6 Lilac coloured muscovite occurs as a massive rock composed of minute scales on the Bear mineral claim, 4.8 km southeast of Lamprey Falls. A chemical analysis by R.J.C. Fabry is as follows: SiO_2 45.58, Al_2O_3 37.45, K_2O 10.90, H_2O 3.16, F_2 0.97, Na_2O 0.93, Li_2O 0.13, MnO 0.15, MgO 0.13, Fe_2O_3 0.16, CaO 0.28, less O for F 0.41, total 99.43, S.G. 2.85 (H.V. Ellsworth, 1932: Geol. Surv. Can. Econ. Geol. Ser., 11, p. 156).

52 L/6 Fuchsite has been described from Point du Bois, Manitoba. The analysis by Whitmore yielded: SiO_2 45.97, Al_2O_3 31.67, Fe_2O_3 2.56, Cr_2O_3 4.81, FeO 0.53, MgO 0.31, CaO 0.15, Na_2O 1.03, K_2O 9.07, H_2O^+ 3.48, H_2O^- 0.51, total 100.09 (D.R.E. Whitmore, 1946: Am. Mineralogist, 31, p. 8).

52 L/6 A rock composed of lenses of bright emerald green fuchsite in a siliceous matrix has been quarried 2.4 km southeast of Lamprey Falls in the Winnipeg River and midway between the river and a small lake to the southeast (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 52).

52 L/6 Rubidian lithian muscovite is abundant in the Tanco pegmatite at Bernic Lake. Chemical analyses by R. Hill, R. Rinaldi and K. Ramlal are as follows.

	R8	R7	REN 5	R9	R3	REN 1
SiO_2	43.20	47.80	44.85	47.50	45.25	45.75
Al_2O_3	34.36	28.64	26.64	28.64	25.90	28.84
FeO	0.32	0.06	0.05	0.03	0.07	0.08
MnO	0.07	0.20	0.38	0.22	0.21	0.42
MgO	<0.01	<0.01	0.02	<0.01	0.37	0.00
Li_2O	0.37	3.12	3.38	3.50	3.97	4.52
Na_2O	0.22	0.19	0.19	0.19	0.41	0.32
K_2O	10.12	9.98	9.43	9.45	9.12	9.00
Rb_2O	1.69	2.91	3.18	3.59	3.46	3.93
Cs_2O	0.21	0.50	0.55	0.71	0.79	0.79
F	0.64	2.73	4.75	4.08	4.18	6.10
H_2O^+	6.00	5.60	4.84	4.38	6.84	2.17
H_2O^-	0.80	0.48	1.60	0.21	0.73	3.51
	98.01	102.22	99.86	102.51	101.30	105.43
O=F	-0.27	-1.15	-2.00	-1.72	-1.76	-2.57
Total	97.74	101.07	97.86	100.79	99.54	102.86

R 3 Violet mica in small curved crystals
R 7 Massive violet lithian mica
R 8 Fine-grained green mica
R 9 Massive violet mica similar to R 7
REN 1 Curved violet mica in large columnar aggregates
REN 5 Fine-grained violet mica

(R. Rinaldi, P. Cerny and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 698)

53 N/2 A swarm of rubidium-rich dykes occurs at the northeastern end of Red Cross Lake, approximately 2.8 km northwest of the Red Sucker River. Much of the rubidium is contained in a mixture of lithian muscovite and lepidolite. Chemical analysis of this mixed mica by Courville and Abbey gave: SiO_2 49.7, TiO_2 0.04, Al_2O_3 26.87, Fe_2O_3 0.52, MnO 0.65, MgO 0.23, Li_2O 3.08, Na_2O 0.18, K_2O 7.37, Rb_2O 4.53, Cs_2O 1.00, F 4.35, H_2O 2.80, total 101.32 less O for F 1.83, total 99.49 (J.L. Jambor and R.R. Potter, 1967: Geol. Surv. Can., Paper 67-15).

Northwest Territories

75 L/4 Chemical analysis by G. Bender and S. Courville of muscovite from quartz monzonite from the south shore of Great Slave Lake at 62°01'20"N., 111°31'50"W.; SiO_2 47.6, Al_2O_3 31.8, Fe_2O_3 2.8, FeO 0.87, MgO 0.87, K_2O 10.1, Na_2O 0.76, CaO 0.35, H_2O^+ 4.10, F 0.19, total 99.54, less O for F 0.08, total 99.46 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

Nova Scotia

11 K/2 Baddeckite, a reported variety of muscovite, occurs in fine, copper red scales, scaly aggregates, and scaly layers distributed through a plastic clay located 800 m from the town of Baddeck, in Victoria County.

A chemical analysis by Johnston gave the following results: SiO_2 48.96, Al_2O_3 13.85, Fe_2O_3 25.82, CaO 1.17, MgO 2.65, K_2O 3.47, Na_2O 0.22, H_2O 3.78, total 99.92, S.G. 3.252 (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept. IX, p. 11R). Max Hey (1955: Chemical Index of Minerals, 2nd ed.)described baddeckite as a mixture of hematite and clay. This was confirmed by the X-ray Laboratory, Geol. Suv. Can., on examination of a specimen from the type locality.

Ontario

31 C/12 An occurrence of damourite has been reported on lot 14, conc. XVI, Methuen Township (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 83).

31 C/12 Diamond-shaped muscovite crystals occur at Blue Mountain, Methuen Township. Penetration twins with twin axis [310] are common. Chemical analysis by F.A. Gonyer: SiO_2 45.87, Al_2O_3 38.69, MgO 0.10, Na_2O 0.64, K_2O 10.08, H_2O 4.67, total 100.05 (C.S. Hurlbut Jr., 1956: Am. Mineralogist, 41, p. 892).

31 F/2
31 F/3 Large, pseudo-hexagonal crystals of muscovite from lot 4, conc. XI, Miller Township, have been donated to the National Mineral Collection.

31 F/3 Fuchsite from a mica schist in Matawatchan Township, Renfrew County, has been analyzed by Wait with the following results: SiO_2 43.72, Al_2O_3 35.51, Fe_2O_3 2.94, Cr_2O_3 1.26, MnO 0.26, CaO 4.46, MgO 1.36, K_2O 8.88, Na_2O 0.39, H_2O 3.68, total 102.46, S.G. 2.93 (G.C. Hoffmanm, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 21R).

31 F/4 An interesting occurrence of muscovite was found just east of the Morrison quarry, lot 10, conc. XIII, Dungannon Township. Well fromed crystals of nepheline have been altered to twisted aggregates of muscovite but have retained their original outward form (L.Moyd, 1949: Am. Mineralogist, 34, p. 748).

31 L/2 Large crystals of muscovite were found at the Purdy property lot 6, conc. II, Calvin Township. Sheets of mica measuring 2 m in diameter have been stripped from the mine, and one crystal was recorded as being 290 cm by 213 cm and nearly 90 cm thick.

Chemical analysis by Ferguson: SiO_2 45.66, Al_2O_3 31.80, Fe_2O_3 2.69, FeO 1.53, MgO 0.92, TiO_2 0.31, CaO 0.09, Na_2O 0.60, K_2O 10.34, H_2O^+ 5.32, H_2O^- 0.36, F 0.37, total 99.99, S.G. 2.84 (J.C. Browning, 1942: Can. Mining J., 63, p. 658) (R.B. Ferguson, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 31) (R.H. Jahns, 19-53: Am. Mineralogist, 38, p. 567).

32 D/4 Muscovite (var. mariposite) from a locality northwest of Fork Lake, Gauthier Township, has been identified by M.J. Buerger. This chrome-bearing, emerald green mica occurs in a rock of ankerite composition (J.E. Thomson, and A.T. Griffis, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. VIII, p. 9).

Bright green fuchsite is present in a siliceous carbonate rock in D, E, and F orebodies at the Kerr-Addison Mine, McGarry Township (J.E. Thomson, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. VII, p. 62).

32 D/4 Green fuchsite occurs in the gold deposits of the Larder Lake area, notably at the Raven River, Cheminis, Barber-Larder and Armistice mines, all of which are adjacent to Highway 66 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 32, 33, 34, 36).

32 D/5 A green talc-like mineral found in conglomerate in Morrisette Township, east of Nettie Lake, has been identified as fuchsite (D.G.H. Wright, 1921: Ont. Dept. Mines, Ann. Rept., vol 30, Pt. VI, p. 43).

41 J/1 An analysis by Cairns of chromiferous mica from Aird Island (North Channel), Algoma district, is as follows: SiO_2 45.49, Al_2O_3 31.08, Fe_2O_3 tr., Cr_2O_3 3.09, CaO 0.51, MgO 3.36, K_2O 9.76, Na_2O 0.90, H_2O 5.85, total 100.04 (A.H. Chester, 1887: Am. J. Sci., 3rd Ser. XXXIII, p. 284).

41 P/14
41 P/15 Pea green mariposite (a variety of muscovite) occurs in streaks in ferruginous dolomite on claims 8457 and 8242, Montrose and Bannockburn townships (C.H. Rickaby, 1931: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. II, p. 21).

42 A/6 A carbonate rock containing scales of chromiferous muscovite outcrops on the United Minerals property, claim M. E20 in Deloro Township (A.G. Burrows, 1924: Ont. Dept. Mines, Ann. Rept., vol 33, Pt. II, p. 54).

42 A/6 Masses of bright green fuchsite in white quartz are abundant on the dumps at the Kenilworth Mine in the Timmins area. Fuchsite has also been reported at the Dome Mine (Ann P. Sabina, 1974: Geol. Surv., Can., Paper 73-13, p. 147, 150).

42 A/7
42 A/10 Bright green fuchsite was noted in quartz on rock dumps at the Night Hawk Peninsular Mine on the shore of a peninsula at the northern end of Night Hawk Lake; at the Goldhawk Mine on the eastern tip of the south end of the peninsula; and at the Gold Island Mine on an adjacent island (Ann. P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 123, 124).

42 A/9 Mariposite from Ross Mine, Hislop Township, was analyzed by W.W. Moorhouse: (1) SiO_2 56.0, Al_2O_3 23.52, Fe_2O_3 3.30, FeO .51, TiO_2--, Cr_2O_3 0.78, MgO 2.12, CaO 0.37, K_2O 7.03, Na_2O 2.72, H_2O 3.52, total 99.87; (2) SiO_2 55.35, Al_2O_3 25.62, Fe_2O_3 0.63, FeO 0.92, TiO_2 0.18, Cr_2O_3 0.18, MgO 3.25, CaO 0.07, K_2O 9.29, Na_2O 0.12, H_2O 4.52, total 100.13 (E.S. Moore, 1936: Ont. Dept. Mines, Ann. Rept., vol. 45, p. 16).

42 A/11 Fuchsite is present at the Kidd Creek Mine 25.7 km north of Timmins. (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 139)

42 C/4 Bands of fuchsite up to 30 cm wide occur near an outcrop of sugary quartz iron-formation on the southeast shore of Michell Lake (P.E. Hopkins, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. I, p. 196).

42 E/5 Green mica crystals found in a medium-grained dyke rock from Josephine-Bartlett iron range near Parks Lake are believed to be fuchsite (E.S. Moore and H.S. Armstrong, 1946: Ont. Dept. Mines, Ann, Rept., vol. 55, Pt. IV, p. 48).

52 G/13 Fuchsite is found with native gold at the Central Manitoba Mine on Neepawa Island in the north-eastern part of Minnitaki Lake (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 39).

Quebec

21 M/16
22 C/4 Large tabular, twinned crystals of muscovite from Lac Pied des Monts, Charlevoix County, and from Little Bergeronnes, Saguenay County, have been donated to the National Mineral Collection.

31 G/13 The National Mineral Collection contains specimens of muscovite from the Villeneuve Mica Mine, lot 31, rang I, Papineau County.

31 H/1 Fuchsite occurs in magnesite in Sutton Township, Brome County (R.Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 232A).

31 H/2 Fuchsite is present in the dolomite rocks of Bolton Township, Brome County (R.Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 231A).

32 C/4
32 C/5 Small amounts of green mica, thought to be mariposite, were found on the property of Siscoe Gold Mines Limited, in Dubuisson and Vassan townships (P.E. Auger, 1947: Que. Dept. Mines, Geol. Rept., 17, p. 35).

32 C/5 Pegmatites in the Fiedmont area, Abitibi County, have quartz cores enclosed by spodumene-rich zones containing quartz and microcline, cleavelandite, lepidolite, and accessory sugary albite, beryl, spessarite, columbite, tantalite, microlite, betafite, bismuthinite, molybdenite and powellite. The spodumene is partly or completely altered to lithium-bearing mica in the form of rosettes or platy aggregates (E.W. Heinrich and A.A. Levinson, 1953: Am. Mineralogist, 38, p. 35).

32 D/1 Bright green chromian mica forms lenses and streaks in the wall rocks at the Barnat Mine on the north side of Highway 59 about 1.6 km east of Malartic (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 94).

32 D/6 Fuchsite has been reported at the Powell Rouyn gold mine situated 2.6 km west of Highway 46 from a point 2.1 km from Rouyn (Ann P. Sabina 1974: Geol. Surv. Can., Paper 73-30, p. 50).

Saskatchewan

63 L/10 Green bands of fuchsite are present in schist at the Western Nuclear Mine at Hanson Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 17).

74 N/7 Rock samples taken from 2.1 km north of Elliot Point, Milliken Lake, contain fuchsite (X-ray Laboratory, Geol. Surv. Can.).

Yukon

105 F/8 Scaly aggregates and scattered particles of muscovite (var. fuchsite) occur with chromite in the first range of mountains east of Big Salmon, below Big Salmon (formerly Island) Lake (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 15R).

116 B/3 Fuchsite has been found at the junction of Last Chance and Hunker Creek, Klondike area (X-ray Laboratory, Geol. Surv. Can.).

MUSKOXITE

hydrous Mg-Fe^{+++} oxide

Northwest Territories

86 O/3 Muskoxite is a hydrous oxide of magnesium and ferric iron of uncertain formula which occurs with serpentine in small fractures in drill cores from the Muskox intrusion. Chemical analysis by J.A. Maxwell: Fe_2O_3 41.1, FeO 0.0, MgO 35.4, H_2O 23.8, total 100.3. Muskoxite is dark reddish brown with perfect basal cleavage and it occurs typically as aggregates of intergrown minute crystals (J.L. Jambor, 1969: Am. Mineralogist, 54, pp. 684-696).

NAGYAGITE

near $Pb_5Au(Te,Sb)_4S_{5-8}$

British Columbia

82 K/11 Nagyagite occurs associated with gold on the Olive Mabel claim, Gainer Creek, Trout Lake mining division (E. Thomson, 1936: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

Ontario

52 B/10 Nagyagite, associated with sylvanite, hessite gold, galena, pyrite, chalcopyrite, and sphalerite, is found at the Huronian Mine, Moss Township (E. Thomson, 1936: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

NARSARSUKITE

$Na_2(Ti,Fe)Si_4O_{11}$

Quebec

31 H/11 Yellowish white to greyish white narsarsukite crystals are found in a hornfels collar on the east side of Mont St-Hilaire at three localities within 30 m of each other. Chemical analysis recalculated to 100 per cent after elimination of impurity albite: SiO_2 57.26, TiO_2 14.04, Al_2O_3 1.13, Fe_2O_3 5.67, FeO 0.73, MnO 1.10, MgO 1.19, CaO 1.76, Na_2O 13.50, K_2O 1.53, P_2O_5 0.50, H_2O^+ 1.57, H_2O^- 0.02 (K.C. Rajasekaran, 1966: Can. Mineralogist, 8, pp. 506-514). Narsarsukite occurs as tabular crystals in inclusions in nepheline syenite. It is usually found associated with quartz and sometimes with leucosphenite. Chemical analysis: SiO_2 62.11, TiO_2 16.99, Al_2O_3 0.2, MnO_2 0.02, CaO 0.46, Na_2O 15.20, K_2O 0.1, P_2O_5 0.20, H_2O^+ 0.17, F_2 0.76, Fe 2.25, total 98.46 (G.Y. Chao, 1967: Can. Mineralogist, 9, pp. 286-7).

NATROALUNITE

$NaAl_3(SO_4)(OH)_6$

British Columbia

92 L/3 Natroalunite occurs with pyrophyllite at the Morris deposit at Easy Inlet on the west side of Kashuti Inlet at 50°08'N, 127°18'W (J.E. Muller, K.E. Northcote and D. Carlisle, 1974: Geol. Surv. Can., Paper 74-8, p. 57).

NATROLITE

$Na_2Al_2Si_3O_{10}.2H_2O$

Natrolite occurs in association with other zeolites in cavities in basalts and is sometimes present in igneous rocks as a very late crystallization product, or as an alteration product of nepheline. Like other zeolites it exhibits the property of cation exchange and may lose its water without loss of crystal structure. Natrolite is very similar in chemical composition and appearance to scolecite and mesolite, but is an independent species.

British Columbia

82 E/5 Zeolites are abundant along the north side of Yellow Lake about 14 km west of Okanagan Falls. They occur as nodules up to 7 cm in diameter and include natrolite, heulandite, laumontite, thomsonite and analcime (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 20).

82 F/4 Small quantities of natrolite were found at the Josie Mine, Rossland (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 165)

92 I/15 Natrolite was found in the Ashcroft mining district, about 400 m above the mouth of Criss Creek where it joins Deadman River (National Mineral Collection, Donor: W.F. Ferrier, 1918).

93 K/4 Natrolite, phillipsite and thomsonite are associated on a specimen from Marinol Lake, near Burns Lake (X-ray Laboratory, Geol. Surv. Can.).

Manitoba

63 N/3 During mining operations at the Sherritt-Gordon Mine the zeolites, analcime, chabazite and natrolite were encountered in cavities in gneiss (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 48).

New Brunswick

21 B/10
21 B/15 On Grand Manan Island, natrolite is found with scolecite, heulandite, laumontite, analcime, epistilbite, thomsonite, stilbite, quartz crystals, copper, hematite and chlorite. The zeolites occur as crystal aggregates and as radiating fibres in cavities and seams in amygdaloidal basalt. They are most abundant along the coastline known as Seven Days Work (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 10).

Nova Scotia

Natrolite has been found at numerous localities in the Minas Basin - Bay of Fundy area. The following list of localities and associated minerals was compiled from the detailed account by Ann P. Sabina, 1964; Rocks and Minerals for the Collector, Bay of Fundy Area; Geol. Surv. Can., Paper 64-10.

	Locality	Associated Minerals
21 A/14	Hampton (Chute Cove), Annapolis County	chalcedony, apophyllite, epidote
21 H/3	Margaretsville, Annapolis County	heulandite, laumontite, analcime, apophyllite, gyrolite, mesolite, stilbite, scolecite
21 H/7	Horseshoe Cove, Cape D'Or, Cumberland County	anaclime, stilbite, laumontite, apophyllite, chabazite, thomsonite, mesolite, heulandite, jasper, copper
21 H/8	Partridge Island, Cumberland County	stilbite, laumontite, heulandite, chabazite, analcime, apophyllite, quartz crystals, calcite, chalcedony, jasper
	Swan's Creek (Swan Brook) Cumberland County	gmelinite, chabazite, analcime, apophyllite, heulandite, calcite, stilbite
	Wasson Bluff, Cumberland County	chabazite, heulandite, stilbite, gmelinite, analcime, calcite, copper
	Two Islands (The Brothers) Guysborough County	gmelinite, analcime, chabazite, heulandite, cailcite, agate
	Cape Blomidon to Cape Split, Kings County	apophyllite, heulandite, stilbite, chabazite, analcime, gmelinite, laumontite, mesolite, thomsonite, amethyst, jasper, agate, calcite, celadonite
21 H/8	Pinnacle Island, Cumberland County	analcime, chabazite, stilbite, heulandite, thomsonite, gmelinite, calcite
	Scots Bay, Small Cove, Big Cove, Kings County	chalcedony, jasper, amethyst, stilbite, mesolite, heulandite

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21 H/3 Port George, Margaretsville, and Stronach Brook, Annapolis County (C.W. Willimott,1882-84: Geol. Surv. Can., Rept. Prog., p. 25L). Gates Mountain, Annapolis County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 48T).

21 H/7 Cape d'Or, Cumberland County (H. How, 1868: Mineralogy of Nova Scotia, p. 202).

21 H/7
21 H/8 Five Islands, Horse Shoe Cove, Swan Creek, and Two Islands (the Brothers), Cumberland County (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog., p. 28L).

21 H/8 Cape Split, Kings County (H. How, 1868: Mineralogy of Nova Scotia, p. 203).

Amethyst Cove, Wasson Bluff and Pinnacle Island, Cumberland County (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 62) (A.L. Parsons, 1930: Univ. Toronto Stud., Geol. Ser., 29, p. 35). Cape Blomidon, Kings County (E.Coste, 1886-87: Geol Surv. Can., Ann Rept., III, p. 78S).

An analysis by Marsh of a specimen from Cape Blomidon is as follows: SiO_2 45.74, Al_2O_3 28.38, CaO 0.27, Na_2O 14.23, K_2O 1.16, H_2O 10.11, total 99.89 (J.D. Dana, 1904: System of Mineralogy, 6th ed., p. 603).

21 H/8 Chemical analysis by E.W. Todd of natrolite from amethyst Cove: SiO_2 47.34, Al_2O_3 27.17, Fe_2O_3 0.01, CaO 0.48, Na_2O 15.42, K_2O 0.28, H_2O 9.47, total 100.17 (T.L. Walker and A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser. 14, p. 64).

Ontario

31 C/12 The mineral collection at the Royal Ontario Museum includes specimens of natrolite from the following occurrences in Methuen Township: International Minerals Mine, lot 20, conc. VI; and Indusmin Cabin Ridge quarries, lot 15, conc. VIII (J. Satterly 1977: Ont. Geol. Surv., MP70, p. 260).

31 F/4 Pink natrolite occurs in the form of radial aggregates replacing sodalite along joint fissures at the Princess sodalite quarry, lot 25, conc. XIV, Dungannon Township (L. Moyd, 1949: Am Mineralogist, 34, p. 748).

41 I/9 Natrolite and analcime occur in joints in anorthosite building stone at the Nipissing Black Granite quarry at 46°37'30"N, 80°10'W, about 3.2 km north of River Valley. (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 85)

42 D/15 Specimens of natrolite collected near Coldwell station, Port Coldwell, Coldwell Township are included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 260).

42 I/4 The mineral collection at the Royal Ontario Museum includes natrolite from Sextant Portage, Sextant Rapids, Abitibi River, Pitt Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 260).

Quebec

21 L/3 Crystals of natrolite almost 90 cm long by 10 cm in diameter were seen in huge aplite blocks in the dump of the Johnston Asbestos Mine in Thetford Township. A chemical analysis by R.J.C. Fabry gave the following results: SiO_2 46.53, Al_2O_3 26.63, Fe_2O_3 1.34, CaO 0.44, MgO 0.12, Na_2O 15.53, K_2O 0.44, H_2O 9.62, total 100.65: S.G. 2.20 to 2.26 (E. Poitevin, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 57).

31 H/5
31 H/12 Natrolite, with sodalite and analcite is found in dykes in the Trenton limestone, at the Montreal reservoir extension. The results of an analysis by Harrington is as follows: SiO_2 47.40, Al_2O_3 26.38, CaO 0.48, Na_2O 16.48, K_2O 0.57, H_2O 9.75, total 101.06: S.G. 2.22 (B.J. Harrington, 1874-75: Geol. Surv. Can., Rept. Prog., p. 303) (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., IV, p. 48T).

31 H/11 Natrolite is a constituent of veins and vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9. pp. 109-123).

31 H/12 Colourless, white and orange-red crystal aggregates of natrolite occur in small cavities in a sill cutting limestone at the Miron Quarry, Montreal Island (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 68).

31 H/12 Natrolite is reported to occur at the Corporation quarry, Outremont. Quebec (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 165).

NATRON

$Na_2CO_3.10H_2O$

British Columbia

92 P/4 Crystallized natron has been taken from a soda lake of exceptional purity near Clinton, British Columbia. A chemical analysis by H.C. Rickaby gave the following results: Na_2O 21.23, CO_2 15.46, H_2O 63.59, Cl tr., Mg tr., insol. tr., total 100.28; S.G. 1.34 (T.L. Walker and A.L. Parsons, 1927: Univ, Toronto Stud., Geol. Ser., 24, p. 20).

92 P/5 Natron occurs at Goodenough Lake in the Clinton mining division, where it precipitates on the bottom in winter, sometimes to a thickness of 35 cm. An analysis of this material by Johnston gave the following results: CO_2 (expelled on ignition) 0.29, CO_2 (in ignited residue) 15.17, Na_2O 21.36, H_2O 63.03, NH_3 undetermined, SO_3 0.08, P_2O_5 0.01, B_2O_5 tr., Cl 0.01, SiO_2 0.01, total 99.96 (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, pp. 12, 13R).

NAUMANNITE

Ag_2Se

Ontario

42 A/11 Naumannite is one of the most commonly encountered selenide minerals in a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine north of Timmins. Electron microprobe analysis: Ag 73.5, Fe 0.03, Se 27.6, S 0.02, total 101.15. The mine is 25.7 km north of Highway 101 via Highway 655 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A p. 311).

NENADKEVICHITE

$(Na,Ca,K)(Nb,Ti)Si_2O_6(O,OH).2H_2O$

Quebec

31 H/11 Nenadkevichite has been identified from Mont St-Hilaire. (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99)

NEPHELINE

$NaAlSiO_4$

Nepheline is an important constituent of nepheline syenite which is used as a raw material in the manufacture of glass and ceramics. It is usually associated with feldspar, cancrinite, sodalite, biotite, apatite, corundum and zircon; but not with primary quartz. The composition shows considerable variation; excess silica, some potassium and small amounts of calcium, lithium and fluorine have been reported.

British Columbia

82 N/1
82 N/2 Nepheline occurs as a constituent of the nepheline syenites at Ice River and Beaverfoot River, Golden mining division (G.M. Dawson, 1885: Geol. Surv. Can., Ann. Rept., I, p. 123B).

Ontario

31 C/12 Fine-to medium-grained, sugary textured, nepheline syenite, cut by stringers of nepheline pegmatite, occurs on lot 21, conc. VI, and lot 14, conc. IX, Methuen Township (J. Satterly, 1943: Ont. Dept. Mines, Ann. Rept., vol. 52, Pt. II, pp. 78-81).

31 C/12 White, pink (hydronephelite), and green (gieseckite) nepheline as well as natrolite and muscovite occur at the Blue Mountain quarries of the American Nepheline Company in Methuen Township (L. Moyd, 1949: Am. Mineralogist, 34, p. 747).

31 C/12 Chemical analysis of nepheline from biotite nepheline syenite, Blue Mountain, Methuen Township, by J.H. Scoon: SiO_2 42.89, TiO_2 0.00, Al_2O_3 33.99, Fe_2O_3 0.36, MgO 0.00, CaO 0.23, Na_2O 16.27, K_2O 6.57, total 100.31 (C.E. Tilley, 1952: Sir Douglas Mawson Anniv. Vol., Univ. of Adelaide, p. 167).

31 C/12 Nepheline from the Indusmin Cabin Ridge quarry, lot 15, conc. VIII, Methuen Township is represented in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 261).

31 D/16 Nepheline pegmatite containing abundant zircon occurs on lot 32, conc. III, and lot 30, conc. IV, Glamorgan Township. Nepheline pegmatite is also found on lot 34, conc. IV, Glamorgan Township, along with albite, biotite, green apatite, and zircon. Secondary minerals present include orange cancrinite, blue sodalite, and (pink) hydronephelite. In Monmouth Township, nepheline is found on lots 11 and 14, conc. VI, and on lots 10 and 11, conc. VIII (J. Satterly, 1943: Ont. Dept. Mines, Ann. Rept., vol 52, Pt. II, pp. 71-77).

31 D/16 Chemical analysis of nepheline from theralitic canadite, Trooper Lake, Glamorgan Township, by J.H. Scoon: SiO_2 44.40, TiO_2 0.00, Al_2O_3 33.14, Fe_2O_3 0.18, MgO 0.05, CaO 0.36, Na_2O 17.17, K_2O 3.72, H_2O^+ 0.94, H_2O^- 0.02, total 99.98.

31 D/16 Chemical analysis of nepheline from nepheline syenite, Monmouth Township, by J.H. Scoon: SiO_2 43.61, TiO_2 0.00, Al_2O_3 33.05, Fe_2O_3 0.85, MgO 0.05, CaO 0.53, Na_2O 16.09, K_2O 4.92, H_2O^+ 0.70, H_2O^- 0.01, total 99.82 (C.E. Tilley and J. Gittins, 1961: J. Petr., 2, p. 38).

31 F/4 An analysis by Harrington of nepheline from the York River area, Dungannon Township is as

follows: SiO_2 43.51, Al_2O_3 33.78, Fe_2O_3 0.15, CaO 0.16, MgO tr., K_2O 5.40, Na_2O 16.94, loss (ign.) 0.40, total 100.34; S.G. 2.625 (B.J. Harrington, 1894: Am. J. Sci., XLVIII, p. 17).

31 F/4 Nepheline associated with pink sodalite occurs in Dungannon Township. A chemical analysis by H.C. Rickaby gave the following results: SiO_2 41.80, Al_2O_3 35.48, CaO 0.63, MgO 0.13, H_2O 0.42, K_2O 6.28, Na_2O 14.59, CO_2 0.28, total 99.61; S.G. 2.664(T.L. Walker and A.L. Parsons, 1925: Univ, Toronto Stud., Geol. Ser., 20, p. 8).

31 F/4 Excellent crystals of nepheline occur on joint faces in small working on the top of Davis Hill, lot 25, conc. XIII, Dungannon Township (D.F. Hewitt, 1960: private communication).

31 F/4 Nepheline is a common constituent of gneisses in Carlow and Monteagle townships, Hastings County. A mineralogical analysis by L. Moyd of a gneiss from the Monteagle Minerals property, lots 2 and 3, conc. II, gave results as follows: andesine 40, nepheline 15, potash feldspar 10, scapolite 10, muscovite 10, biotite 10, corundum 5, spinel tr., total 100 (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. VI, pp. 60-63).

31 F/4 The mineral collection at the Royal Ontario Museum includes specimens of nepheline from: Egan Chute, York River, lot 12, conc. XII, Dungannon Township; Princess Quarry, lot 25, conc. XIV, Dungannon Township; south half of lot 1, conc. XII, Faraday Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 261).

31 F/5
31 F/6 Nepheline is prominent constituent in some of the gneisses and syenites which outcrop in Brougham, Sebastopol, Lyndoch, Raglan, Brudenell and Radcliffe townships. For a detailed description of occurrences in Renfrew County, see: J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. III, pp. 89-92; and L. Moyd, 1949: Am. Mineralogist, 34, p. 743 .

41 I/2 In Bigwood Township, Sudbury district, salmon-coloured nepheline forms the chief constituent in a pegmatite dyke which is exposed on the French River, 6.4 km below the French River Station on the Canadian Pacific railway line. Analysis by H.C. Rickaby: SiO_2 42.56, Al_2O_3 35.80, CaO 0.05, MgO 0.20, Na_2O 14.86, K_2O 5.75, H_2O 0.67, CO_2 0.35, total 100. 24; S.G. 2.610 (T.L. Walker and A. L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 7).

42 D/10 At Pic Island, Lake Superior, nepheline occurs in large, orange-red grains associated with black hornblende in white feldspar boulders (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 480).

Quebec

31 G/8
31 G/9 Nepheline is an abundant mineral constituent of the silicate rocks of the Oka Complex, located about 32 km, west of Montreal on the north shore of the Lake of Two Mountains. Chemical analyses of I, nepheline from okaite, and II, nepheline from wollastonite-garnet-urtite, by H. Ulk, and III, nepheline from wollastonite-garnet-melteigite, by W.H. Herdsman: I, SiO_2 37.88, Al_2O_3 31.57, Fe_2O_3 0.13, FeO 0.29, MnO 0.01, MgO 0.39, CaO 5.60, Na_2O 15.85, K_2O 7.47, P_2O_5 0.22, H_2O^+ 0.10, H_2O^- 0.01, CO_2 nil, SrO 0.21, total 99.73, S.G. 2.637; II SiO_2 41.60, Al_2O_3 34.11, Fe_2O_3 0.54, FeO 0.20, MnO 0.03. MgO 0.05, CaO 1.59, Na_2O 17.96, K_2O 1.61, P_2O_5 0.52, H_2O^+ 0.45, H_2O^- 0.14, CO_2 0.65, SrO 0.08, total 99.53, S.G. 2.620; III, SiO_2 40.86, Al_2O_3 33.64, Fe_2O_3 1.21, FeO 0.14, MnO 0.02, MgO 0.07, CaO 0.89, Na_2O 14.74, K_2O 6.78, P_2O_5 0.53, H_2O^+ 0.39, CO_2 0.56, total 99.83, S.G. 2.596 (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 H/11 At the Mont St-Hilaire Quarry, also known as the Desourdy Quarry, on the north side of Mont St-Hilaire, nepheline is present as greyish green to pink masses (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 57).

31 H/5
31 H/7
31 H/11
31 H/12 Nepheline occurs near Montreal, Hochelaga County: at Brome Mountain, Brome County; and at Beloeil Village, Rouville County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 49T).

nephrite

(see ACTINOLITE)

NEPTUNITE

$Na_2K\ Li\ (Fe,Mn)_2Ti_2Si_8O_{24}$

Newfoundland

13 K/5 Neptunite is found in the metasomatic syenite gneisses (Fenites) of the Seal Lake region, Labrador. It is in anhedral grains ranging from 0.1 to 2 mm in diameter, and much is associated with pyrochlore and barylite (E.Wm. Heinrich and S.H. Quon, 1963: Can. Mineralogist, 7, p. 650).

NEWBERYITE

$NgHPO_4.3H_2O$

Yukon

115 O/14 A mixture of newberyite, struvite and traces of magnesite was found filling interglobular spaces in the ivory of a mammoth tusk. The tusk was found at a depth of some 5 m in the surface bed of frozen muck on Quartz Creek, a tributary of the Indian River. Analysis by Jonhston: P_2O_5 38.53, MgO 21.93, NH_3 1.94, H_2O 37.18, CO_2 0.42, total 100.00 (G.C. Hoffmann, 1889: Geol. Surv. Can., Ann. Rept., XII, pp. 13, 14R).

NEYITE

$Pb_7Bi_6(Cu,\ Ag)_2S_{17}$

British Columbia

103 P/6 Neyite is a new mineral which occurs as acicular aggregates in vuggy quartz veins at the Lime Creek molybdenum deposit located near the old community of Alice Arm. It is named for C.S. Ney, geologist in charge of the early exploration of the deposit. The new mineral is closely associated with pyrite, galena, sphalerite and minor chalcopyrite, aikinite, cosalite, tetrahedrite, molybdenite and nuffieldite (A.D. Drummond, J. Trotter, R.M. Thompson and J.A. Gower, 1970: Can. Mineralogist, 10. p. 90-96).

niccolite

(See NICKELINE)

NICKEL HYDROXIDE MINERAL

(UNNAMED)

$4\ Ni(OH_2\ .NiO(OH)$

British Columbia

82 E/2 The nickel hydroxide mineral was found in a large dolomite-quartz-serpentine boulder in Rock

Creek about 180 m west of the point where the main highway crosses Rock Creek. Rock Creek is about 24 km southwest of Greenwood. The yellow mineral is a non-stoichiometric compound approaching the composition noted above. It appears to form by alteration of garnierite (J.L. Jambor and R.W. Boyle, 1964: Can. Mineralogist, 8, p. 116).

NICKELINE

NiAs

The Commission on New Minerals and Mineral Names, of the International Mineralogical Association, has recommended use of the name nickeline in preference to its synonyms niccolite and nickelite.

Newfoundland

2 E/13 Tilt Cove Mines, Newfoundland's oldest copper producers, are located at Tilt Cove on the northwest shore of Notre Dame Bay. The West Mine also contained nickel ore consisting of nickeline, maucherite, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann. P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Northwest Territories

75 L/12
85 I/2 Niccolite is found on the Nix property, 16 km southwest of Taltheilei Narrows on the northwest arm of Great Slave Lake, and near Gros Cap, 3.2 km north of Great Slave Lake and 4.8 km east of the François River. Specimens from both localities consist of solid, compact, masses of botryoidal niccolite and rammelsbergite cemented by ankerite gangue and partly coated with annabergite (R.M. Thompson, 1951: Am. Mineralogist, 36, pp. 506, 507).

85 I/2
85 I/5 A vein of niccolite was found in augite diorite country rock near the François River, in the Yellowknife area (A.W. Jolliffe, 1936: Geol. Surv. Can., Paper 36-5, p. 6).

86 E/9 Minor amounts of niccolite (nickeline), cobaltite, gersdorffite and pararammelsbergite occur with matildite, native silver and bismuth, safflorite, skutterudite and rammelsbergite at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay, 65°36'14"N, 118°06'45"W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 F/13 Niccolite occurs with cobaltite, safflorite-lollingite, glaucodot, gersdorffite, rammelsbergite and breithauptite at the B.E.A.R. deposit on the north shore if Contact Lake, about 1.4 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 759).

86 K/4 Niccolite is a constituent of the complex silver-uranium deposits of the Eldorado Mine on Labine Point, and the Echo Bay Mine located one mile northeast of Port Radium (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 36).

Ontario

31 M/5 Niccolite occurs in veins on the M.J. O'Brien Limited property on the shore of Cross Lake, 3.2 km southeast of Cobalt. It is associated in different proportions at different levels and parts of the veins, with the following minerals: rammelsbergite, skutterudite, argentite, cobaltite, chloanthite, safflorite, gersdorffite, smaltite, chalcopyrite, tetrahedrite, arsenopyrite, sphalerite, galena, pyrite, pyrargyrite, marcasite, silver, and in some places breithauptite and dyscrasite (E. Thompson, 1931: Univ, Toronto Stud., Geol. Ser., 32, p. 33).

31 M/5 Copper-coloured niccolite encloses breithauptite and is turn enclosed by grey cobaltite at the Hudson Bay Mines property near Cobalt. Analysis of the separated niccolite: Ni 40.64, Co 2.04, Fe tr., As 50.78, Sb 4.95, S 1.47, total 99.88 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 217).

31 M/5 At the Silver Bar Mine, near Cobalt, niccolite occurs in vein deposit with an abundance of smaltite and in a few cases rammelsbergite. Other minerals present include arsenopyrite, cobaltite, ullmannite, and gersdorffite (T.L. Walker and A.L. Parsons, 1921: Univ, Toronto Stud., Geol. Ser., 12, p. 27).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16 Nickeline is a common mineral in Ni-As and Ni-Co-As assemblages in the ores of the Cobalt-Gowganda camp. Electron probe micro-analyses by D.C. Harris are as follows:

Ni	Co	Fe	As	Sb	Total
45.5	0.7	nd	55.8	0.3	102.3
44.6	0.6	-	54.4	-	
42.3	0.6	nd	54.4	2.0	99.3
43.0	0.4	0.7	52.0	5.3	101.4
43.8	0.6	nd	55.0	nd	100.3
44.0	0.4	-	56.0	nd	100.4
43.5	nd	-	53.5	-	
44.0	0.6	-	55.5	-	
45.1	0.2	0.1	57.1	nd	102.5
44.7	nd	-	55.4	nd	
44.0	nd	-	56.0	-	
43.5	nd	-	55.4	1.4	100.3
43.1	nd	0.1	55.1	1.5	99.8
41.1	0.9	-	50.6	6.5	99.1
40.6	3.2	-	54.1	4.3	102.2
39.2	3.9	-	53.3	3.2	99.6

nd not detected; -not analyzed

(W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 151)

41 I/6 Niccolite is a relatively rare mineral in the nickel ore mined at Sudbury. It shows bright salmon pink colour, high reflectivity and pronounced pleochroism. Anistropism is very strong. Samples average about 0.1 per cent Co with traces of Sb, Bi, Ag, Au, Pd, Cu, Fe. It occurs massive in interlocking grains, in quartz veins up to 3 centimetres across, or stringers in chalcopyrite (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7. p. 41).

41 I/6 Niccolite is found with chalcopyrite, pyrrhotite, and gersdorffite on lot 12, conc. III, Denison Township (G.C. Hoffmann, 1888-89; Geol. Surv. Can., Ann. Rept., IV, p. 49T).

41 N/12
41 N/13 Niccolite occurs with domeykite in a vein cutting amygdaloidal trap on Michipicoten Island, Lake Superior (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 49T).

41 P/10 Niccolite is reported to occur on a number of properties in the Timiskaming district. Included here are the Silver Bullion property,

Nicol Township, the Haines claim (H.R. 439) in Charters Township, and the Silverade claim (H.S. 693) in Leith Township (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol 30, Pt. II, p. 43).

52 A/7 Niccolite occurs in one of the silver-bearing veins at Silver Islet, Sibley Township, in the Thunder Bay district (E.D. Ingall, 1887-88: Geol Surv. Can., Ann. Rept., III, p. 27H).

Quebec

31 F/10 A specimen of niccolite from lot 12, range IX, on Calumet Island, Pontiac County, has beem presented to the National Mineral Collection.

Saskatchewan

64 L/4 Nickeline is present in small amounts at the Rabbit Lake uranium deposit at 58 11'00"N, 103 42'36"W, west of Wollaston Lake (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1B, p. 235).

74 N/8 Niccolite is reported to occur on the Fish Hook Bay Group claims (held by Eldorado Mining and Refining (1944) Limited) at Fish Hook Bay on Lake Athabasca, 4.8 km east of Goldfields. Pitchblende is accompanied by major amounts of niccolite and cobalt-nickel arsenides, with minor arsenopyrite, in a small parallel zone along a quartz-dolomite contact about 200 m west of the south end of the 'B' zone of mineralization (A.H. Lang, 1952: Geol Surv. Can., Econ. Geol. Ser., 16, pp. 89-90).

NICKEL-IRON

Ni, Fe

Terrestrial nickel-iron, ranging in composition from 65 to 75 per cent nickel and 25 to 35 per cent iron has been variously referred to as: awaruite, brokovkite, josephinite and souesite. Awaruite was the first name to be applied and probably deserves priority.

British Columbia

92 I/12 Souesite, a variety of nickel-iron was found associated with platinum, iridosmine, gold, magnetite, quartz, and garnet in river gravels about 3.2 km below Lillooet on the Fraser River. A chemical analysis by Wait gave results as follows: Ni 75.50, Fe 22.02, Cu 1.20, insol. 1.16, total 99.88; S.G. 8.215. Centesimal composition of the pure mineral after deducting insoluble matter: Ni 76.48, Fe 22.30, Cu 1.22, total 100.00 (G.C. Hoffmann, 1905: Am. J. Sci., 19, p. 319).

92 J/15 Specimens of awaruite, a variety of nickel-iron, were collected from gravels in the Bridge River (W.S. McCann, 1922: Geol. Surv. Can., Mem, 130, p. 78).

104 P/12 Awaruite is reported in serpentinized dunite and peridotite at elevations between 1000 m and 1500 m at the head of Blue River, 32 km northwest of Cassiar (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1970, p. 34).

Northwest Territories

86 J/14
83 O/3 Serpentine-rich dunites and pyroxenites of the Muskox Intrusion contain awaruite. Electron microprobe analyses indicate that the composition is near Ni_2Fe (J.A. Chamberlain, C.R. McLeod, R.J. Traill and G.R. Lachance, 1965: Can. Jour. Earth Sci., 2, p. 188).

Quebec

21 E/13
21 L/3 Awaruite occurs in serpentinized dunites and peridotites in the Thetford Mines area, particularly at the Jeffrey, Normandie, British Canadian, and Bell Asbestos mines, as well as the Beaver Mine and the Black Lake Asbestos and Crome Mine. Chemical analyses of two samples separated from asbestos tailings from the Canadian Johns Manville mill at Asbestos, are as follows: (1) Fe 25.19, Ni 70.18, Co 4.04, Cu 0.31, insol. 0.66, total 100.38; (2) Fe 23.63, Ni 66.55, Co 2.68, Cu 0.18, insol. 7.17, total 100.21, Analyses after subtraction of the insoluble residue: (1) Fe 25.26, Ni 70.38, Co 4.05, Cu 0.31, total 100.00; (2) Fe 25.40, Ni 71.53, Co 2.88, Cu 0.19, total 100.00; S.G. (Sample 2) = 7.44; after correction for insoluble content, S.G. of alloy = 8.58, S.G. (calc.) =8.57 (E.H. Nickel, 1959: Can. Mineralogist, 6, pp. 307-319).

32 D/9 Most of the recoverable nickel in a large ultramafic intrusion explored by Dumont Nickel Corporation near Amos is in the form of awaruite and pentlandite (J.L. Jambor, 1975: Geol. Surv. Can., Paper 75-1A, p. 261).

Yukon

105 F/16 Nickel-iron (var. awaruite) has been observed in the concentrates from alluvial gold washings of Hoole Canyon on the Pelly River. Chemical analysis by Johnston: Ni 74.34, Fe 21.35, Co 1.34, Cu 0.48, P 0.08, S 0.03, insol. 1.72, total 99.34; S.G. =7.746, Centesimal composition of the mineral after deducting insoluble matter: Ni 76.16, Fe 21.87, Co 1.37, Cu 0.49, P 0.08, S 0.03, total 100.00 (R.A.A. Johnston, 1910: Geol Surv. Can., Sum. Rept., p. 258).

NIOBOPHYLLITE

$$(K,Na)_3(Fe,Mn)_{6-7}(Nb,Ti)_2(Si,Al)_8O_{25}(OH,F)_6$$

Newfoundland

13 K/5 Niobophyllite, the niobium analogue of astrophyllite, was discovered during a study of samples from a beryllium-bearing alkaline syenite in the vicinity of Ten Mile Lake in the Seal Lake area of Labrador. It occurs in a band of paragneiss consisting chiefly of albite and arfvedsonite, as sub-parallel, fine-grained, polycrystalline aggregates, either intergrown with other dark minerals or as thin seams in feldspar.

Chemical analysis of 600 mg. hand-picked concentrate, by D.J. Charette: Na_2O 2.49, K_2O 5.51, CaO 0.72, R.E. oxides 1.50, FeO + Fe_2O_3 23.74, MgO 0.16, MnO 9.83, TiO_2 2.94, Nb_2O_5 14.76, Ta_2O_5 0.52, Al_2O_3 0.89, SiO_2 33.40, H_2O^+ 3.64, H_2O^- 0.08, F 0.46; total 100.64 less O for F 0.19, 100.45, S.G. 3.42 (E.H. Nickel, J.F. Rowland and D.J. Charette, 1964: Can. Mineral., 8, p. 40).

NIOCALITE

$$(Ca,Nb)_4Si_2(O,OH,F)_9$$

Quebec

31 G/8 Niocalite was described for the first time by Dr. E.H. Nickel of the Mines Branch, Ottawa, in 1956. It occurs on the property of Quebec Columbium Limited at Oka, in a rock consisting essentially of strontian calcite, niocalite, magnetite and apatite. The niocalite is present as randomly oriented, coarse, prismatic crystals up to 1

centimetre in length, with a nearly square cross section. Chemical analyses by J.A. Maxwell of niocalite from (1) diamond drill core, and (2) open pit, are as follows: (1) CaO 47.50, SiO_2 29.70, Nb_2O_5 16.56, Al_2O_3 1.31, Fe_2O_3 0.54, TiO_2 0.22, P_2O_5 0.60, MgO 0.28, MnO 1.28, Na_2O 0.78, K_2O 0.02, H_2O 0.16, F 1.7, total 100.65, less O for F 0.71, total 99.94; (2) CaO 46.96, SiO_2 29.90, Nb_2O_5 18.86, Al_2O_3 0.16, Fe_2O_3 0.54, TiO_2 0.26, P_2O_5 0.07, MgO 0.70, MnO 0.99, Na_2O 0.55, K_2O 0.00, H_2O 0.18, F 1.73, total 100.90, less O for F 0.73, total 100.17 (E.H. Nickel, J.F. Rowland and J.A. Maxwell, 1958: Can. Mineralogist, 6, pp. 264-272).

NISBITE

$NiSb_2$

Ontario

52 L/16 The new mineral nisbite was found as a minor constituent of drill core from claims held by Cochenour Willans Gold Mines Limited in Mulcahy Township about 32 km west of Red Lake, and about 1200 m south-southwest of the south end of Trout Bay. Electron probe microanalyses of four grains gave (average): Ni 19.15, Sb 80.43, total 99.58 (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10. p. 232).

NITRE

KNO_3

British Columbia

92 O/1 Nitre has been found at Big Bar Creek, on the Fraser River, Clinton mining division (G.M. Dawson, 1887-88: Geol. Sruv. Can., Ann. Rept., III, p. 161R).

93 B/13 Nitre occurs as a white granular powder, filling holes and cavities in the travertine of the Nazko River, about 8 km below the mouth of the Clisbako River in the Quesnel mining division (G.M. Dawson, 1875-76: Geol. Surv. Can., Rept. Prog., pp. 264-265).

NOLANITE

near $3FeO.V_2O_3.3V_2O_4$

Saskatchewan

74 N/7
74 N/8 This iron-vanadium oxide mineral was first discovered in a hand specimen from the 'A' zone of Eldorado Mining and Refining Limited, on the shore of Fish Hook Lake Bay, Lake Athabasca. Nolanite has also been identified from the No. 2 mine of Consolidated Nicholson Mines Ltd., from the Ace Mine, and from the main showing on the Pitche Group of claims on the southwest shore of Beaverlodge Lake. Microanalysis of 25 milligrams hand picked sample, by Sherwood: V_2O_3 16.5, V_2O_4 59.8, FeO 24.0, total 100.3 (S.C. Robinson, H.T. Evans, Jr., W.T. Schaller, and J.J. Fahey, 1957: Am. Mineralogist, 42, p. 619).

NORBERGITE

$Mg(OH,F)_2.Mg_2SiO_4$

The humite group minerals, norbergite, chondrodite, humite and clinohumite occur almost exclusively in metamorphosed and metasomatized limestones. Identification of individual minerals of the group is difficult and often impossible without the use of X-ray diffraction techniques.

Ontario

31 E/1 Norbergite has been identified by X-ray powder pattern in specimens from Wilberforce, in Monmouth Township, and from the Cardiff area, Cardiff Township (E.W. Nuffield and D.H. Gorman, 1960: private communication).

NORDSTRANDITE

$Al(OH)_3$

Ontario

31 F/4 Nordstrandite has been found at the Princess sodalite mine near Bancroft, where it occurs as colourless, transparent, blade-like crystals in vugs in massive natrolite and as white fibrous patches and striated masses on natrolite (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 337).

Quebec

31 H/11 Nordstrandite has been identified from Mont St-Hilaire (G.Y. Chao, and J. Baker, 1979: Mineralogical Record. 10. p. 99).

NUFFIELDITE

$10PbS.5Bi_2S_3.2Cu_2S$

British Columbia

103 P/6 Nuffieldite, named for Professor E.W. Nuffield of the University of Toronto, occurs as prismatic to acicular crystals up to 3 mm in length, in vugs in narrow quartz veins in the Lime Creek quartz diorite stock on the property of B.C. Molybdenum Corp., 10 km southeast of the town of Alice Arm. Chemical analysis: Pb 40.42, Bi 37.67, Cu 5.90, S 16.35, total 100.36, Associated minerals are: molybdenite, aikinite and cosalite (P.W. Kingston, 1968: Can. Mineralogist, 9, p. 439-452).

octahedrite

(see ANATASE)

OFFRETITE

$(K_2,Ca,Mg)_{2.5}Al_5Si_{13}O_{36}.15\text{-}16H_2O$

British Columbia

82 L/5 Thick offretite overgrowths on levyne have been found southwest of Westwald along the road to Douglas Lake. Electron microprobe analysis: SiO_2 55.99, Al_2O_3 20.62, Fe_2O_3 0.00, MgO 0.00, CaO 7.61, Na_2O 0.22, K_2O 3.81, total 88.25 (W.S. Wise and R.W. Tschernich, 1976: Am. Mineralogist, 61, p. 853).

OKENITE

$CaSi_2O_5.2H_2O$

Nova Scotia

21 H/2 Okenite was collected from the trap rock, 800 m east of Morden, Kings County, as part of a concretion about 6 cm in diameter. Apart from a very narrow margin, okenite filled the whole cavity. Chemical analyses are as follows: I. SiO_2 56.02, Al_2O_3 0.26, Fe_2O_3 0.12, CaO 26.46, MgO 0.24, Na_2O 0.28, K_2O 2.24, H_2O 13.25, CO_2 1.58, total 100.45; S.G. 2.388; II. SiO_2 55.08, Al_2O_3 0.26, Fe_2O_3 0.20, CaO 26.57, MgO 0.12, Na_2O 0.76, K_2O 0.60, H_2O 16.31, CO_2 0.32, total

100.22; S.G. 2.333 (T.L. Walker, 1922: Univ. Toronto. Stud., Geol. Ser., 14, p. 65).

Quebec

21 E/13 Radiating okenite crystals form white spheres about 8 mm in diameter on pale brown wollastonite at the Jeffrey Mine 45°46'25"N, 71°57'12"W, on lots 9 and 10, ranges II and III, Shipton Township (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10 p. 69).

OLIGOCLASE

$NaAlSi_3O_8$-$CaAl_2Si_2O_8$

Oligoclase is a member of the plagioclase feldspar series and is a common rock-forming mineral found characteristically in monzonites and granodiorites. The plagioclases form a continuous series from pure albite, $NaAlSi_3O_8$ (Ab) to pure anorthite $CaAl_2Si_2O_8$ (An). Oligoclase by definition, contains between 70 and 90 per cent of the Ab molecule.

British Columbia

92 I/15
92 I/16 Unzoned, subhedral phenocrysts of oligoclase occur in a rhyodacite on the Tranquille Plateau, 40 km northwest of Kamloops on an old wagon road from Tranquille to Red Lakes and Copper Creek (L.S. Stevenson, 1939: Am Mineralogist, 24, p. 446).

Ontario

31 C/15 Chemical analysis of oligoclase from the Fournier Mine, lot 14, conc. I, South Sherbrooke Township: SiO_2 58.58, Al_2O_3 24.78, Fe_2O_3 tr., CaO 4.84, MgO 0.20, Na_2O 6.63, K_2O 2.15, H_2O 1.85, total 99.03; S.G. 2.63-2.64 (B.J. Harrington, 1873-74: Geol. Surv. Can., Rept. Prog., p. 198).

31 E/8 Oligoclase with very coarse twinning striation occurs in pegmatite at the McKenzie Lake (Gunter) feldspar quarry on the McKenzie Lake South road at a point 7.4 km from its junction with Highway 127 about 17 km north of Maynooth (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

31 F/4 A chemical analysis of oligoclase from Monteagle Valley, Hastings County, gave results as follows: SiO_2 64.92, Al_2O_3 22.20, CaO 2.64, Na_2O 9.72, K_2O 0.68, H_2O 0.09, total 100.25; S.G. 2.637. Percentages of feldspar: Or 3.89, Ab 81.72, and An 13.07 (V.B. Meen, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 39).

31 F/4 Oligoclase is associated with zircon, quartz, microcline, calcite, titanite, pyrrhotite, chalcopyrite and ellsworthite in a pegmatite deposit on lot 18, conc. VII, Monteagle Township (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto Stud., Geol Ser., 16, p. 18).

Quebec

31 G/12 Almost perfect crystals of oligoclase have been found on lot 12, range XVI, Hull Township, Gatineau County (R.A.A. Johnston, 1915: Geol. Surv, Can., Mem, 74, p. 169).

31 H/6 Oligoclase occurs with hornblende in the intrusive diorite on Mount Johnson, Iberville County. Chemical analysis by Hunt: SiO_2 62.05, Al_2O_3 22.60, Fe_2O_3 0.75, CaO 3.96, Na_2O 7.95, K_2O 1.80, H_2O 0.80, total 99.91; S.G. 2.631 (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 50T).

OLIVINE

$(Mg,Fe)_2SiO_4$

Olivine is a series name for a continuous solid solution of two major components, forsterite, Mg_2SiO_4, and fayalite, Fe_2SiO_4. It is a constituent of many basic igneous rocks such as basalt, gabbro, dunite and peridotite, and is a common mineral in meteorites. Forsterite is also found as a metamorphic mineral in crystalline limestone.

British Columbia

82 F/10 Manganoan fayalite (knebelite) occurs as dark brown, radiating, tabular crystals in a calcite matrix at the Bluebell Mines on the east side of Kootenay Lake (J.D. Grice and R.A. Gault, 1977: Mineralogical Record, 8, p. 33).

92 P/14 Peridot, a synonym for olivine, occurs in irregularly shaped masses in hypersthene peridotite on the summit of Timothy Mountain in the Cariboo district. The olivine crystals vary in colour from pale yellow to dark green, and in sizes from 0.5 to 12 mm (L. Reinecke, 1920: Geol Suv. Can., Mem. 118, p. 81).

93 G/1 Gem quality peridot has been found at Lightning Creek at the headwaters of the Gamsby River (1958: Canadian Rockhound, vol. 2, No. 2).

Newfoundland

14 E/2 A rock containing about 50 per cent fayalitic olivine outcrops west of Tallifer Lake at 57°06.1'N, 62°49.2'W. Chemical analyses of the olivine by S. Courville and G. Blender: SiO_2 29.82, Al_2O_3 0.00, Fe_2O_3 2.16, FeO 64.21, CaO 0.24, MgO 2.34, Na_2O n.d., K_2O n.d., H_2O^+ 0.04, H_2O^- n.d., TiO_2 0.01, P_2O_5 n.d., MnO 0.92, total 99.74, corresponding to Fa_{94} (E.P. Wheeler, 2nd, 1965: Can. Mineralogist, 8, p. 339-346).

Quebec

22 B/16 Rocks composed almost entirely of fine-grained, sugary, pale green olivine occur alongside the Trans-Gaspésien highway at about 45 km from Ste-Anne-des-Monts (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 72).

22 D/11 Brownish green olivine crystals, about 12 mm across, occur at the St-Charles titanium deposit on the north shore of the Saguenay River (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 109).

31 G/8
31 G/9 Olivine occurs sparingly in bands in the carbonate rocks and also in alnoite rock in the Oka Complex, located 32 km west of Montreal on the north shore of the Lake of Two Mountains. Chemical analysis by H. Ulk: SiO_2 39.36, TiO_2 0.28, Fe_2O_3 0.81, FeO 2.84, MnO 4.78, MgO 49.15, CaO 1.49, Na_2O 0.07, K_2O 0.01, P_2O_5 0.87, H_2O^+ 0.47, SrO 0.03, total 100.16, S.G. 3.290 (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 G/12 Black olivine (forsterite) crystals partly altered to serpentine, occur at the Cross Quarry near Meach Lake (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 41).

31 H/5 At Ste-Anne, Jacques Cartier County, angular masses of olivine occasionally more than 2.5 cm in diameter occur in a fine-grained groundmass which also contains large plates of mica and

irregular masses or occasional bright crystals of augite. The olivine colours the rock a bright red. It has the usual fissured or cracked appearance. Along some of the cracks alteration to serpentine has taken place, whereas along others a little red oxide of iron is visible and gives the olivine its red colour. Chemical analysis by B.J. Harrington (1879): SiO_2 38.56, Fe_2O_3 1.36, FeO 12.65, MgO 44.37, H_2O 2.91, MnO 0.11, total 99.96 (J.A. Maxwell, et al., 1965: Geol. Surv. Can., Bull. 115, p. 336).

31 H/7 Manganian fayalite (iron knebelite) occurs in nordmarkite, the youngest rock on Shefford Mountain, about 72 km east-southeast of Montreal. Electron microprobe analysis: SiO_2 29.5, FeO 61.4, MnO 9.12, MgO 0.45, total 100.5 (Thomas Frisch, 1972: Can. Mineralogist 11, p. 552).

31 H/11 Olivine occurs in a granite dolorite at Montarville, Chambly County. It is the predominant mineral and occurs as olivine or amber coloured imperfect crystals up to 12 mm diameter, forming 45 per cent of the rock. It is serpentinized along cracks and partings. Chemical analyses of two different parts of the olivine are: (a) SiO_2 37.13, FeO 22.57, MgO 39.36, total 99.06; (b) SiO_2 37.17, FeO 39.68, MgO 22.54, total 99.39 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 336).

31 H/11 Found at the Goyer Quarry north of St-Bruno are igneous dykes and sills cutting the sedimentary rocks, and containing phenocrysts (up to 2.5 cm long) of colourless to white analcime, greenish yellow olivine, dolomite, chlorite and talc (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 54).

31 J/4 Crystals of olivine are found at the Parker Mine near Notre Dame du Laus. The olivine occurs as olive-green to almost black, flattened crystals commonly 5 cm long, embedded in calcite-mica aggregates.

Olivine, as pale yellow, colourless, grey and light green granular aggregates is abundant in crystalline limestone exposures on the north bank of the Lièvre River immediately downstream from the des Cèdres dam (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 48,51).

31 J/11 Olivine occurs at the Val-Barrette Quarries as yellowish white granular masses (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 57).

Yukon

115 A/12 Olivine crystals up to 10 cm long occur with light green diopside crystals in peridotite along a mountain slope on the west side of Dezadeash River. Access is via the trail to Sugden Creek which leaves the Alaska Highway (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 66).

OPAL

$SiO_2.nH_2O$

Opal is deposited at low temperatures from silica-bearing waters and can occur in fissures and cavities in any rock type. It is the form of silica secreted by sponges, radiolaria, and diatoms and is an example of a solidified colloidal gel. Opal is essentially amorphous, although X-ray powder photographs indicate cristobalite-like groupings.

British Columbia

82 E/2 Common opal occurs at the Mother Lode Mine at Deadwood (National Mineral Collection: donor, P.E. Crane, 1916).

82 F/14 Common opal is reported to occur at Fourmile (or Silverton) Creek, in the Slocan mining division (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 29R).

92 H/8 Specimens of semi-opal, a variety of opal, were found on Agate Mountain, southeast of Princeton, in the Similkameen mining division (C. Camsell, 1911: Can. Mining Inst. J., XIV, p. 606).

92 I/8 Hyalite, a variety of opal, occurs at Stump Lake, Droppingwater Creek, in the Kamloops mining division (G.M. Dawson, 1887-88; Geol Surv. Can., Ann. Rept., III, p. 110R).

92 I/10 White, pale greenish white, and apple green opal occur in the Tertiary agglomerate on Savona Mountains, Ashcroft mining division (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 16R).

92 I/15 Fire opal is reported from a nodule found in Watching Creek, north of Kamloops Lake.

92 O/8 Opal, agate, jasper and "thundereggs" are found in the vicinity of Black Dome Mountain in the Empire Valley region, south of Gang Ranch.

92 P/3 Good specimens of hyalite are found in dark grey foliated basalt along the Bonaparte River near Hihium Lake, in the Clinton mining division (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 28R). The National Mineral Collection contains specimens of opal from the head of Loon Lake.

93 A/6 Finely-laminated massive opal occurs with Tertiary argillite and sandstone at the Horse Fly Mine, located on the Horse Fly River about 11 km above its entry into Quesnel Lake (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 14R)

93 K/4 Two pieces of precious opal were found along the Eagle Creek about 6.4 km southwest of Burns Lake village. Opal, agate and jasper occur in lavas along the shore of François Lake (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 25-29).

Nova Scotia

21 A/9
21 A/10 Two varieties of opal, girasol and common opal, have been found in granite located between New Ross and Lake Ramsay, Lunenberg County (H. Piers, 1909-10: Trans. Nova Scotia, Inst. of Sci., XII, p. 446).

21 A/14 Opal (var. cacholong) from the North Mountains, Annapolis County, has been donated to the National Mineral Collection.

21 H/8 Cacholong (opal) occurs at Cape Split and Cape Blomidon, Kings County (G.C. Hoffmann, 1888-89: Geol Surv. Can., Ann. Rept., IV p. 25T). Nodules of opal, the colour of beeswax, were found on Partridge Island, Cumberland County (D.S.M. Field, 1952: Can. Mining J., 73, Pt. 2, p. 86).

21 H/16 A specimen of tripolite from Fountain Lake, near Amherst, Cumberland county, has been donated to the National Mineral Collection.

116 C/7 Pea-green to olive-green and brownish-red to brown common opal has been found near the surface of the pit at the Clinton Creek Mine on Porcupine Hill overlooking Clinton Creek at 480 m elevation (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 111).

ORPIMENT

As_2S_3

British Columbia

92 F/14 Orpiment is reported to be one of the main minerals present in the quartz vein at the Mount Washington Copper deposit on the northeast slope near the summit of Mount Washington about 24 km northwest of Courtenay (J.E. Muller and D.J.T. Carson, 1969: Geol. Surv. Can., Paper 68-50, p. 42).

orthoclase

(see POTASSIUM FELDSPAR)

OSMIRIDIUM

Ir, Os

In modern usage, the name osmiridium is recommended for the iridium-rich (over 68 per cent) cubic phase in the natural Ir-Os alloy system. Earlier writers used the same name simply for Ir-rich members of the system.

British Columbia

92 H/7
92 H/8 Osmiridium has been found with platinum on the Tulameen and Upper Similkameen rivers (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 104R).

93 A/12
93 B/9
93 B/16 Small amounts of osmiridium have been found with platinum in the Quesnel River area (E.D. Ingall, 1902-03: Geol. Surv. Can., Ann. Rept. XV, p. 190S).

93 A/12
104 N/11
104 N/12 Electron microprobe analysis of osmiridium from placers in the Atlin and Cariboo districts:

Ir	Os	Ru	Pt	Pd	Rh	Fe	Cu	Ni	Total
54.9	36.0	1.4	7.5	-	0.5	0.3	-	0.1	100.7
64.5	29.8	0.6	3.4	-	0.3	0.3	-	-	98.9
64.3	31.8	1.2	2.0	-	0.4	0.3	-	-	100.0
61.5	30.9	1.0	6.0	0.1	0.5	0.3	0.1	0.4	100.8
68.0	27.0	1.3	2.5	-	0.3	0.3	-	0.1	99.5
61.6	33.1	1.8	1.8	0.1	1.0	0.5	-	0.1	100.0
63.0	33.1	0.6	3.3	-	0.2	0.3	-	0.1	100.5
62.0	34.4	1.5	1.2	0.1	0.5	0.3	-	0.1	100.1
58.6	35.5	1.2	4.1	0.1	0.4	0.3	-	0.1	100.3
73.5	23.2	0.8	1.6	-	0.2	0.5	-	0.1	99.9
63.3	32.3	1.4	0.4	0.2	0.6	0.4	-	-	98.6
61.6	30.4	4.8	1.9	0.2	0.4	-	-	-	99.3
56.6	32.3	3.7	3.7	0.2	1.0	-	-	-	97.5
59.3	35.7	1.6	3.4	-	0.5	0.3	0.1	-	100.9

(D.C. Harris and L.J. Cabri, 1973: Can Mineralogist, 12, p. 104)

Quebec

21 E/5
21 E/16
21 L/1
21 L/2 Osmiridium has been mentioned by Hunt as occurring with platinum on the Rivi re Lini re (formerly Rivière-du-Loup), a branch of the Chaudi re River in Beauce County (G.C. Hoffmann, 1886: Geol Surv. Can., Ann. Rept., II, p. 5T).

115 O
116 A
116 B Osmiridium has been detected with gold from the Klondike River (R.G. McConnell, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 64B).

OSMIUM

Os

British Columbia

104 N/11
104 N/12 Native osmium has been found in two specimens from the Atlin district that are included in the mineral collection at the Royal Ontario Museum. Electron microprobe analyses: specimen M 12340, Ir 5.4, Os 94.1, Ru 0.8, Pt 0.1, total 100.4; specimens M11735, Ir 16.8, Os 80.1, Ru 1.2, Pt 1.7, Rh 0.7, Fe 0.1, total 100.6 (D.C. Harris and L.J. Cabri, 1973: Can. Mineralogist, 12, p. 104).

OSUMILITE

$(K,Na,)(Mg,Fe)_2(Al,Fe)_3(Si,Al)_{12}O_{30}.H_2O$

Newfoundland

14 D/8 Osumilite occurs in a granulite within the contact aureole of the anorthositic Nain complex. Associated minerals are quartz, hypersthene, orthoclase, cordierite, plagioclase, graphite and pyrrhotite. Specimens were collected from the north branch of Ikkinikulluit Brook at 56°28.8'N, 62°21.1'W. Average of 14 electron microprobe analyses: SiO_2 62.18, Al_2O_3 21.58, TiO_2 0.12, Cr_2O_3 0.03, FeO 3.97, MnO 0.07, MgO 7.46, CaO 0.06, Na_2O 0.22, K_2O 4.12, BaO 0.25, total 100.06 (J.H. Berg and E.P. Wheeler, 1976: Am. Mineralogist, 61, p. 29).

ottrelite

(see CHLORITOID)

OWYHEEITE

$Pb_5Ag_2Sb_6S_{15}$

British Columbia

82 F/4 Specimens from the Bluebird-Mayflower workings of Rossland Mines Limited, at Gopher Creek, consisted of a massive complex of sulphides and sulphosalts. Major consituents included pyrite, arsenopyrite, pyrrhotite, sphalerite, galena, and boulangerite, with minor amounts of tetrahedrite, owyheeite, meneghinite, chalcopyrite and gold. Owyheeite, which appears to carry the main silver values, is intergrown with a fibrous, radiating, or interlacing mosaic of boulangerite crystals which form the groundmass of much of the ore (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 547).

82 F/14 The Alamo Lode, near the head of Howson Creek, Slocan mining division, carries galena, sphalerite, tetrahedrite, pyrargyrite, pyrite and chalcopyrite in a gangue of quartz, with some calcite and siderite. A specimen resembling tetrahedrite gave the X-ray pattern of owyheeite (H.V. Warren, 1947: Univ, Toronto Stud., Geol. Ser., 52, p. 85).

92 F/5 Samples from the area about the headwaters of Drinkwater Creek, Alberni mining division, show some vuggy quartz with bands of dark sphalerite and minor amounts of disseminated galena, tetrahedrite, and needles of arsenopyrite. The

vugs are occupied by a capillary mineral, owyheeite (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 453).

92 F/5
92 F/12 Fissure veins in Permian volcanic rocks carry galena, pyrite, sphalerite, tetrahedrite, pyrargyrite, owyheeite and arsenopyrite at the CREAM claims 6.4 km south of Butte Lake, at 49°29.5'N, 125°33'W, and elevation of 900 m to 1500 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 219).

Yukon

105 G/3 Owyheeite has been identified in specimens from Tintina Silver Mines Limited located at 61°09'N, 131°09'W, some 11 km northwest of the confluence of the Ings and Upper Liard Rivers. Jamesonite, argentian tetrahedrite, galena, sphalerite, pyrite, arsenopyrite, marcasite, bournonite, tintinaite, pyrrhotite and chalcopyrite were also identified (D.C. Harris, J.L. Jambor, G.F. Lachance and R.I. Thorpe, 1968: Can. Mineralogist, 9, p. 371-382).

PARACOSTIBITE

CoSbS

Ontario

52 L/16 Paracostibite is a new mineral found in a small amount in drillcore from claims held by Cochenour Willans Gold Mines Limited in Mulcahy Township about 32 km west of Red Lake, and about 1,200 m south-southwest of the south end of Trout Bay. Average electron probe microanalysis of five grains gave: Co 26.4, Fe 0.4, Ni 0.8, Sb 56.8, S 14.9, total 99.3 (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 232).

PARAGONITE

$NaAl_3Si_3O_{10}(OH)_2$

Quebec

32 F/9 Paragonite, serpentine, chlorite, kaolinite and epidote are present as alteration products in a gabbro dyke composed originally of about 65 per cent labradorite, 25 per cent augite and 10 per cent magnetite. The dyke is located east of Barbie Lake, in the Bachelor Lake area, Abitibi Territory (W.W. Longely, 1951: Que. Dept. Mines, Geol. Rept., 47, p. 20).

32 G/13 Paragonite is present in small amounts in the Capisisit Lake granite, near the western boundary of the Branssat-Daine area, Abitibi-East County (J.E. Gilbert, 1955: Que. Dept. Mines, Geol. Rept., 64, p. 21).

PARARAMMELSBERGITE

$NiAs_2$

Northwest Territories

86 E/9 Minor amounts of pararammelsbergite, gersdorffite, cobaltite, and niccolite occur with matildite, native silver and bismuth, safflorite, skutterudite and rammelsbergite at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay, at 65°36'14"N, 118°06'45"W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

Ontario

31 M/4
31 M/5 Pararammelsbergite, a replacement mineral which can grow at the expense of chloanthite or niccolite, occurs with gersdorffite, chloanthite, rammelsbergite and niccolite at the Keeley, the Coniagas, and the Silver Bar mines, near Cobalt. Chemical analysis by Rickaby: Ni 17.46, Co 11.24, Fe 0.73, As 66.61, S 3.30, SiO_2 0.84, total 100.18; S.G. =6.73 (P. Ramdohr, 1947: Univ, Toronto Stud., Geol. Ser., 52, p. 9) (M.A. Peacock and A.S. Dadson, 1940: Am. Mineralogist, 25, p. 572).

31 M/5 Pararammelsbergite is also found at the Hudson Bay Mine, near Cobalt. Chemical analysis by Todd: Ni 27.08, Co 1.94, Cu 0.16, Fe 0.56, As 65.78, Sb 0.91, S 3.05, total 99.48; S.G. =7.02 (M.A. Peacock and A.S. Dadson, 1940: Am. Mineralogist, 25, p. 572).

41 P/9
41 P/10 A chemical analysis by Rodgers of pararammelsbergite from the Moose Horn Mine, at Elk Lake, in the Gowganda district, gave the following results: Ni 28.1, Co 0.4, As 68.5, S 2.6, total 99.6; S.G. =7.14 (M.A. Peacock and A.S. Dadson, 1940: Am. Mineralogist, 25, p. 573).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16 Electron probe microanalyses of pararammelsbergite in the Cobalt-Gowganda ores:

Ni	Co	Fe	As	Sb	S	Total
28.5	2.7	0.2	68.0	0.0	1.3	100.7
28.7	0.0	0.0	70.5	0.8	0.3	100.2
27.4	1.8	0.0	69.0	0.0	1.2	100.0
29.0	0.7	0.0	70.0	0.4	1.1	101.2
26.0	5.5	0.0	69.6	0.0	1.5	102.0
28.0	1.7	0.7	71.0	0.0	0.6	102.0
29.1	2.2	0.0	69.0	0.0	0.5	100.8

(W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 166)

Saskatchewan

74 K/6 Pararammelsbergite has been identified as a consituent of the ore at the D uranium deposit at 58°21'35"N, 109°00'08"W, east of the northern tip of Cluff Lake (V. Ruzicka, 1975: Geol. Surv. Can., Paper 75-1C, p. 279).

PARATACAMITE

$Cu_2(OH)_3Cl$

Nova Scotia

11 E/9 Paratacamite forms a bright green coating on copper-bearing fossil plant fragments and on sandstone at Knoydart Point. The rock is exposed along the shore of the Northumberland Strait just west of the mouth of the first brook on the west side of the Antigonish/Pictou county line (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 64-10. p. 51).

Ontario

31 M/5 Paratacamite has been identified on specimens collected from rock dumps at the Nova Scotia Mine. The mine is 2.4 km from Cobalt along the Cobalt-Brady Lake road (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 42).

Prince Edward Island

11 L/5 Paratacamite occurs as blue-green to bright green finely-granular patches up to 2 cm across in red breccia exposed at low tide at the south

shore of Malpeque Bay, about 2.4 km from Sherbrooke (Ann P. Sabina, 1965; Geol. Surv. Can., Paper 65-10, p. 61).

Quebec

32 D/9 A minor amount of paratacamite was identified on drill core from an ultramafic deposit near Amos, explored by Dumont Nickel Corporation (J.L. Jambor, 1975: Geol. Surv. Can., paper 75-1A, p. 261).

PARISITE

$(Ce,La)_2Ca(CO_3)_3F_2$

This fluo-carbonate mineral was originally found in emerald deposits which occur in intensely folded carbonaceous shales in the Muzo district, north of Bogota, Columbia. Subsequent reported occurrences have been in alkaline rocks.

Ontario

42 D/9 Parisite and bastnaesite have been found in syenite pegmatite near Marathon. The parisite replaces long (up to 20 millimetres) crystals of bastnaesite. In most cases only a thin core of bastnaesite remains surrounded by numerous small parisite crystals (J.A. Mandarino and W.M. Tovell, 1963: Can. Mineralogist, 7, p. 819).

Quebec

31 H/11 Parisite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

PARKERITE

$Ni_3(Bi,Pb)_2S_2$

85 I/2 Specimens from the Gros Cap area, 3.2 km north of Great Slave Lake and 4.8 km east of the François River, consisted of closely spaced compact masses of botryoidal niccolite and rammelsbergite, cemented by a carbonate gangue and covered with much earthy annabergite. In polished section, the niccolite was seen to contain a series of bluish grey dots of parkerite (0.01 millimetre) along an arc parallel to its outer boyryoidal surface, as well as a few larger areas (0.02 millimetre) which showed distinct multiple twinning (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 506).

Ontario

31 M/12 At the Langis Mine, Casey Township, Cobalt-Gowganda area, lead-free parkerite occurs as a component of sulphide grains within arsenides. It generally surrounds the bismuth and is intergrown with or adjacent to bismuthinite, and is also closely associated with cobalt-pentlandite and linnaeite. Electron probe microanalysis by D.C. Harris: Ni 30.3, Bi 60.1, S 9.1, total 99.5 (W. Petruk, D.C. Harris and J.M. Stewart, 1969: Can. Mineralogist, 9, p. 597-616).

41 I/6 Parkerite has been identified in the nickel ore at Sudbury. It is recognized by its pale cream colour and striking lamellar twinning revealed both by pleochroism and double refraction. It occurs as irregular equidimensional, rounded and subhedral particles varying in size from 0.1 to 3 millimetres. A less common occurrence is in veinlets or stringers 2.0-3.0 millimetres long and .1 to .2 millimetres wide near contacts of massive ores. Most occur in galena associated with hessite, tetradymite, native bismuth and native gold (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7, p. 41).

PARSONITE

$Pb_2UO_2(PO_4)_2.2H_2O$

41 N/2 Specimens of parsonite from the Ranwick Mine in the southwest corner of Peever Township are listed in the catalogue of Ontario minerals in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 272).

PEARCEITE

$(Ag,Cu)_{16}(As,Sb)_2S_{11}$

Pearceite and polybasite have been considered to be the As and Sb dominant members of a single solid solution series. Peacock and Berry (1947) showed that these minerals are not isostructural because the cell dimensions of polybasite are doubled as compared to those of pearceite. Frondel (1963) has shown that the antimony analogue of pearceite and the arsenic analogue of polybasite occur in nature and he has named these antimonpearceite and arsenopolybasite, respectively. Thus, pearceite-antimonpearceite and arsenopolybasite-polybasite probably form two complete solid solution isodimorphous series having the same composition range, $(Ag,Cu)_{16}(As,Sb)_2S_{11}$-$(Ag,Cu)_{16}(Sb,As)_2S_{11}$. The members of both series are monoclinic but the cell dimensions of the polybasite-arsenopolybasite series are all double those of the pearceite-antimonpearceite series (M.A. Peacock and L.G. Berry, 1947: Mineral Mag., 28, pp. 1-13) (C. Frondel, 1963: Am. Mineralogist, 48, p. 565).

Northwest Territories

86 F/13 Pearceite is reported to a constituent of the silver-uranium deposit on the B.E.A.R. property on the north shore of Contact Lake about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 761).

Ontario

31 M/5 The mineral collection at the Royal Ontario Museum includes a specimen of pearceite associated with acanthite and native silver from the Silver Miller Mine, lot 2, conc. III, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 273).

41 P/10 Pearceite has been found intergrown with stromeyerite in a sample from the Morrison Mine. Electron probe microanalysis by D.C. Harris: Ag 58.1, Cu 11.9, As 4.4, Sb 2.0, Bi 7.0, S 15.7, total 99.1 (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 208).

42 A/8 The occurrence of pearceite has been reported at the Ross Mine at Holtyre on Highway 572 about 8.8 km from Highway 11, Hislop Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 112).

42 A/11 Pearceite is an accessory mineral in the ore at the Kidd Creek Mine, lots 3 and 4, conc. V, Kidd Township, about 27 km north of Timmins (R.R. Walker, A. Matulich, A.C. Amos, J.J. Watkins and G.W. Mannard, 1975: Econ. Geol., 70, p. 80).

Quebec

32 C/4 Material from the unique, high grade ore shoot at Golden Manitou Mines, in Bourlamaque Township, Abitibi County, was found to contain pearceite. The mineral was identified by X-ray powder pattern by R.M. Thompson and by E.W. Nuffield and D.H. Gorman in solid, compact, masses of sulphide ore associated with galena, tetrahedrite, chalcopyrite, sphalerite, arsenopyrite, pyrite and native silver (M.H. Frohberg: personal communication).

PECTOLITE

$NaCa_2Si_3O_8OH$

Pectolite occurs typically with zeolites in cavities and fissures in basic igneous rocks. It generally forms close aggregates of acicular, brittle, sharp-pointed crystals that must be handled carefully to avoid cutting the hands.

Newfoundland

12 G/8
12 H/5 Fine-grained aggregations of prehnite, pectolite, phologopite and xonotlite are exposed in four places along the walls of a stream draining into the North Arm in the Bay of Islands, in western Newfoundland. The largest body is 16 m by 3 m (C.H. Smith, 1954: Am. Mineralogist, 39, p. 531).

12 H/5 Massive white pectolite is associated with pink xonotlite at an outcrop on the east bank of Winter House Brook near its headwaters just north of the mouth of a stream flowing from the east (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 130).

Ontario

52 A/3 Pectolite occurs as radiating fibrous aggregations at McKellar Point, Crooks Township, in the Thunder Bay district (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 51T).

52 A/10 A specimen of pectolite in the mineral collection of the Royal Ontario Museum is from Silver Harbour, MacGregor Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 274).

52 H/8 Pectolite, prehnite, analcite and scapolite occur as fillings in crevices in olivine diabase, in railway cuts between Orient Bay station and Fairclough in the Lake Nipigon region. The pectolite crystals are bladed and radiating and their maximum length is about 2.5 cm. Chemical analysis by H.C. Rickaby: SiO_2 53.28, Al_2O_3 0.16, Fe_2O_3 0.48, MnO 0.33, CaO 33.41, MgO 0.26, Na_2O 9.14, K_2O 0.25, H_2O 2.70, total 100.01; S.G. 2.857 (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 17).

52 H/8 Pectolite is reported in diabase at George Creek, 1 km from Highway 11, east-northeast of North Sinclair Lake. A specimen is included in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 254).

Quebec

21 E/13 Pectolite occurs as tabular crystals, as acicular to fibrous bundles, and as "bow-tie" aggregates at the Jeffery Mine. The crystals are up to 2 cm long and generally less than 1 cm wide. They are mainly translucent and white to grey in colour. The mine is on lots 9 and 10, ranges II and III, Shipton Township, Richmond County, at 45°46'25"N, 71°57'12"W (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

21 L/3 Pectolite occurs as acicular crystals and in massive forms at the King Mine, on lot 26, range V, Thetford Township (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 173).

21 L/3 Pectolite is found at Thetford Mines in intimate association with apophyllite in cavities in a granite or aplite rock in the serpentine deposits. Analysis by E.W. Todd: SiO_2 54.18, Fe_2O_3 0.18, FeO 0.42, CaO 33.36, Na_2O 8.72, K_2O 0.88, H_2O 2.74, total 100.48; S.G.=2.834 (A.L. Parsons, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 55).

22 B/5 Masses of white, compact-fibrous pectolite are common in the serpentine on lot 5, range III, and lots 11 and 12, range IV, in Awantjish Township, Matapedia County (E. Aubert de la Rue, 1941: Que. Dept. Mines, Geol. Rept., 9, p. 22).

31 H/11 Inclusions of coarse-grained pectolite and calcite with abundant dark green soda-amphibole occur in nepheline syenite at the Desourdy Quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

PEKOITE

$CuPbBi_{11}S_{18}$

Manitoba

52 L/6 A mineral previously identified as "aikinite-bismuthinite intergrowths" in a specimen from the Tanco pegmatite, Bernic Lake, has been re-examined and identified as consisting of ex-solved blebs of gladite in a pekoite host. Electron mircroprobe analysis of the pekoite: Cu 0.6, Pb 1.1, Bi 75.0, Sb 3.5, S 19.0, total 99.2 (D.C. Harris and T.T. Chen, 1976: Can. Mineralogist, 14, p. 194).

PELLYITE

$Ba_2Ca(Fe,Mg)_2Si_6O_{17}$

Yukon

105 J/16 Pellyite was described for the first time from a contact metasomatic deposit near the headwaters of the Ross and Pelly rivers about 3.2 km southwest of Gillespite Lake. Chemical analysis by Sharples, Elridge and Company of Vancouver: SiO_2, 40.50, BaO 34.16, CaO 6.25, FeO 12.46, MnO 0.57, MgO 1.46, ZnO 1.05, Al_2O_3 3.53, total 99.98. Associated minerals include: barite, hedenbergite, quartz, andradite, taramellite, gillespite, sanbornite, chalcopyrite, witherite (J.H. Montgomery, R.M. Thompson and E.P. Meagher, 1972: Can. Mineralogist, 11, p. 444).

PENIKISITE

$Ba(Mg,Fe,Ca)_2Al_2(PO_4)_3(OH)_3$

Yukon

117 A/9 Penikisite, the magnesium analogue of kulanite, was found with kulanite in specimens from a phosphate occurrence at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams.

The mineral is named after one of the finders of the occurrence, Mr. Gunar Penikis. Associated phosphate minerals are: lazulite, wardite, vivianite, childrenite, ludlamite, metavivianite, arrojadite, augelite and brazilianite (J.A. Mandarino, B.D. Sturman and M.I. Corlett, 1977: Can. Mineralogist, 15, p. 393).

penninite

(see CHLORITE)

PENTLANDITE

$(Fe,Ni)_9S_8$

Pentlandite is found in basic igneous rocks, closely associated with pyrrhotite, where it probably formed by a process of magmatic segregation. It closely resembles pyrrhotite in hand specimens but may be distinguished from it by prominent octahedral parting. Pentlandite is the most important world source of nickel, and about two-thirds of the world production comes from Canadian pentlandite-pyrrhotite ores.

British Columbia

92 H/6 Thirteen orebodies of various sizes outcrop on the surface at the British Columbia Nickel Mines property, 11 km by road up Stulkawhits Creek from Choate on the Canadian Pacific railway. The main minerals are pyrrhotite, chalcopyrite, pentlandite, pyrite, chromite, and magnetite (H.C. Horwood, 1936: Geol. Surv. Can., Paper 36-4, p. 6).

104 I/7 Chalcopyrite and pentlandite occur with pyrrhotite in a pyroxenite-peridotite body on Turnagain River, 3.2 km northeast of Hard Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 544).

Manitoba

52 L/5 Argentian pentlandite containing up to 14 per cent silver has been found in samples from the Ore Fault claims of Bird River Mines Company in Township 17, Range 15E. Average of four electron microprobe analyses normalized to 100 per cent: Fe 33.3, Ni 22.1, Ag 13.6, S 31.0 (S.D. Scott and E. Gasparrini, 1973: Can. Mineralogist 12, p. 165).

52 L/6 Solid masses and stringers of pyrrhotite, chalcopyrite, pyrite, cubanite, magnetite, pentlandite and violarite are exposed on the Martin-Devlin, Chance and Wento claims on the north side of the Bird River, about 4.4 km north of the Bernic Lake Mine (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 58).

63 J/10 The ore at the Manibridge (Wabowden) Mine consists of disseminated and massive pyrrhotite, pentlandite, pyrite, chalcopyrite and violarite. The mine is 4.5 km south of Highway 391 from a point 7.5 km east of the bridge over Kiski Creek (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 70).

63 K/13
63 O/13 Pentlandite is a constituent of the nickel ores of the Thompson Moak Lake belt. It occurs finely disseminated in serpentinized peridotite or mixed with schist and gneiss fragments which are penetrated and partly replaced (H.B.D. Wilson and W.C. Brisbin, 1961: Can. Inst. Mining Met., Bull. 54, p. 820).

63 O/1
63 O/8 The Soab South, Soab North, Pipe, Birchtree, Thompson and Moak Lake nickel mines lie along a

63 P/12
63 P/13 fault zone that extends for 160 km from Setting Lake to the Mystery Lake-Moak Lake area. The ores consist mainly of pyrrhotite, pentlandite and pyrite with lesser amounts of chalcopyrite, magnetite and marcasite (Ann P. Sabina, 1972; Geol. Surv. Can., Paper 71-27, p. 71-75.

New Brunswick

21 G/3 Pentlandite occurs in gabbro with pyrrhotite and chalcopyrite at Woodward Farm property, Dennis Stream, and at the Saint Croix River, in Charlotte County; in nickeliferous pyrrhotite and pyrite in gabbro at Milltown Reservoir, and at Crocker Island, in Charlotte County (G.S. MacKenzie, 1940: New Brunswick Mines Br., Paper 40-6). The ore at the Atlantic Nickel Company property at Rogers Farm consists of pentlandite, nickeliferous pyrrhotite, chalcopyrite and pyrite bodies of gabbro (New Brunswick Mines Br., files).

21 J/6 Pentlandite occurs in diorite and gabbro at Becaquimec Lake, York County, with chalcopyrite, chalcocite, pyrite and pyrrhotite (F.D. Anderson et al., Geol. Surv. Can., Map 37-1959).

21 O/8 Pentlandite occurs in gabbro at Goodwin Lake, in Northumberland County (New Brunswick Mines Br., files).

Northwest Territories

55 K/16 A deposit of pyrrhotite carrying pentlandite and chalcopyrite is mined for nickel on the holdings of North Rankin Nickel Mines Limited, Rankin Inlet, situated on the west side of Hudson Bay, in the Keewatin district. The host rock of the ore is ultrabasic, the ore lying along the lower contact of a convoluted sill (G.J.R. Hannah, 1961: Precambrian, vol. 34, No. 1, p. 14).

Ontario

31 M/4 Pyrrhotite and pentlandite are associated with chalcopyrite and pyrite in serpentinized peridotite at a deposit located on a gossan-covered knoll on the west side of a pond about 1.6 km south of Kanichee (Cedar Lake) (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 7).

41 I/6 Pentlandite is common in the Sudbury district and occurs in particular at the following localities:

Evans Mine, lot 1, conc. I, Snider Township. Analyses by Browne: (1) S 35.43, Fe 29.95, Ni 34.12, total 99.50; (2) S 33.35, Fe 29.60, Ni 34.90, total 98.05.

Copper Cliff Mine, lot 12, conc. II, McKim Township. Analyses by Browne: (1) S 34.35, Fe 29.80, Ni 35.05, total 99.20; (2) S 33.50, Fe 30.30, Ni 35.00, total 98.80 (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 94H) (D.H. Browne, 1863: Eng. & Mining J., LVI, p. 566).

Creighton Mine, lot 10, conc. I, Snider Township. Analyses by Dickson: S 32.90, Fe 30.00, Ni 34.82, Co 0.84, total 98.56 (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 94H) (C.W. Dickson, 1903: Trans. Am. Inst. Mining Eng., XXXIV, p. 1) (A.D. Pearson and M.J. Buerger, 1956: Am. Mineralogist, 41, p. 804).

Worthington Mine, lot 2, conc. II, Drury Township. Analyses by Dickson: S 32.30, Fe 29.17, Ni 33.70, Co 0.78, total 95.95. Chief

mineral is pentlandite with pyrrhotite, chalcopyrite, millerite and violarite (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 94H) C.W. Dickson, 1903: Trans. Am. Inst. Mining Eng., XXXIV, p. 1) (M.N. Short and E.V. Shannon, 1930: Am. Mineralogist, 15, p. 1).

Vermilion Mine, lot 6, conc. IV, Denison Township (M.N. Short and E.V. Shannon, 1930: Am. Mineralogist, 15, p.1).

Lots 1 and 2, conc. II, Drury Township; and lot 12, conc. III, Denison Townships are reported to have occurrences of folgerite (a synonym of pentlandite) (S.H. Emmons, 1892: J. Am. Chem. Soc., XIV, p. 7).

41 I/7 The pentlandite of the Sudbury area is without crystal forms but has a characteristic octahedral cleavage (A.P. Colemanm 1916: Can. Mining J., 36, p. 389).

A chemical analysis of pentlandite from the Sudbury district gave the following results: S 33.42, Fe 30.25, Ni 34,23, Co 0.85, insol. 0.67, total 99.42; S.G. 4.94 (S.L. Penfield, 1893: Am. J. Sci., Ser. 3, XLV, p. 493).

41 I/10 A chemical analysis by Browne of pentlandite from the Stobie Mine lot 5, conc. I, Blezard Township, gave the following results: S 33.90, Fe 29.90, Ni 34.70, total 98.50 (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 94H) (D.H. Browne, 1863: Eng. & Mining J., LVI, p. 566).

Pentlandite occurs at the Falconbridge Nickel Mines and the Nardeena Mines Limited properties in Falconbridge Township (J.E. Thompson, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. VI, p. 33).

41 I/11 Pentlandite is the chief nickel mineral at the Levack Mine, lot 2, conc. IV, Levack Township (M.N. Short and E.V. Shannon, 1930: Am. Mineralogist, 15, p. 1).

An analysis by Dickson of pentlandite from the Frood Mine, lot 6, conc. VI, McKim Township, gave the following results: S 33.30, Fe 30.04, Ni 34.98, Co 0.85, total 99.17 (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 94H) (C.W. Dickson, 1903: Trans. Am. Inst. Mining Eng., XXXIV, p. 1).

42 A/3 Electron microprobe analysis of pentlandite from the Texmont Mine about 32 km south of Timmins in Bartlett-Geikie Township: Ni 43.48, Fe 22.49, Co 1.04, S 33.15, total 100.16 (A.J. Naldrett, E. Gasparrini, R. Buchan and J.E. Muir, 1972: Can. Mineralogist, 11, p. 879).

42 A/10 Pentlandite and pyrrhotite were the chief ore minerals at the Alexo Mine, a former nickel-copper producer in Clergue Township. Access to the mine is by a single-lane road to the right of Highway 67 at a point 17.8 km from its junction with Highway 101 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 122).

52 B/9 The Shebandowan Mine is situated at the southwest end of Lower Shebandowan Lake. The major sulphide minerals in the orebody are pyrrhotite, pentlandite, chalcopyrite and pyrite. Polydymite, bravoite, violarite and millerite are present in minor amounts (J.A. Morin, 1973: Ont. Div. Mines, GR110, p. 21).

52 F/5
52 F/12 The ore at the property of Kenbridge Nickel Mines Limited, at Kathleen Lake, in the Kenora district, is made up of disseminated and massive pyrite, pyrrhotite, pentlandite, and chalcopyrite (J.C. Davies and S.N. Watowich, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. IV, p. 20).

52 F/13 Sulphide minerals including pentlandite occur in large quantities on the Eastern Mining & Smelting Corporation Limited property in the Gordon Lake area, District of Kenora (H.D. Carlson, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. IV, pp. 22-24).

Quebec

32 D/8 Millerite, pentlandite and pyrite are the main sulphide minerals at the No. 2 Mine of Marbridge Mines Limited on lots 9 to 13, range V, LaMotte Township, about 22.5 km north of Malartic. An electron microprobe analysis of the pentlandite by J. Rucklidge showed that it was unusually rich in nickel: Ni 42.64, Fe 25.03, Co 0.16, S 32.17, total 100.00 (R. Buchan and J.H. Blowes, 1968: C.I.M.M. Bulletin, 61, p. 532).

Saskatchewan

74 A/7 Pentlandite is a constituent of the ore at the Rottenstone Mine. Pyrrhotite, violarite and chalcopyrite are the most abundant minerals. The deposit is on the southeast shore of Rottenstone Lake, 144 km north-northeast of La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 8).

Yukon

115 F/15 The nickel-copper sulphides pyrrhotite-pentlandite-chalcopyrite occur with sphalerite, pyrite and marcasite mainly as disseminations, less commonly as massive lenses, in very fine-grained volcanic rocks on the Canalask Nickel Mines property on the east and west banks of the White River. The property is reached by a 4.5 km access road that leaves the Alaska Highway at km 1878 (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 50).

115 G/5 Massive sulphides, mainly pyrrhotite, chalcopyrite, and pentlandite with minor sphalerite, have been discoverd on the Wellgreen property on Nickel Creek, a small tributary of Quill Creek, about 16 km west of Burwash Flats. The property may be reached by a 11 km access road from the Alaska Highway near km 1787 (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 52).

Electron microprobe analyses of pentlandite from Canadian deposits by D.C. Harris, CANMET:

Deposit	Ni	Fe	Co	S	Total
Atikokan	38.2	27.8	n.d.	32.3	98.3
Bird River	37.2	26.8	2.8	33.0	99.8
Creighton	35.7	30.1	0.8	33.3	99.9
Dumbarton	33.3	28.2	6.2	33.3	101.0
Dumbarton	33.0	27.5	6.3	32.7	99.5
Dumbarton	32.6	27.3	6.5	33.5	99.9
Dumbarton	35.9	27.8	1.7	32.6	98.0
Dumbarton	37.0	28.8	1.3	33.6	100.7
Dumbarton	37.1	27.8	1.7	32.7	99.3
Dumbarton	37.7	28.1	1.5	33.1	100.4
Dumont	27.8	37.7	1.9	33.0	100.4
Dumont	27.5	35.4	2.5	33.0	98.4
Dumont	28.4	32.9	4.6	32.9	98.8
Dumont	28.8	37.4	0.9	33.2	100.3
Dumont	29.4	36.7	1.0	32.4	99.5
Dumont	24.6	41.0	1.3	33.5	100.4
Dumont	31.0	24.3	11.9	32.4	99.6
Dumont	31.8	22.2	13.3	32.6	99.9
Expo Ungava	35.8	32.9	0.0	32.5	101.2
Falconbridge	36.4	28.2	1.5	32.2	98.3
Helen	41.2	19.5	5.3	33.5	99.5
Long Lac	35.8	28.0	2.4	32.7	98.9
Lorraine	37.9	27.4	0.9	33.6	99.8
Marbridge	35.2	30.2	0.3	33.3	99.0
Marbridge	36.2	28.4	0.6	33.8	99.0
Marbridge	38.8	27.3	0.2	33.3	99.6
Marbridge	40.9	24.9	0.7	32.9	99.4
Marbridge	40.9	25.2	1.0	32.9	100.0
Marbridge	41.2	23.4	2.3	32.3	99.2
Marbridge	39.7	25.0	0.4	35.4	100.5
Marbridge	40.0	24.1	1.0	33.1	98.2
Marbridge	40.8	24.1	1.0	33.1	99.0
Marbridge	42.1	25.0	1.3	33.7	102.1
Marbridge	42.6	24.2	0.8	35.1	102.7
Marbridge	41.7	24.1	0.7	32.8	99.3
Marbridge	41.4	24.9	0.4	31.6	98.3
Marbridge	41.8	24.2	0.9	32.2	99.1
Marbridge	42.0	23.1	0.3	33.2	98.6
Marbridge	42.6	23.0	0.7	33.9	100.2
Marbridge	42.6	25.0	0.2	32.2	100.0
Marbridge	43.4	22.6	1.5	32.7	100.2
McKim	35.2	28.1	2.3	32.1	97.7
McWatters	43.3	24.1	0.1	32.5	100.0
Muskox	25.2	37.9	5.1	32.1	100.3
Muskox	26.5	38.9	1.1	32.7	98.9
Muskox	28.1	37.7	2.6	32.8	101.2
Muskox	31.0	33.5	2.6	33.1	100.2
Nicopor	38.3	28.5	0.7	32.6	100.1
Old Nick	32.6	32.8	1.2	32.2	98.8
Strathcona	34.5	29.9	1.3	32.2	97.9
Strathcona	35.2	29.8	2.5	32.8	100.3
Strathcona	35.4	29.8	2.2	33.1	100.5
Strathcona	35.0	30.5	1.4	32.5	99.4
Strathcona	35.1	29.7	1.0	32.4	98.2
Strathcona	35.9	29.2	1.2	33.2	99.5
Strathcona	37.9	29.6	0.8	33.0	101.3
Strathcona	34.5	29.3	2.6	33.2	99.6
Strathcona	37.0	30.2	0.4	32.8	100.4
Strathcona	40.5	24.3	1.4	32.5	98.7
Texmont	34.7	30.8	0.7	32.3	98.5
Texmont	37.9	28.7	0.5	33.1	100.2
Texmont	38.6	27.4	1.0	32.8	99.8
Texmont	42.0	21.8	1.6	32.8	98.2
Texmont	44.2	22.8	0.9	32.9	100.8

The locations of the deposits are as follows:

Atikokan	52 B/14	Hutchinson Township, Ontario
Bird River	52 L/5	Lac du Bonnet, Manitoba
Creighton	41 I/6	Sudbury, Ontario
Dumbarton	52 1/12	Lac du Bonnet, Manitoba
Dumont	32 D/8	Val d'Or, Quebec
Expo Uhngava	35 M/11	Wakeham Bay, Ungava, Quebec
Falconbridge	41 I/10	Sudbury, Ontario
Helen	104 P/4	McDame Creek, British Columbia
Long Lac	42 E/15	Rainy River, Ontario
Lorraine	31 M/7	Gaboury Township, Quebec
Marbridge	32 D/8	Malartic, Quebec
McKim	41 I/11	Sudbury, Ontario
McWatters	42 A/6	Langmuir Township, Ontario
Muskox	86 J/14	Coppermine, Northwest Territories
Nicopor	42 D/14	Schreiber, Ontario
Old Nick	82 E/3	Bridesville, British Columbia
Strathcona	41 I/11	Sudbury, Ontario
Texmont	42 A/3	Bartlett-Geikie Township, Ontario

(D.C. Harris and E.H. Nickel, 1972: Can. Mineralogist, 11, p. 861)

peridot

(see OLIVINE)

peristerite

(see ALBITE)

PEROVSKITE

$CaTiO_3$

Perovskite was originally found as fine pseudocubic crystals in chlorite schist, and later in talc schist. More characteristically, it occurs as an accessory or late deuteric mineral in basic and alkalic igneous rocks, especially rocks containing melilite, nepheline, or leucite, and as a metamorphic product in crystalline limestone in contact with alkalic or basic intrusives. Dysanalyte and loparite are synonyms for niobian perovskite, and knopite is a synonym for cerian perovskite.

British Columbia

82 N/1 Knopite (cerian perovskite) occurs in small bunches, up to 7 cm in diameter, in a fairly coarse pegmatite composed essentially of hornblende, biotite, and magnetite, on Moose Creek, about 42 km by trail southeast of Leanchoil. The pegmatite is a lenticular body, 9 m wide, intruding alkaline rocks at an elevation of 2,600 m on the ridge between Moose Creek and the west branch of the Vermilion River. Chemical analyses by H.V. Ellsworth: SiO_2, 2.17, TiO_2 54.49, Al_2O_3 0.68, Fe_2O_3 2.85, CaO 35.10, MgO 0.21, MnO 0.08, K_2O 0.07, Na_2O 0.46, SnO_2 0.04, ThO_2 0.06, $(Ce,La,Di)_2O_3$ 2.33, $(Yt,Er)_2O_3$ 0.05, H_2O 0.68, total 99.27 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol, Ser., 11, p. 262).

Quebec

31 G/8 Perovskite occurs with pyrochlore and niocalite in a niobium ore deposit in the Oka district east of Montreal. The ore deposit is in a complex of carbonate and alkaline rocks (R. Guimond, 1963: Precambrian, vol. 36, No. 5, p. 14).

31 G/8
31 G/9 Minerals of the perovskite - latrappite series occur in the rocks of the Oka Complex, located about 32 km west of Montreal on the north shore of the Lake of Two Mountains. The composition varies from niobium - poor perovskite in the silicate rocks to niobian perovskite and latrappite in the carbonate rocks. Chemical analyses of perovskites are as follows: I, brown perovskite from an alkaline dyke on the Oka Rare Metals property, TiO_2 51.20, CaO 38.20, Nb_2O_5 0.69, Ta_2O_5 0.07, Na_2O 0.31, K_2O 0.23, CeO_2 1.60, Nd_2O_5, 0.23, La_2O_3 0.80, ZrO_2 0.13, SrO 0.35, MgO 0.12, Fe_2O_3 2.84, ThO_2 0.17, H_2O^+ 1.44, total 98.22. II, black niobian perovskite from okaite, Dufresne Hill, TiO_2 51.79, CaO 33.88, Nb_2O_5 4.86, Ta_2O_5 0.39, Na_2O 0.67, Ce_2O_3 0.19, Fe_2O_3 5.85, FeO 0.86, SiO_2 0.48, H_2O^+ 0.40, Al_2O_3 0.44, total 99.81.

III, black niobian perovskite from monticellite calcite rock, TiO_2 38.63, CaO 33.16, Nb_2O_5 15.80, Ta_2O_5 1.32, Na_2O 1.22, Ce_2O_3 0.26, Fe_2O_3 7.45, FeO 0.86, SiO_2 0.48, H_2O^+ 0.32, Al_2O_3 0.36, total 99.86. IV, black niobian perovskite from monticellite calcite rock, Bond Zone, TiO_2 25.00 CaO 28.70, Nb_2O_5 27.60, Ta_2O_5 2.79, Na_2O 3.75, K_2O 0.22, CeO_2 2.04, Nd_2O_3 0.30, La_2O_3 0.94, ZrO_2 0.95, SrO 0.65, Fe_2O_3 6.38, MnO 0.10, Tho_2 0.04, H_2O^+ 0.90, total 100.36 (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 G/12 Perovskite occurs in serpentine marble at the Maxwell and Stephen Cross quarries which were mined for brucite near Wakefield (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 257).

32 F/9 Kimberlite forms small bodies intruding the rocks near Bachelor Lake in Lesueur Township, Abitibi Territory. The kimberlite has porphyritic and panidiomorphic textures, and consists of olivine, phlogopite, calcite, augite, perovskite, magnetite, ilmenite, apatite, and chlorite (K.D. Watson, 1955: Am. Mineralogist, 40, p. 565).

Yukon

105 D/10
105 D/11
105 D/14 Shiny black specks of perovskite are rare in serpentine and calcite at the Whitehorse copper deposits (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 46).

PERRIERITE

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

Ontario

31 E/1 Reddish brown striated plates of perrierite occur sparingly in crystalline limestone exposed by a shallow open-cut on the northern part of the property of Desmont Mining Corporation Limited near Wilberforce (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 F/11 Black, resinous to adamantine plates of perrierite are sparsely distributed in crystalline limestone exposed by a roadcut on Highway 60, 2.3 km west of Golden Lake village (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

perthite

(see POTASSIUM FELDSPAR)

PETALITE

$LiAlSi_4O_{10}$

Manitoba

52 L/6 Petalite has been identified at the Montgary deposit and the Peg and Coe claims at Bernic Lake, Manitoba (M.H. Frohberg, 1962: private communication).

52 L/6 Log-shaped and tabular crystals of petalite up to 2 m long occur with spodumene in a zone adjacent to the pollucite body in the Tanco pegmatite at Bernic Lake. Chemical analyses by K. Ramlal and R.M. Hill: grey petalite, SiO_2 77.85, Al_2O_3 16.60, Fe_2O_3 0.053, MgO 0.028, CaO 0.01, Li_2O 4.54, Na_2O 0.145, K_2O 0.050, Rb_2O 0.036, Cs_2O 0.136, H_2O^+ 0.37, H_2O^- 0.13, P_2O_5 0.03, total 99.98; white petalite, SiO_2 77.60, Al_2O_3 16.66, Fe_2O_3 0.053, MgO 0.012, CaO 0.00, Li_2O 4.84, Na_2O 0.117, K_2O 0.040, Rb_2O 0.016, Cs_2O 0.021, H_2O^+ 0.47, H_2O^- 0.11, P_2O_5 0.04, total 99.98 (P. Černý and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 663).

Ontario

30 M/11 Petalite was found with tremolite in a large boulder on the shore of Lake Ontario at Toronto, York County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 481).

PETZITE

$(Ag,Au)_2Te$

British Columbia

82 E/2 Petzite occurs with hessite, native copper, and other minerals at the Enterprise claim on the south side of Long (Jewell) Lake, in the Greenwood mining division (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 12R).

82 E/4 Petzite occurs with hessite, native gold, and other minerals in a vein on the Calumet claim, Kruger Mountain, on the western shore of Osoyoos Lake in the Yale district (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 12R).

82 E/4
82 E/5 X-ray powder photographs have confirmed the occurrence of petzite, associated with altaite and hessite, at the Hedley Monarch Gold Mines Limited property near Olalla in the Osoyoos mining division (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 351).

82 F/2 The telluride minerals petzite and hessite occur with pyrite, galena, sphalerite, chalcopyrite, tetrahedrite and scheelite at the Bayonne Mine at Bayonne Creek, a tributary of Summit Creek (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p.101).

Manitoba

52 M/4 A specimen of quartz from the San Antonio Mine at Bissett, contained small areas of calcite containing abundant gold and small grains of petzite (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 351).

New Brunswick

21 P/5 Petzite and krennerite are associated with chalcopyrite and occur as inclusions within pyrite and silicates at the Captain deposit on the headwaters of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland Counties, about 14 km from Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can., Paper 66-18, p. 12).

Ontario

31 M/13
32 D/4 Petzite occurs associated with calaverite, tetradymite, pyrite, gold, chalcopyrite, and sphalerite, at Boston Creek, Pacaud Township, in the Timiskaming district (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 99).

32 D/4 Petzite has been identified by X-ray powder diffraction in a specimen from the Bidgood Mine, Lebel Township Timiskaming district (E.W. Nuffield and D.H. Gorman, 1960: private communciation).

32 D/4 Quartz containing native gold and telluride minerals, including petzite, is found at the

Miller Independance Mine, lot 1, conc. IV, Pacaud Township (K.D. Lawton, 1957: Ont. Dept. Mines, Ann. Rept., vol. 66, Pt. V, p. 47).

32 D/4 At the Upper Canada Mine in Gauthier Township, petzite occurs as small areas in contact with calaverite, associated with altaite, chalcopyrite, pyrite, and gold (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 352).

42 A/1 Petzite, associated with other tellurides, sulphides and gold, occurs at the Sylvanite and the Toburn mines in the Kirkland Lake area (J.E. Hawley, 1948: Ont. Dept. Mines, Ann. Rept., vol. 57, Pt. V, p. 111). A chemical analysis by Rickaby of petzite from the Sylvanite Mine gave the following results: Au 21.56, Ag 35.86, Hg 6.90, Pb 0.24, Fe 0.56, Te 33.40, insol. 0.80, total 98.32.

42 A/1 Pezite occurs as disseminations in quartz porphyry and is associated with chalcopyrite and gold at the Lake Shore Mine, Kirkland Lake (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 351). Petzite also has been reported from the Wright- Hargreaves Mine in the same district.

42 A/1 At the Tough Oakes Burnside Mine, Kirkland Lake, petzite is found in a vertical fault vein. The petzite is associated with altaite, coloradoite, calaverite, melonite, and sulphides (A.G. Burrows, 1923: Ont. Dept. Mines, Ann. Rept. vol. 32, Pt. IV, p. 24) (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 99).

42 A/1 Petzite is associated with native gold in quartz gangue on the Labine-Smith claims, lot 9, conc. II, Maisonville Township, in the Timiskaming district (E. Thomson, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 98).

42 A/6 Petzite is sometimes intimately associated with ankerite at the 240 m level of the Hollinger Mine at Timmins. It occurs as films in cleavage cracks and, more rarely, as masses up to 12 mm in diameter. Analysis by H.C. Rickaby: Ag 49.57, Au 11.10, Fe 0.76, Co 0.76, Te 33.62, As 1.20, insol. 2.38, S tr., Sb tr., Ni tr., total 99.39; S.G. =7.53 (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 39).

42 A/8 In the Swastiska area, petzite occurs on the south half of lot 9, conc. II, Benoit Township (E. Thomson, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 98).

42 A/8 Petzite was reported to occur with rich concentrations of native gold encountered during mining operations at the Bourkes Mine. The deposit is at a bend in the Whiteclay River 2.1 km east of Highway 11 along the road to Bourkes (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 110).

52 B/10 Petzite, hessite, pyrite, chalcopyrite, nagyagite, and native gold occur in a quartz and carbonate gangue at the Huronian Mine (formerly the Moss or Ardeen Mine) in Moss Township, Thunder Bay district. On one surface of vein quartz the petzite occurs with hessite, as a massive black crust 5 millimetres thick. Analysis by Smith (1890): Au 23.691, Ag 41.062, Pb 0.071, Fe tr., Te 32.007, insol. 0.097, total 96.928 (E.Thomson, 1922 and 1931: Univ. Toronto Sutd., Geol. Ser., 14, p. 92, and 30, p. 52)(R.M. Thompson, 1949: Am. Mineralogist, 34, p. 351).

52 E/9 The chief metallic minerals in the Bigstone Bay area, Lake of the Woods, are tetradymite, calaverite, petzite, and pyrite, with lesser amounts of gold, chalcopyrite, and hessite (E.Thomson, 1935: Univ. Toronto Stud., Geol. Ser., 38, p. 48).

Quebec

31 M/7 Petzite has been identified by X-ray powder pattern in specimens from the Belleterre Mine, Guillet Township, Témiskamingue County (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Petzite is common in Abitibi County, Quebec, and occurs in particular at the following localities:

32 C/3 Bevcon (formerly Bevcourt) Mine in Louvicourt Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 352).

32 C/4 Siscoe Gold Mines property, Dubuisson-Vasson Township (P.E. Auger, 1940: Que. Dept. Mines, Prelim. Rept., 149, p. 8) (P.E. Auger, 1949: Que. Dept. Mines, Geol. Rept., 17, p. 21).

Lamaque Mine, Bourlamaque Township, and Sullivan Consolidated Mines in Dubuisson-Vasson Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 352).

32 D/1 Canadian Malartic Mine, Fournière Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 352).

32 D/3 Home Mine and Stadacona Mine, Rouyn Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 352).

32 D/6 Robb-Montbray property, Montbray Township (E. Thomson, 1928: Univ. Toronto Stud., Geol. Ser., 27, p. 12).

32 D/6 Petzite, rimmed by frohbergite, has been identified in specimens from Noranda (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 709-716).

Yukon

105 D/6 Petzite occurs on the Gold Reef claim, on Gold Hill in the Wheaton River district, associated with sylvanite, hessite, telluric ochre, pyrite and gold (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

PHARMACOSIDERITE

$Fe_3(AsO_4)_2(OH)_3.5H_2O$

Yukon

105 M/14 Pharmacosiderite has been identified by X-ray diffraction pattern in a specimen taken from the Comstock Mine adit in the Keno Hill - Sourdough Hill area, where it occurs as a yellow, botryoidal encrustation on arsenopyrite (X-ray laboratory, Geol. Surv. Can.).

PHENAKITE

Be_2SiO_4

Quebec

32 D/8 Phenakite is reported to occur in small quantities associated with beryl, fluorite and molybdenite in pegmatite on the Height of Land Mining Company property in Preissac Township, Témiskamingue County. The mineral was collected in 1911 by J.A. Bancroft and examined and identified by R.P.D. Graham (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 178).

PHILLIPSITE

$(K_2,Na_2,Ca)Al_2Si_4O_{12}.4\text{-}5H_2O$

British Columbia

93 K/4 Phillipsite, thomsonite and natrolite were identified on a specimen from Marinol Lake near Burns Lake (X-ray Laboratory, Geol. Surv. Can.).

Quebec

31 H/11 Phillipsite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

31 H/12 Phillipsite is present as snow white, sugary encrustation on igneous rocks at the Miron quarry, Jarry Street at Papineau Avenue, Montreal (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 253).

PHLOGOPITE

$K(Mg,Fe)_3Si_3AlO_{10}(OH,F)_2$

Phlogopite is an important member of the trioctahedral mica group. It forms a complete solid solution series with biotite and is arbitrarily defined as having a ratio of magnesium to iron atoms greater than two to one. In hand specimen, brown and reddish brown micas are commonly called phlogopite, and black micas are called biotite. The main occurrences of phlogopite are in metamorphosed limestones and in ultrabasic rocks.

Northwest Territories

65 N/7 Chemical analysis by G. Bender and S. Courville of phlogopite from lamprophyre dyke on an island in Outlet Bay, Dubawnt Lake (63°27'20"N, 100°51'W): SiO_2 41.34, Al_2O_3 14.94, TiO_2 1.43, Fe_2O_3 1.82, FeO 6.15, MgO 18.11, MnO 0.07, Cr_2O_3 0.93, NiO 0.03, K_2O 9.12, Na_2O 0.55, CaO 0.68, BaO 0.54, SrO 0.02, H_2O^+ 2.94, H_2O^- 0.08, F 0.74, P_2O_5 0.05, total 99.54, less O for F 0.31, total 99.23 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

Ontario

31 C/8 A crystal of phlogopite measuring 4 m in diameter and 10 m long was found at the Lacey Mine, Loughborough Township, Frontenac County (R.H. Jahns, 1953: Am. Mineralogist, 38, p. 567).

31 C/9
31 C/10 Zoned phlogopite occurs on lots 10 and 27, conc. XI, Bedford Township, Frontenac County (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 18).

31 C/10 Phlogopite with a marked zonal arrangement also occurs on lot 13, conc. XII, Loughborough Township (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 18).

31 C/16 Large, tabular, twinned crystals of phlogopite occur with apatite at the Adams Mine, lot 6, conc. VIII, North Burgess Township. Specimens from this locality have been donated to the National Mineral Collection.

31 C/16 Mica occurs in pyroxenite at the Pike Mine as large sheets and as large aggregates (about 30 cm across) of cleavage plates. Its colour varies from silvery-amber to dark brown. The deposit is located about 11 km south of Perth, near the north end of Pike Lake (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 34).

31 D/16 Chemical analysis by G. Bender and S. Courville of phlogopite from a calcite-pyroxenite vein in Monmouth Township at 44°55'N, 78°20'W: SiO_2 42.3, Al_2O_3 10.0, TiO_2 0.40, Fe_2O_3 0.0, FeO 2.59, MgO 26.8, MnO 0.0, K_2O 9.9, Na_2O 0.9, CaO 1.0, BaO 0.2, H_2O^+ 2.10, H_2O^- 0.5, F 4.3, P_2O_5 0.0, total 101.00, less O for F 1.8, total 99.2 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

31 E/1 Chemical analyses by G. Bender and S. Courville:

(1) phlogopite from pyroxenite (45°02'N, 78°09'W): SiO_2 41.4, Al_2O_3 10.2, TiO_2 0.40, Fe_2O_3 3.7, FeO 4.22, MgO 23.2, MnO 0.2, K_2O 10.0, Na_2O 0.3, CaO 0.9, BaO 0.3, H_2O^+ 1.85, H_2O^- 0.35, F 4.2, total 100.9, less O for F 1.8, total 99.1.

(2) phlogopite from calcite-fluorite dyke 45°01'N,78°12'W): SiO_2 43.4, Al_2O_3 9.4, TiO_2 0.70, Fe_2O_3 0.6, FeO 5.55, MgO 21.8, MnO 0.1, K_2O 10.0, Na_2O 0.3, CaO 0.9, BaO 0.3, H_2O^+ 1.35, H_2O^- 0.25, F 5.7 total 100.4, less O for F 2.4, total 98.0 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull, 149, p. 10).

31 F/4 Chemical analysis of phlogopite from pyroxenite at 45°08'N, 77°50'W, by G. Bender and S. Courville: SiO_2 42.8, Al_2O_3 10.1, TiO_2 0.30, Fe_2O_3 1.3, FeO 0.79, MgO 26.4, K_2O 9.7, Na_2O 0.5, CaO 1.3, BaO 0.3, H_2O^+ 2.15, H_2O^- 0.35, F 4.21, total 100.2, less O for F 1.8, total 98.4 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull, 149, p. 10).

Quebec

23 I/10 Chemical analysis of phlogopite from gneiss at 54°45'N, 65°00'W, by G. Bender and S. Courville: SiO_2 41.5, Al_2O_3 12.07, TiO_2 1.25, Fe_2O_3 1.92, FeO 6.90, MgO 21.3, MnO 0.06, Cr_2O_3 0.23, NiO 0.06, K_2O 9.55, Na_2O 0.39, CaO 0.40, BaO 0.27, H_2O^+ 1.40, H_2O^- 0.04, F 3.33, P_2O_5 0.05, total 100.72, less O for F 1.4, total 99.32 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

31 G/5 Chemical analysis by G. Bender and S. Courville of phlogopite from old mica mine near Old Chelsea (45°30'N, 75°48'W: SiO_2 39.12, Al_2O 18.24, TiO_2 0.54, Fe_2O_3 0.96, FeO 1.27, MgO 24.47, MnO 0.03, Cr_2O_3 0.02, K_2O 9.46, Na_2O 0.34, CaO 0.26, BaO 0.25, H_2O^+ 2.88, H_2O^- 0.32, F 2.28, P_2O_5 0.06, total 100.5, less O for F 0.96, total 99.54 (J.H.Y. Rimsaite, 1967: Geol. Surv. Can., Bull. 149, p. 10).

31 G/8
31 G/9 Chemical analysis of phlogopite from pyroxene-pyrochlore-calcite rock, Oka Complex, 32 km west of Montreal on the north shore of the Lake of Two Mountains: SiO_2 39.44, Al_2O_3 8.56, TiO_2 0.15, Fe_2O_3 3.81, FeO 5.17, MnO 1.63, MgO 25.86, CaO 0.32, Na_2O 0.17, K_2O 11.94, P_2O_5 0.17, H_2O^+ 1.36, H_2O^- 0.04, CO_2 nil, F 1.83, less O for F 0.75, total 99.70. Analyst: W.H. Herdsman (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 G/12 The National Mineral Collection contains specimens from the following localities in Gatineau County: lot 10, range XII, Hull Township; lot 7, range I; lot 9, range II; and lot 7, range I, all in Wakefield Township.

Phlogopite of exceptional quality, was a product of the Wallingford Mine, 2.4 km west of Perkin's Mills, Quebec. The mine is located on the west half of lot 16, range VIII, in Templeton Township, and samples from this mine won first prize at several international expositions (K.K. Landes, 1938: Am. Mineralogist, 23, p. 367).

31 G/12
31 G/13 The National Mineral Collection contains specimens of phlogopite from lot 30, range V, Portland Township, and from the Villeneuve Mine, Villeneuve Township, Papineau County.

31 G/15 Phlogopite is found associated with magnesite, dolomite, limestone, serpentine, diopside and asbestos at Kilmar, Argenteuil County, in the underground workings of a mine operated by Canadian Refractories Limited. The phlogopite possesses the peculiar property that when it is split along the cleavage in complete darkness, it exhibits a bluish white luminescence extending along the length of the split, and lasting only as long as the splitting is taking place (V.B. Meen, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 33).

Phlogopite crystals 10 to 20 cm in diameter occur in lenses and irregular veins in pyroxenite at a number of localities in Gatineau and Labelle counties. The best known occurrences of the area are as follows:

	Lot(s)	Range	Township
31 J/12	7, 13, 14, 20	B	Aumond
31 J/12	3, 5	III	Aumond
31 J/5	38, 39	I	Bouchette
31 J/5	50, 51	III	Cameron
31 J/5	47	VII	Cameron
31 J/12	46	B	Egan
31 J/5	15	I	Egan
31 J/5	28	II	Egan
31 J/5	44, 45	I	Kensington
31 J/5	3, 16	VI	Kensington
31 K/8	20, 21	E. of Maniwaki Rd.	Maniwaki

(E.A. de la Rue, 1944: Que. Dept. Mines, Prelim., Rept., 183, p. 17)

PHOSPHURANYLITE

$Ca(UO_2)_4(PO_4)_2(OH)_4.7(?)H_2O$

Saskatchewan

74 P/4
74 P/5 Phosphuranylite has been identified by its X-ray powder pattern in a specimen from Stony Rapids, Middle Lake (E.W. Nuffield and D.H. Gorman, 1960: private communication).

PICKERINGITE

$MgAl_2(SO_4)_4.22H_2O$

Pickeringite, or magnesia alum, forms a complete solid solution series with the analogous iron alum, halotrichite. The names pickeringite and halotrichite are applied to the halves of the series with Mg>Fe and Fe>Mg, respectively. These minerals commonly form as weathering products of pyrite and aluminous rocks and occur as colourless, white or lightly tinted aggregates of acicular, often hair-like crystals. The minerals are completely soluble in water, giving a bitter astringent taste.

Alberta

83 N/12 Salts occur as thin veins and incrustations, mixed with clay, along the banks of a stream valley in township 77, range 24, at the junction of the two branches of the Smoky River. A chemical analysis and optical examination of this material proved the main mineral to be pickeringite. Chemical analysis of pickeringite: SO_3 39.92, Al_2O_3 11.90, MgO 6.32, H_2O 41.35, Fe_2O_3 0.40, SiO_2 0.53, total 100.42 (R.L. Rutherford, 1932: Am. Mineralogist, 17, p. 401).

Nova Scotia

11 J/4 Pickeringite has been identified with rozenite, aluminocopiapite and halotrichite in surface outcrops of the Emery seam at No. 26 Colliery, Glace Bay (E.L. Zodrow and K. McCandlish, 1978: Can. Mineralogist, 16, p. 17).

21 H/1 Pickeringite is found as an efflorescence on the shale of a sheltered cliff on the banks of the Meander River near Newport, Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 52T).

Chemical analysis of pickeringite from Hants County, by How: SO_3 36.33, Al_2O_3 10.64, FeO 0.13, MnO 0.45, NiO 0.14, CoO 0.06, CuO 0.02, MgO 4.79, K_2O 0.23, H_2O 46.04, insol. 0.72, total 99.57 (H. How, 1863: J. Chem. Soc., Nova Scotia, I, p. 200).

PIGEONITE

$(Mg,Fe,Ca)(Mg,Fe)Si_2O_6$

Pigeonites are calcium-poor monoclinic pyroxenes that are distinguished optically from the other members of the pyroxene group by low optic axial angles, invariably less than 30 degrees and generally less than 25 degrees. Pigeonite is commonly found in quickly chilled lavas and minor intrusions.

Ontario

42 C/8 Pigeonite occurs in a gabbro-wehrlite at the northwest end of Lochalsh, township 47, District of Algoma. The primary constituents of the rock include olivine, bytownite, augite, biotite, pigeonite, chromite, magnetite and apatite; while the secondary minerals present are: serpentine, talc, chlorite, hornblende, iddingsite, carbonate, and magnetite (M.H. Frohberg, 1944: Am. Mineralogist, 29, p. 302).

Quebec

22 A/13 Rare occurrences of pigeonite are found with fine-grained recrystallized quartz of a white to light blue colour, at Needle Mountain, Holland Township, Gaspé-North County (J.E. Riddell, 1952: Que. Dept. Mines, Prelim, Rept., 269, p. 2).

32 F/5 Pigeonite was recognized in a thin section of diabase from the Taibi Lake area, south of Indienne River, Abitibi East County (R. Beland, 1950: Que. Dept. Mines, Geol. Rept., 40, p. 13).

32 F/11 Pigeonite constitutes more than 50 per cent of the olivine gabbro found south of the west end of Baptiste Lake, in the Iserhoff River area, Abitibi East County (J. Claveau, 1951: Que. Dept. Mines, Geol. Rept., 49, p. 25).

pisanite

(see MELANTERITE)

pitchblende

(see URANINITE)

PLATINIRIDIUM

Ir,Pt

British Columbia

92 H/7 Platiniridium is defined as a cubic platinian iridium having an iridium content between 50 and

80 atomic per cent of the total iridium plus platinum, and containing less than 10 atomic per cent of any other single element. An alloy of platiniridium composition was found as tiny inclusions in iron-bearing platinum from a placer on the south bank of the Tulameen River midway betweem Coalmont and Princeton. Electron microprobe analysis: Pt 14.7, Ir 72.3, Os 5.3, Ru 4.5, Fe 1.9, Cu 0.33, Ni 0.14, total 99.17 (L.J. Cabri and Mx H. Hey, 1974: Can. Mineralogist, 12, p. 299).

PLATINUM

Pt

Native platinum is most commonly found in placer deposits, usually as grains or scales, occasionally as nuggets or lumps up to 10 kg in weight. Is is malleable and ductile, and whitish steel grey colour. Native platinum is usually black in colour. Platinum originates by magmatic differentiation in basic and ultrabasic rocks.

Alberta

83 H/11
83 H/12 Native platinum has been found in association with gold on sand bars in the North Saskatchewan River, in the neighbourhood of Edmonton (A.R.C. Selwyn, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 66A).

British Columbia

82 E/3 Platinum occurs with gold, magnetite, quartz, and pyrite in the sands of Rock Creek, a tributary of the Kettle River in the Greenwood mining division (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., Vi, p. 14R).

82 E
92 H Nuggets of platinum, many containing grains of chromite and magnetite have been found in the Similkameen and Tulameen rivers, Princeton map-area. The presence of palladium, rhodium, iridium, copper, iron, and osmium was revealed in an analysis by G.C. Hoffmann (H.M.A. Rice, 1947: Geol. Surv. Can., Mem. 243, p. 59).

82 K/11 Platinum has been found in sands near Ferguson, in the Lardeau mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 181).

92 H/7 Analyses of platinum from Granite Creek, Similkameen mining division by G.C. Hoffmann, are as follows: (1) Nonmagnetic platinum: Pt. 68.19, Pd 0.26, Rh 3.10, Ir 1.21, Cu 3.09, Fe 7.87, Os 14.62, gangue (embedded chromite) 1.95, total 100.29; S.G. 17.017; (2) Magnetic platinum: Pt 78.43, Pd 0.09, Rh 1.70, Ir 1.04, Cu 3.89, Fe 9.78, Os 3.77, gangue (embedded chromite) 1.27, total 99.97; S.G. 16.095 (G.C. Hoffmann, 1887: Trans. Roy, Soc. Can., V. Sec. 3, p. 17) (G.C. Hoffmann, 1886: Geol. Surv. Can., Ann. Rept., II, pp. 6, 7T).

92 H/7 Electron microprobe analyses of platinum collected along the south bank of the Tulameen River halfway between Coalmont and Princeton:

	(1)	(2)	(3)	(4)
Pt	78.2	88.1	90.7	76.7
Ir	8.0	0.45	0.64	9.0
Fe	12.6	7.7	5.3	12.6
Cu	0.66	1.73	0.66	0.43
Ni	0.23	0.14	0.11	0.19
Sb	-	0.86	-	
Total	99.69	98.98	97.41	98.92

(L.J. Cabri and Max H. Hey, 1974: Can. Mineralogist, 12, p. 299)

92 H/7
92 H/10 Platinum is found as grains and nuggets in Cedar, Granite, and Slate (now called Olivine) creeks, all of which flow into the Tulameen River, in the Similkameen mining division (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 52T).

92 H/10 Platinum has been observed as fine grains in the peridotites of Olivine Mountain, Similkameen mining division (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., p. 263).

92 I/4 The black sand of the Fraser River near Lytton is composed of the following minerals in order of their abundance: magnetite (67 per cent by weight), garnet, ilmenite, zircon, rutile, olivine, platinum, gold, quartz, epidote, thorianite, chromite, feldspar, cinnabar, muscovite, calcite, scheelite and sperrylite (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 526).

92 H
92 I
92 O
93 B
93 G Fine scales of platinum and gold are found along the Fraser and Tranquille rivers, in the Kamloops mining division (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 52T).

93 A/6 The National Mineral Collection contains specimens of platinum from the Horsefly Mine on the Horsefly River, Cariboo district, donated by G.M. Dawson, in 1894.

93 A/11
93 A/12
93 B/9
93 B/16 Black sand along the Quesnel River, in the Quesnel mining division was found to contain platinum (R.A.A. Johnston, 1908: Geol. Surv. Can., Sum. Rept., p. 169).

93 O/16 Fine gold and platinum were found in 1923 in Branham Flat on the north side of Peace River about 48 km west of Hudson's Hope (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 8).

104 J/15
104 J/16 Finely divided platinum is found in some abundance in the black sands of Thibert Creek on the headwaters of Dease River, Liard mining division (J. Cartmel, 1912: British Columbia Dept. Mines, Ann, Rept., pp. 63, 78).

Ontario

42 A/1 Platinum discoveries were reported in a band of tuffs and agglomerates in Otto Township, lot 12, conc. IV, northern part; and lot 12, conc. V, southern part (H.C. Cooke, 1920: Geol. Surv. Can., Summ. Rept., 1919, pt. E, p. 18-19; and (H.L Lovell, 1972: Ont. Dept. Mines, GR 99, p. 28).

Quebec

21 E/15
21 E/16
21 L/2
21 L/7 Platinum has been observed in association with iridosmine in gold washings from Rivière-du-Loup, Rivière Linière, and Rivière des Plantes, Beauce County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 52T).

Yukon

115 G/6 Platinum, silver and copper have been found in concentrates with coarse gold in highly productive placer deposits along Burwash Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 70).

PLAYFAIRITE

$16PbS.9Sb_2S_3$

Ontario

31 C/6 The new mineral, playfairite, was found in polished sections of specimens collected from a

small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr Ed. Taylor of Madoc. It occurs in very small amounts at the peripheries of other sulphosalt grains commonly as microscopic veinlets. Electron probe microanalysis (average of three grains) by G.R. Lachance: Pb 51.0, Sb 28.0, As 2.4, S 18.8, total 100.2 (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 191).

PLUMBOJAROSITE

$PbFe_6(SO_4)_4(OH)_{12}$

New Brunswick

21 P/5 Plumbojarosite has been identified by X-ray pattern and qualitative XRF analysis in specimens from the Brunswick No. 6 deposit in the Bathurst area, Gloucester County. The XRF analyses showed major Pb, Fe and no As (X-ray Laboratory Geol. Surv. Can.).

Yukon

105 M/14 Lead- and silver-bearing jarosites occur in small amounts in some of the oxidized zones of the lead-zinc-silver deposits, Keno Hill - Galena Hill area, as small crusts and earthy coatings on galena. J.L. Jambor (U.B.C. Thesis, 1957) investigated an oxidized zone from the Hector-Calumet system (Calumet Mine) and concluded that the jarositic material is essentially plumbojarosite. A partial chemical analysis gave: PbO 20.74, Fe_2O_3 39.03, Ag 0.63 (R.W. Boyle, 1965: Geol. Surv. Can., Bull, 111, p. 155).

POITEVINITE

$CuSO_4.H_2O$

British Columbia

92 I/14 Naturally-occurring copper sulphate monohydrate was discovered for the first time in a specimen from the Avoca claim, Hat Creek, Bonaparte River. It was named poitevinite in honour of Dr. E. Poitevin former mineralogist with the Geological Survey of Canada. Chemical analysis by G.R. Lachance and S. Courville: CuO 21.6, FeO 18.0, ZnO 3.7, SO_3 43.85, H_2O 11.94, insol. 1.09, total 100.18, corresponding to the formula $(Cu_{.50}Fe_{.46}Zn_{.08})SO_4.(H_2O)_{1.2}$ (J.L. Jambor, G.R. Lachance and S. Courville, 1964: Can. Mineralogist, 8, p. 109. Also Jambor, 1962: Can. Mineralogist, 7, p. 245).

POLLUCITE

$(Cs,Na)AlSi_2O_6.nH_2O$

Pollucite is the principle primary mineral of caesium and contains about 27 per cent Cs_2O. It is colourless to white or greyish, generally massive with a vitreous lustre, and may closely resemble quartz. It occurs in pegmatites that are rich in lithium minerals.

Manitoba

52 L/5
52 L/6 At the Chemalloy (formerly called "Montgary") property at Bernic Lake, pollucite occurs in a lenticular mass nearly 150 m long and up to 18 m thick. The mass consists of nearly pure pollucite. It is bounded for the most part by spodumene-rich assemblages, and together with quartz-amblygonite forms a core unit of the pegmatite. Other minerals in the pegmatite include cleavelandite, lepidolite, petalite, and beryl (R. Brinsmead, 1960: Precambrian, vol. 33, No. 8, p.19) (R. Mulligan, 1961: Geol. Surv. Can., Paper 61-4) (R. Brinsmead, 1963: Geol. Soc. Am., Bull., 74, No. 7, p. 919).

52 L/12 Pollucite has been identified in a specimen from spodumene-bearing pegmatite on the Spot group claims northeast of Maskwa Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

Ontario

32 D/13 An occurrence of pollucite with spodumene has been reported in Steel Township, north shore of Abitibi Lake, on the property held by Johns Manville Company (Private communication: S.C. Robinson).

32 E/4 Spodumene, pollucite, beryl and columbite-tantalite occur in a pegmatite dyke in the Case batholith near its contact with metasedimentary rocks on lot 5, conc. I, Steele Township (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept., 23, p. 79).

52 F/16 Pollucite occurring as large masses (up to 20 cm), associated with large spodumene crystals, was found by Alex Kozowy and Alex Ledichowski about 5 km northeast of Gullwing Lake in Webb Township. The identification was confirmed at the Royal Ontario Museum (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 377-8).

Quebec

32 C/5 Pollucite has been identified by X-ray powder pattern as occurring at the Valor property, range 8, lot 22, Lacorne Township. The mineral occurs as masses up to 1.5 m in maximum dimension in the core of a complex pegmatite. Quartz, cleavelandite and spodumene are the most abundant minerals in the core zone; lepidolite and beryl are in lesser amounts (R. Mulligan, 1961: Geol. Surv. Can., Paper 61-4).

POLYBASITE

$(Ag,Cu)_{16}(Sb,As)_2S_{11}$

Polybasite and pearcite have been considered to be the Sb and As dominant members of a single solid solution series. Peacock and Berry (1947) showed that these minerals are not isostructural because the cell dimensions of polybasite are doubled as compared to those of pearceite. Frondel (1963) has shown that the arsenic analogue of polybasite and the antimony analogue of pearceite occur in nature and has named these arsenopolybasite and antimonpearceite-pearceite respectively. Thus, polybasite-arsenopolybasite and antimonpearceite-pearceite probably form two complete solid solution isodimorphous series having the same composition range, $(Ag,Cu)_{16}(Sb,As)_2S_{11}$-$(Ag,Cu)_{16}(As,Sb)_2S_{11}$. The members of both series are monoclinic but the cell dimensions of the polybasite-arsenopolybasite series are all double those of the antimonpearceite-pearceite series (M.A. Peacock and L.G. Berry, 1947: Mineral. Mag., 28, pp. 1-13)(C. Frondel, 1963: Am. Mineralogist, 48, p. 565).

British Columbia

82 E/6 Polybasite occurs at the Highland Bell Mine at Wallace Mountain, 37 km east of Penticton in the

Greenwood mining division. It is found as stringers and veinlets, as crystals in vugs and cavities, and also as a coating. Chemical analyses by R.N. Williams: (1) Ag 69.72, Cu 3.90, Sb 10.15, As 0.63, S 15.68, total 100.08; S.G. 6.26±0.03; from veinlets; (2) Ag 67.13, Cu 2.23, Bi 0.80, Sb 9.50, As 0.78, S 16.94, Zn tr., Fe 0.31, Pb 2.41, total 100.10; S.G. 6.33±0.03; crystals fragments; (3) Ag 69.80, Cu 4.25, Sb 10.72, As 0.58, S 15.57, total 100.92; S.G. 6.28±0.05; thin coatings (A.B. Staples and H.V. Warren, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 30).

82 L/1 Polished sections of ore from the Silver Horde Mine on Bromide Mountain, 75 km east of Vernon, show polybasite in microscopic amounts in galena, and associated with chalcopyrite, sphalerite, tetrahedrite, silver, pyrite, and magnetite (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 453).

93 M/5 Polybasite occurs at the Silver Standard Mine, Glen Mountain, Omineca mining division, in close association with argentiferous tetrahedrite, galena, pyrargyrite, and meneghinite. Sphalerite, pyrite, pyrrhotite, marcasite, arsenopyrite, chalcopyrite, covellite, and limonite are also present (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 506).

103 P/12 Polished sections of silver ore from the Torbrit (Toric) Silver Mine show pyrargyrite as disseminated grains and tiny veinlets with polybasite. The mine is located on the east bank of the Kitsault River, 27 km by road from Alice Arm, Portland mining district (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 507).

103 P/12 Samples from the Dolly Varden Mine, Alice Arm, Skeena mining division, consist of rather glassy, bluish black, vuggy quartz containing pyrite and argentite. Ore minerals present in order of their abundance are: pyrite, argentite, galena, sphalerite, pyrargyrite, silver, chalcopyrite, tetrahedrite, polybasite, and argyrodite (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 545).

Ontario

31 M/4 Polybasite from the Keeley Mine, Silver Centre, Timiskaming district, has been identified by the X-ray powder diffraction method (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 M/4 Chemical analysis of polybasite from the Keeley mine, South Lorrain Township, by R.N. Williams: Ag 70.97, Cu 2.50, Sb 9.46, As 2.37, S 14.69, total 99.99; S.G. 6.27 (M.A. Peacock and L.G. Berry, 1947: Mineral Mag., 28, p. 1-13.

31 M/5 Polybasite occurs as irregular grains associated with chalcocite, stromeyerite and tetrahedrite in a sample from the Foster Mine. Electron probe microanalysis by D.C. Harris: Ag 54.6, Cu 17.6, As 2.5, Sb 7.8, Bi 1.8, S 18.3, total 102.6 (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 208).

31 M/5 Polybasite occurs at the O'Brien Mine, Cobalt area, as minute brilliant, tabular crystals up to 2 millimetres in diameter. The crystals are always firmly attached to argentite (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann, Rept., vol. 25, Pt. 1, p. 233).

31 M/5 Shiny black, pseudo-hexagonal, platy crystals of polybasite up to 5 millimetres in diameter occur in vugs at the Silver Miller Mine, Brady Lake property, near Cobalt. The crystals, identified crystallographically, by polished section (Frohberg), and by X-ray powder pattern (M.A. Peacock) are associated with stephanite, pyrargyrite, and breithauptite (M.H. Frohberg, 1960: private communication).

41 P/10 Vugs containing polybasite-pearceite associated with prousite, xanthoconite, acanthite, stephanite and pyrargyrite have been reported in calcite veins mined at the Miller Lake O'Brien Mine in Nicol Township near Gowganda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 77).

42 L/7 Polybasite occurs with other sulphides, and two ages of quartz, at Kupfer Lake, O'Sullivan Lake area (W.W. Moorhouse, 1955: Ont. Dept. Mines, Ann. Rept., vol. 64, Pt. IV, p.22).

Quebec

32 F/9 Polybasite occurs at the Coniagas Mine 4.8 km southwest of Bachelor Lake, Lesueur Township, with native silver and pyrargyrite, and closely associated with chalcopyrite and galena (K.D. Watson, 1957: Can. Mineralogist, 6, Pt. I, p. 26).

Yukon

105 M/13
105 M/14 Polybasite is one of several sulphosalt minerals identified at the silver-lead-zinc deposits in the Elsa-Galena Hill-Keno Hill area (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 91).

POLYDYMITE

Ni_3S_4

Northwest Territories

86 K/4 Polydymite is reported to occur with glaucodot and gersdorffite in the complex uranium-silver ores at the Eldorado Mine, Labine Point (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 36).

Ontario

41 I/6 Polydymite occurs at the Vermilion Mine, lots 5 and 6, conc. IV, Denison Township, with chalcopyrite, some pyrite, and minor quartz. Chemical analysis by Browne: S 38.43, Ni 36.85, Fe 18.70, Cu 4.47, total 98.45; by Clarke and Catlett: S 40.80, Ni 41.96, Fe 15.57, Cu 0.62, SiO_2 1.02, total 99.97; S.G. =4.541 (A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 11H) (D.H. Browne, 1893: Eng. & Mining J., LVI, p. 566) (F.W. Clarke and C. Catlett, 1889: Am. J. Sci., Ser. 3, XXXVII, p. 373).

41 I/6 The mineral collection at the Royal Ontario Museum includes specimens of polydymite from: Vermilion Mine, lot 6, conc. IV, Denison Township; Crean Hill Mine, lot 5, conc. V, Denison Township; Worthington Mine, lot 2, conc. II, Drury Township(J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 290).

52 B/9 The major sulphide minerals in the orebody at the Shebandowan Mine are pyrrhotite, pentlandite chalcopyrite and pyrite. Polydymite, bravoite, violarite and millerite are present in minor amounts. The mine is located at the southwest end of Lower Shebandowan Lake (J.A. Morin, 1973: Ont. Div. Mines, GR 110, p. 21).

polylithionite

(see LEPIDOLITE)

POSNJAKITE

$Cu_4(SO_4)(OH)_6.H_2O$

British Columbia

93 M/4 The secondary copper minerals posnjakite, chrysocolla and brochantite have been identified on specimens from the Rocher Deboule Mine about 10 km south of Hazelton (X-ray Laboratory, Geol. Surv. Can.).

Manitoba

63 K/13 Light blue posnjakite occurs as encrustations on ore-bearing rock along with bright green brochantite at the North Star and Don Jon deposits on small islands on the west side of Thompson Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 47).

Newfoundland

1 N/6 The secondary copper minerals brochantite and posnjakite form powdery and finely crystalline coatings on sulphide-bearing rock at a deposit on the north side of a bend in the Colliers River south of Highway 60 (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 73).

Nova Scotia

11 K/1 Blue fine flaky masses of posnjakite are found as coatings on quartz and host rocks at the Coxheath copper mine, located about 3.2 km east of Frenchvale, Cape Breton County. Bright green aggregates of acicular crystals of brochantite are associated (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 29).

Ontario

31 M/5 Posnjakite has been identified on specimens collected from the mine dumps of the Green-Meehan and Red Rock silver mines. The dumps are on the south side of Highway 567, 2.4 km from North Cobalt (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 59).

Quebec

The following occurrences of posnjakite in copper deposits of the Eastern Townships region are reported by Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 5, 8, 19, 21, 25.

21 E/5 With brochantite and devilline at the Capelton and Albert Mines and with brochantite at the Eustis Mine. The mines may be reached by travelling 4.8 km west of Lennoxville along Belvedere Street and then 4.2 km south.

31 H/2 With malachite and brochantite at Sweet's Mine, located 4.8 km north of Sutton along the road to West Brome.

31 H/8 With langite and brochantite at the Ives mine, located on the west side of the road between Eastman and Bolton Centre.

31 H/10 With azurite, malachite and brochantite at the Acton Mine near Acton Vale.

31 M/7 The secondary copper minerals posnjakite and brochantite occur as coatings on specimens on the rock dumps at the Lorraine Mine. The mine is 5 km by road south of Highway 62 from a point 20.1 km west of Belleterre (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 94).

Saskatchewan

63 K/12 Specimens coated with posnjakite, devilline, brochantite and antlerite were collected from the dumps at the Coronation Mine near the shore of Phil (McNally) Lake. Specimens coated with brochantite and posnjakite were found at the site of the Mandy Mine, a former copper producer, on a peninsula in the Northwest Arm of Schist Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27, 38).

Yukon

105 D/11 Greenish blue posnjakite has been found on the mine dumps of the Copper King Mine, about 4.8 km west of Whitehorse (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 46).

POTASSIUM FELDSPAR

$KAlSi_3O_8$

Feldspars are the most abundant of all minerals. Although closely related in chemical composition and physical properties they are classified into two groups: the potassium feldspars which are monoclinic or nearly so, and the sodium and calcium feldspars, or plagioclases, which are definitely triclinic. The potassium feldspars occur in several distinct forms. Microcline the triclinic modification is the most abundant form and is the main feldspar of commerce. A distinctive green variety of microcline, amazonite or amazon stone, is cut and polished as a gem and ornamental stone. Orthoclase in the proper sense refers to a monoclinic potassium feldspar formed at intermediate to low temperatures. The name has been loosely used in the literature for potassium feldspar, thus much of the reported orthoclase is in fact microcline perthite. Sanidine, a high temperature monoclinic form is characteristic of eruptive rocks, especially rhyolite, trachyite, and phonolite. The name adularia is given to an apparently metastable potassium feldspar with a distinctive habit, found in low temperature hydrothermal veins. It frequently shows opalescence, is then termed moonstone, and is used for gem purposes. The alkali feldspars of common rocks frequently consist of lamellar intergrowths of potassium and sodium feldspars. Such an intergrowth is called perthite if potassium feldspar is the dominant or host feldspar, and antiperthite if the reverse is true. The name hyalophane is used for potassium feldspar containing minor amounts of barium. As rock-forming minerals, the feldspars are too widely-distributed to list all occurrences.

Alberta

82 G/10 Orthoclase is the most prevalent mineral in the Crow's Nest Volcanics, the only igneous rocks occurring in the foothills and front ranges of the Rocky Mountains of Alberta. Orthoclase phenocrysts have in some places weathered out of the porphyry and can be easily collected from outcrops between the railway and highway, about 2 km west of the railway station at Coleman (R.K. Rutherford, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 67).

British Columbia

82 E/5 A quartz porphyry located southwest of Penticton contains good crystals of orthoclase varying from less than 9 gm to more than 450 gm in weight. Chemical analyses by W.L. Swanson: (1) SiO_2 63.52, Al_2O_3 20.94, Fe_2O_3 0.14, MgO 0.24, K_2O 11.22, Na_2O 3.03, ignition 0.45, total 99.54; S.G. =2.54; (2) SiO_2 62.84, Al_2O_3 21.28, Fe_2O_3 0.14, MgO 0.13, K_2O 12.57, Na_2O 2.26, total 99.22; S.G. =2.52 (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 46).

92 I/15 Sanidine phenocrysts occur in a rhyodacite on the Tranquille Plateau, 40 km northwest of Kamloops, on an old wagon road from Tranquille to Red Lakes. Phenocrysts of oligoclase, quartz and biotite are also present, but the sanidine is a conspicuous feature, making up 49 per cent of the rock. Twinning is present, but untwinned euhedra and subhedra are more common (L.S. Stevenson, 1939: Am. Mineralogist, 24, p. 446).

Newfoundland

13 O/2 Amazonite, a variety of microcline is the major constituent of an unusual aplite dyke found on the south shore of Northern Adlavik Island, 1.6 km east of Maconit Bay, Labrador. Albite and quartz are associated with the amazonite; mica, topaz, fluorite, apatite and magnetic yellow sulphide are present in minor amounts (E.P. Wheeler, 1935: Am. Mineralogist, 20, p. 44).

Ontario

31 C/4 Pale flesh pink microcline forms the major part of the feldspar on lot 18, conc. VII, of Monteagle Township (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto Stud., Geol. Ser., 16, p. 18).

31 C/7 What has been described as a fetid feldspar occurs on lot 3, conc. XI, of Loughborough Township. It is a white to bluish white microcline showing microperthitic intergrowths and emitting a peculiar odour when broken. This has been attributed to hydrogen selenide. An analysis by W.K. McNeil is as follows: SiO_2 65.72, Al_2O_3 18.98, Fe_2O_3 0.63, CaO 0.62, Na_2O 3.68, K_2O 9.61, H_2O 0.14, CO_2 0.53, total 99.91. Associated minerals are quartz, diopside, titanite and pyrite. The perthitic plagioclase is albite (F.L. Sine, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 25).

31 C/10 A chemical analysis of microcline from lot 1, conc. II, Bedford Township, gave the following results: SiO_2 65.87, Al_2O_3 19.10, CaO 0.20, K_2O 12.24, Na_2O 2.56, H_2O 0.64, total 100.61 (E.T. Corkill, 1911: Ont. Bur. Mines, Ann. Rept., vol. 20, p. 107).

31 C/12 Harrington's analysis of orthoclase from Dungannon Township, is as follows: SiO_2 63.00, Al_2O_3 18.93, Fe_2O_3 0.59, CaO 0.08, MgO 0.09, K_2O 12.08, Na_2O 3.67, H_2O (ign.) 1.00, total 99.44; S.G. =2.558 (B.J. Harrington, 1894: Am. J. Sci., Ser. 3, XLVIII, p. 18).

31 C/16 The National Mineral Collection contains specimens of perthite from lot 4, conc. VI, North Burgess Township. A chemical analysis by Hunt of perthite from the same area is as follows: SiO_2 66.44, Al_2O_3 18.35, Fe_2O_3 1.00, CaO 0.67, MgO 0.24, K_2O 6.37, Na_2O 5.56, vol. 0.40, total 99.03; S.G. 2.57-2.58 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, pp. 474-476).

Perthite occurs at Perth, Drummond Township. Chemical analysis by C.H. Warren: SiO_2 66.50, Al_2O_3 18.40, Fe_2O_3 1.05, MnO tr., MgO 0.07, CaO 0.30, Na_2O 5.40, K_2O 8.77, H_2O^+ H_2O^- 0.20, total 100.69; S.G. =2.597 (S.S. Goldich and J.H. Kinser, 1939: Am. Mineralogist, 24, p. 417).

31 D/10 The mineral collection at the Royal Ontario Museum includes amazonite from lot 1, conc. XI, and lot 4, conc. XI, Laxton Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 239).

31 D/16 An unusually well-developed perthite intergrowth of microcline and albite in pegmatite masses occurs in syenite at Tory Hill, Monmouth Township. Striking features of this perthite are the uniformity in orientation and size of the blebs of albite, and the high percentage of the albite. Chemical analysis by S.S. Goldich: SiO_2 66.56, Al_2O_3 19.04, Fe_2O_3 0.41, FeO 0.18, MgO 0.00, CaO 0.01, BaO 0.02, Na_2O 6.77, K_2O 7.09, H_2O^+ 0.10, H_2O^- 0.02, total 100.20; S.G. =2.593 (S.S. Goldich and J.H. Kinser, 1939: Am. Mineralogist, 24, p. 417).

31 E/9 The variety of microcline known as sunstone, with a golden iridescence apparently due to oriented inclusions on cleavage planes, was found at the John G. Gole feldspar mine, lot 14, conc. IV, Murchison Township (D.F. Hewitt, 1960: private communication).

31 F/4 High quality pink feldspar from the MacDonald Mine, lot 18, conc. VII, of Monteagle Township, has been analyzed by H.S. Spence. The results are as follows: (1) SiO_2 64.60, Al_2O_3 19.30, Fe_2O_3 0.09, CaO 0.00, MgO 0.72, K_2O 12.35, Na_2O 2.67, total 99.73; (2) SiO_2 64.60, Al_2O_3 19.14, Fe_2O_3 0.06, CaO 0.00, MgO 0.00, K_2O 13.02, Na_2O 2.96, total 99.78, The feldspar occurs in a pegmatite dyke, with large masses of quartz (J.E. Thompson, 1943: Ont. Dept. Mines, Ann. Rept., vol 52, pt. III, p. 26).

31 F/4 A specimen of amazonite from the Woodcox Mine, near Hybla, Monteagle Township, was donated to the National Mineral Collection by H.V. Ellsworth in 1923.

31 F/4 Large pink crystals of orthoclase occur at No. 13, Hastings Road East, in Monteagle Township (National Mineral Collection, Donor: A.T. McKinnon, 1918).

31 F/4 Amazonite from the McCormack North prospect on the north half of lot 24, conc. VI, Monteagle Township is present in the mineral collection at the Royal Ontario Musuem (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 235).

31 F/5 Large, pink orthoclase crystals, showing Carlsbad twinning, occur on lot 2, conc. III, Wicklow Township, Hastings County (National Mineral Collection, Donor: A.E. Barlow, 1897).

31 F/6 The National Mineral Collection contains specimens of pink to brown orthoclase from lot 32, conc. XII, Sebastolpol Township.

31 F/6 Pink microcline perthite occurs in a pegmatite in Lyndoch Township, conc. XV, lot 30. One crystal from the locality measured 6 by 1.8 m and contained about 70 tonnes of material (D.F. Hewitt, 1953: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. V, p. 67).

31 F/6 Amazonite occurs at the Smart Mine, lot 31, conc. X, Sebastopol Township (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog., p. 7L).

31 F/6 The specimen of amazonite in the mineral collection at the Royal Ontario Museum is from the Canadian Beryllium Mines and Alloys property, lot 23, conc. XV, Lyndoch Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 238).

31 F/6 The sunstone variety of potassium feldspar was observed in coarse pegmatite at the west end of a road cut on Highway 515 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 32).

31 F/7 A specimen of microcline (var. amazonstone) from lot 23, conc. XV, Renfrew Township, has been donated to the National Mineral Collection.

31 F/11 Apple green amazonite occurs in pegmatite on the Albert Berger farm, which is located 3.4 km from Highway 41 along the Germanicus Road north of Eganville (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 47).

31 G/5 Massive, white microcline occurs on the south half of lot 10, conc. I, March Township. A specimen of this material is present in the National Mineral Collection.

31 L/1
31 L/2 The National Mineral Collection contains specimens of amazonite from lot 6, conc. A, and lot 7, conc. B, of Cameron Township. District of Nipissing (A.E. Barlow, 1892-93: Geol. Surv. Can., Ann Rept., VI p. 32AA).

31 L/2 Perthite occurs on lot 10, conc. IX, Calvin Township (National Mineral Collection, Donor: C.W. Willimott, 1897).

31 L/7 Pale green and deep green amazonite occur in a small pit on a farm owned by Mr. McMeekin. The farm is about 8 km east of Mattawa and 1.6 km west of a small schoolhouse along highway 17 (B.B. Woods: private communication).

31 L/8 Specimens of amazonite in the mineral collection at the Royal Ontario Museum are from the Turcotte occurrence on lot 4, conc. A, Cameron Township; and lot 7, conc. A, Cameron Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 236).

Quebec

22 D/12 Green amazonite is reported to have been found at the Lac à la Mère mica mine near St. Nazaire, north of the Saguenay river (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 110).

31 G/5 A specimen of microcline from lot 14, range III, of Templeton Township, Papineau County, has been donated to the National Mineral Collection.

31 G/10
31 G/15 An analysis of orthoclase from Rivière Rouge, Argenteuil County, by Hunt, is as follows: SiO_2 65.75, Al_2O_3 19.40, CaO 0.45, K_2O 13.60, Na_2O 0.69, H_2O^- 0.69, H_2O (ign.) 0.25, total 100.14; S.G. 2.56 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 474).

31 G/12 Amazonite occurs on lots 6,13, and 14-A, in range XII, Hull Township, Gatineau County. A sample of this material is present in the National Mineral Collection (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 12).

Chemical analyses of orthoclase from lot 27, range VI, Buckingham Township: (1) SiO_2 64.140, Al_2O_3 18.620, Fe_2O_3 0.374, MnO tr., CaO 0.740, MgO 0.065, K_2O 14.868, Na_2O 1.766, H_2O (ign.) 0.406, total 100.979; S.G. 2.5364; (2) SiO_2 63.460, Al_2O_3 18.780, Fe_2O_3 0.394, MnO tr., CaO 1.280, MgO 0.216, K_2O 13.923, Na_2O 2.173, H_2O (ign.) 0.466, total 100.692; S.G. 2.578 (G.C. Hoffmann, 1876-77: Geol. Surv. Can., Rept. Prog., pp. 511, 512).

31 G/12 Apple green amazonite occurs at the Leduc Mine on the east half of lot 25, range VII, Wakefield Township, near St-Pierre-de-Wakefield. The amazonite contains scattered dark brown inclusions (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 32).

31 G/13 The National Mineral Collection contains specimens of amazonite from lot 31, range I, Villeneuve Township, Papineau County.

31 H/11 Chemical analysis by Hunt of perthite from Brome Mountain, Brome Township: SiO_2 65.70, Al_2O_3 20.80, CaO 0.84, K_2O 6.43, Na_2O 6.52, volatiles 0.50, total 100.79; S.G. 2.575. Chemical analysis by Hunt of perthite from Shefford Mountain, Shefford Township: SiO_2 65.15, Al_2O_3 20.55, CaO 0.73, K_2O 6.39, Na_2O 6.67, volatile 0.50, total 99.99; S.G. 2.56 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, pp. 474-476).

31 H/11 Sanidine is present as colourless crystalline aggregates at the Mont St-Hilaire (Desourdy) Quarry on the northeast slope of Mont St-Hilaire (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 57).

31 L/16 Fine specimens of deep bluish green amazonite have been obtained from a small island in Lac Sairs, about 43 km east of Kipawa (B.B. Woods: private communication).

31 P/3 Microcline crystals up to 7.5 cm across have been reported in a pegmatite dyke cutting gneiss at the face of a cliff on the east side of Lac à Baude. Large crystal clots of allanite are a conspicuous feature of the dyke (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 86).

Saskatchewan

74 O/13 Hyalophane occurs in the Nisikkatch and Northwest Lakes region, located between 56 and 64 km northeast of Uranium City. It is characteristic of a feldspar zone in apatite-rich material (D.D. Hogarth, 1957: Can. Mineralogist, 6, pp. 140-150).

POWELLITE

$CaMoO_4$

British Columbia

82 F/3 The orebodies at the Emerald Mine contain scheelite, powellite, molybdenite and pyrrhotite. The mine is on Iron Mountain between Sheep Creek and Lost Creek about 12.8 km south of Salmo (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Rept., 20, p. 299).

Powellite is also reported at the Victory Tungsten property on the west side of Bennet (Bear) Creek at about 49°09'N, 117°08'W (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser., 17, p. 112).

92 I/6 Powellite is an abundant mineral in the Iona Zone on the Bethlehem property in the Highland Valley area (F.M. Vokes, 1963: Geol. Surv. Can., Econ. Geol. Rept. 20, p. 269).

92 J/9
92 J/16 Skarn dykes in limestone contain scheelite, powellite and molybdenite on the Lubra claims at about 1800 m elevation on Nosebag Mountain (50°45.3'N, 122°22.3'W) 8 km northwest of Seton Portage (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 225).

93 N/1 The Chuchi tungsten showing lies 14.4 km south of the east end of Chuchi Lake at the contact between a small granitic stock and andesite. The deposit consists of scheelite, powellite, molybdenite and chalcopyrite disseminated through a fracture zone (J.E. Armstrong, 1949: Geol. Surv. Can., Memoir 252, p. 193).

104 N/11 Clear yellow powellite is a rare but widely distributed mineral in molybdenite-bearing quartz veins at the Adera property of Adanac Mining and Exploration Limited at 59°42.5'N, 133°24'W, on upper Ruby Creek, about 33.6 km from Atlin by road via Pine Creek and Surprise Lake (A. Sutherland-Brown, 1969: B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., p. 29).

Northwest Territories

85 H/11
85 H/12 Powellite is found on the Outpost Islands, Great Slave Lake, in shear zones in micaceous quartzites. It is associated with chalcopyrite, pyrite, marcasite, ferberite, magnetite, spectacular hematite, ilmenite, bornite, chalcocite, covellite, chlorite, sericite and gold (J.E. Hawley, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 64).

Ontario

31 C/10 Powellite is associated with molybdenite at the D silver occurrence, southwest quarter of lot 2 conc. VII, Olden Township. Specimens are in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 291).

41 N/14 Powellite is reported to occur with molybdenite and scheelite at a property in Township 32, Range 23, near Bear River 2.4 km north of the north shore of Lake Superior 14.4 km west of Michipicoten (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser., 17, p. 169).

Quebec

32 C/5 Pegmatites in the Fiedmont area, Abitibi County, have quartz cores enclosed in spodumene-rich units which also contain accessory sugary albite, bismuthinite, molybdenite and powellite (E.W. Heinrich and A.A. Levinson, 1953: Am. Mineralogist, 38, p. 35).

Yukon

105 F/1 Specimens containing considerable cream-coloured powellite were collected from the north showing, on a ridge about 1040 m northwest of the main showing of the Molly group of Conwest Exploration Company Limited at about 61°10'N, 123°25'W in the Quiet Lake area (L.H. Green and C.I. Godwin, 1964: Geol. Surv. Can., Paper 64-36, p. 46).

PREHNITE

$Ca_2Al_2Si_3O_{10}(OH)_2$

Prehnite occurs characteristically as pale green globular masses. It is found in veins and cavities in basic igneous rocks and as an alteration product of calcic feldspar. Common associates are zeolites, datolite, calcite, and epidote.

British Columbia

82 F/4 Translucent olive green prehnite with a coralloid structure occurs in the Rossland area. Tiny cubic crystals of pyrite are disseminated on the prehnite (C.W. Drysdale, 1915: Geol. Surv. Can., Mem. 77, p. 82).

82 F/4 Green prehnite occurs at the Le Roi Mine, Rossland, in the Trail Creek mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 75, p. 182).

92 B/5 Veins and amygdules in the Metchosin basalt, east of the Sooke River, contain prehnite, epidote, pumpellyite, laumontite, chabazite, stilbite, analcime, quartz and calcite (W.G. Libby and Jerry Kopel, 1971: Can. Mineralogist, 10, p. 915).

92 F/12 Prehnite and pumpellyite are abundant minerals in the metavolcanic rocks of the Karmutsen group in the Buttle Lake area. An electron probe study of the prehnite has shown an appreciable amount of solid solution between the end members ($Ca_2Al_2Si_3O_{10}(OH)_2$ and $Ca_2Fe_2Si_3O_{10}(OH)_2$, with up to 30 per cent of the latter molecule being present in some samples (Ronald S. Surdam, 1969: Am. Mineralogist, 54, p. 256-266).

92 I/14 Fissures of prehnite 7.5 to 10 cm in width and 60 to 90 cm in length occur in one of the large peridotite bodies on the east side of the Bonaparte River valley, north of Ferguson Creek, in the Ashcroft district. The crystals are colourless, translucent, and 5 millimetres in greatest dimension, with pseudocubic appearance. Chemical analysis by E.W. Nuffield: SiO_2 41.67, Al_2O_3 24.44, Fe_2O_3 1.03, FeO 0.32, TiO_2 0.12, MgO 0.25, CaO 27.25, Na_2O 0.18, K_2O 0.18, H_2O^+ 4.44, total 99.88; S.G. 2.915 (E.W. Nuffield, 1943: Univ. Toronto Stud., Geol. Ser., 48, p. 49).

92 J/15 A steeply dipping albite dyke, 7.5 m wide, is exposed in a quarry about 800 m west of Gold Bridge, in the Lillooet district. Prehnite has replaced part of the dyke, especially its footwall, and formed a conspicuous white irregular layer averaging 1.5 m in width (K.D. Watson, 1953: Am. Mineralogist, 38, p. 197).

92 K/3 The pillow breccias of Quadra Island contain chlorite, epidote, pumpellyite, tremolite, quartz, chalcedony, calcite, prehnite and zeolites as alteration products and amygdule fillings (D. Carlisle, 1963: Jour. Geol., 71, No 1, p. 52).

New Brunswick

22 B/1 Prehnite is reported to occur near Dalhousie, in Restigouche County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 182).

22 B/1 Cavities with prehnite, (also stilbite, laumontite, thomsonite, heulandite and phillipsite) have been found in the volcanic rocks along the Inch Arran - Bon Ami shoreline, east of Dalhousie (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 103).

Newfoundland

1 N/10 White to pale yellowish green prehnite occurs with quartz crystals in quartz veins cutting sandstone at the following localities: a quarry on the western slope of a ridge known as the White Hills; along a cliff forming the south end of the White Hills at the eastern end of Quidi Vidi Lake; on Signal Hill; and at a quarry at

the foot of the South Side Hills in St. John's harbour (Ann P. Sabina, 1975; Geol. Surv. Can., Paper 75-36, p. 56, 58, 59).

12 G/1 Four separate bodies composed of prehnite, pectolite, phlogopite, and xonotlite, are exposed in the valley walls of a stream draining into the North Arm, Bay of Islands. The largest body is 3 by 17 m (C.H. Smith, 1954: Am. Mineralogist, 39, p. 531).

12 H/16 A zoisite-prehnite rock containing about 15 per cent prehnite occurs 3.2 km northeast of the Terra Nova Mine, and about 1.2 km from the mouth of Rattling Brook on Baie Verde. The rock is white to faintly greenish in colour, due to the presence of actinolite, and varies in grain size from extremely fine to fairly coarse (K.D. Watson, 1942: Am. Mineralogist, 27, p. 640).

Northwest Territories

48 B/15
48 B/16 A fine green prehnite accompanied by quartz and calcite occurs in veins traversing intrusives at Adams Sound, Admiralty Inlet, Baffin Island. Analysis of prehnite by Johnston: SiO_2 44.35, Al_2O_3 19.44, Fe_2O_3 6.58, CaO 25.50, H_2O 4.00, total 99.87; S.G. 2.924. Centesimal composition after deducting an excess of 4.38 admixed quartz: SiO_2 41.86, Al_2O_3 20.36, Fe_2O_3 6.89, CaO 26.70, H_2O 4.19, total 100.00 (R.A.A. Johnston, 1913: Geol. Surv. Can., Museum Bull., 1, pp. 94-97).

86 N/8
86 O/5 Prehnite occurs with native copper in trap in the Coppermine Mountains (G.M. Dawson, 1886: Geol. Surv. Can., Ann. Rept., II, p. 25R).

87 H/2 Specimens of a white mineral occurring as radiating clusters of crystals in vugs in basalt were collected by R.L. Christie along a tributary of the Minto River, Victoria Island, at approximately 71°15'N, 113°30'W. The mineral was identified as prehnite by its X-ray powder pattern (X-ray Laboratory, Geol. Surv. Can.).

Nova Scotia

11 E/6 Prehnite is reported to occur at Clifton, Hants County (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 77S).

21 H/2
21 H/8 Prehnite occurs at Black Rock, Kings County, and at Clark Head, Cumberland County (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 775).

Ontario

The mineral collection at the Royal Ontario Museum includes prehnite specimens from the following occurrences:

31 D/9
31 E/2 Indusmin Limited old quarries, lot 14, conc. IX, Methuen Township. Highway 519, 4.8 km north of Haliburton, lot 11, conc. XII, Dysart Township.

41 N/2
42 A/15 Roadcut on Highway 17 near Mamainse Point, McDonell Location. North part of lot 9, conc. V, Calvert Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 292).

42 D/13 A cabochon of prehnite, 22 x 15 x 6 millimetres, showing inclusions of native copper was made from a specimen collected at Simpson Island, in Lake Superior (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 77).

42 D/14
52 A/6 Prehnite occurs in trap with native copper along the Slate and Kaministikwia rivers, at St. Ignace, and elsewhere along the north shore of Lake Superior (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 53T).

An analysis by Chapman of prehnite from the Slate River is as follows: SiO_2 43.41, Al_2O_3 23.80, Fe_2O_3 1.26, Mn_2O_3 0.53, CaO 26.62, H_2O 4.14, total 99.76; S.G. 2.882 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 183).

52 H/8 Creamy yellow to bluish green prehnite is associated with pectolite in railway cuts between Orient Bay and Fairloch Lake, Nipigon region. It occurs as radiating, spherical masses. The radiating crystals reach a maximum length of 4 cm. Chemical analysis by H.C. Rickaby: SiO_2 42.78, Al_2O_3 25.37, Fe_2O_3 0.87, CaO 26.95, MgO tr., Na_2O 0.30, K_2O tr., H_2O 4.18, total 100.45; S.G. 2.900 (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 18).

52 H/9 Light green prehnite with analcime in railway cuts southwest of Warneford Station in the Thunder Bay district (A.G. Burrows, 1917: Ont. Dept. Mines, Ann. Rept., vol 26, p. 246).

Quebec

21 E/13 White to greenish white columnar or prismatic masses of prehnite, white fibrous wollastonite, pink garnet, transparent vesuvianite and grass-green diopside occur at the Jeffrey Mine, Asbestos, at the contact of peridotite with granitic rock (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 26).

21 L/3 The following chemical analyses of prehnite were made by R.J.C. Fabry on specimens collected from asbestos deposits in Megantic County by E. Poitevin: (1) Jacobs Asbestos Mine, SiO_2 42.40, Al_2O_3 25.02, Fe_2O_3 0.51, MgO 0.20, CaO 27.18, H_2O 4.57, total 99.88; (2) Jacobs Asbestos Mine, SiO_2 42.88, Al_2O_3 25.85, Fe_2O_3 0.57, MgO 0.20, CaO 30.03, H_2O 1.06, MnO nil, total 100.59; (3) King Asbestos Mine, SiO_2 43.36, Al_2O_3 24.75, Fe_2O_3 0.85, MgO 0.20, CaO 26.86, H_2O 4.46, total 100.48 (J.A. Maxwell et. al., 1965: Geol. Surv. Can., Bull. 115, p. 344).

31 G/12 Prehnite is found on lot 23, range XIII, of Templeton Township (H.S. de Schmid, 1912: Can. Dept. Mines, Mines Br., 118, p. 291).

31 G/12 The National Mineral Collection contains a specimen of prehnite from lot 28, range VI, of Buckingham Township, donated by Mr. Brummell, in 1925.

31 G/12 An analysis by Harrington of prehnite from a cavity on lot 16, range XII, Templeton Township, is as follows: SiO_2 42.82, Al_2O_3 23.86, Fe_2O_3 1.42, MnO 0.10, CaO 27.64, MgO 0.09, H_2O 4.82, total 100.75; S.G. 2.891 (B.J. Harrington, 1877-78; Geol. Surv. Can., Rept. Prog., p. 34G).

31 G/12 Prehnite is reported to have been found at the Breckin deposit, a former phosphate mine, on the farm of Mr. Maurice Last located about 8 km from St-Pierre-de-Wakefield along the road to McGregor Lake (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 27).

31 G/13 Prehnite occurs at the High Rock Mine, lot 7, range VIII, Portland West Township, Papineau County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 183).

Yukon

105 D/14 Veinlets of vesuvianite, prehnite, and carbonate traverse an aggregate of an irregular, birefringent mineral found at the contact of an inclusion and a serpentinite body west of Lake Laberge (J.O. Wheller, 1961: Geol. Surv. Can., Mem. 312, p. 91).

PROUSTITE

Ag_3AsS_3

Proustite and the isostructural mineral pyrargyrite, Ag_3SbS_3, are commonly called ruby silver ores because of their scarlet-vermilion to deep red colour and commercial importance as ore minerals of silver. They are found late in the sequence of crystallization of low temperature silver-bearing veins, and may also form by secondary enrichment. Other silver minerals, galena and calcite are usually associated.

British Columbia

82 E/4 Proustite occurs at the Elkhorn Mine, near Greenwood in the Greenwood mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 184).

82 F/14 Proustite has been found on Tenmile Creek (also known as Enterprise Creek) in the Slocan mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 184).

82 M/4 Mineralized zones containing barite, tetrahedrite, proustite, galena, sphalerite, chalcopryite, pyrite and minor gold are present at the Homestake deposit at 51°07'N, 119°50'W, on Sinmax and Homestake Creeks 4.4 km northwest of the head of Skwaam Bay, Adams Lake (B.C. Dept. Mines and Pet. Res., Geol. Exp., and Mining in B.C., 1973, p. 114).

Newfoundland

1 M Specimens of proustite were found near Fortune Bay by a small local company that was working on a deposit of galena (G.N. Tricoche, 1935: Can. Mining J., 56, p. 148).

Nova Scotia

21 H/1 Proustite is a constituent mineral of the barium-lead-zinc-silver deposit at Magnet Cove, 4 km southwest of Walton. The deposit, a pipe-like body in the breccia between two faults, is mainly composed of sulphides and sulphates. The proustite is distributed throughout the sulphide body being generally associated with galena or occurring as small irregular masses in a matrix of siderite, barite, galena and sphalerite (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104).

Ontario

31 M/4
41 P/10 Crystallized proustite is found associated with xanthoconite at the Keeley Mine, South Lorrain Township. It also occurs with xanthoconite at the Castle-Trethewey Mine, at Gowganda (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 69).

31 M/4 Specimens of proustite in the mineral collection of the Royal Ontario Museum are from the Frontier, Keeley and Lorraine Trout Lake mines in South Lorrain Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 295).

31 M/5 Proustite is found associated with stephanite and dyscrasite at the Penn Canadian Mine, Cobalt (A.L. Parsons, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 69) (and 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 89).

31 M/5 Crystals of proustite are found in the Cobalt area at the O'Brien and the University mines. At the O'Brien Mine, crystals are less than 2 millimetres in length, and rarely exceed 1 millimetre in diameter. They are light ruby red in colour and exceedingly brilliant. A small amount of pyrargyrite was found associated with the proustite. Analysis is as follows: Ag 64.12, As 15.90, S 19.28, Sb 0.08, Fe 0.25, CO (with trace of Ni) 0.12, insol. in HNO_3 0.38, total 100.13 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol 25, Pt. I, p. 223).

31 M/5 Proustite has been identified by X-ray diffraction on a specimen from the Christopher Mine where it is associated with xanthoconite, acanthite, stromeyerite and stephanite; and also on a specimen from the Silverfields Mine where it is associated with tetrahedrite, stephanite, pyrrhotite and ullmannite (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 214).

31 M/5 The mineral collection at the Royal Ontario Museum includes specimens of proustite from the following silver deposits in the Cobalt district, Coleman Township: Temiskaming Mine, claims 441, 1198, north half of lot 1, conc. III; Foster Mine, southeast quarter of north half of lot 4, conc. IV; University Mine, claims JB8, SW20, PB124, south half of lot 4, conc. IV; Cobalt Lake Mine under Cobalt Lake, lots 5 and 6, conc. V and VI (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 294).

41 P/10 Vugs coated with proustite, pyrargyrite, xanthoconite, polybasite-pearceite, acanthite and stephanite have been reported in calcite veins mined for silver at the Miller Lake O'Brien Mine near Gowganda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 77).

42 A/8 Proustite has been reported at the Ross Mine in the community of Holtyre on Highway 572, 8.8 km from Highway 11, Hislop Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 111).

Quebec

32 C/4 Proustite and pyrargyrite occur with native gold and silver at the Manitou-Barvue (Golden Manitou) Mine. The mine is 1.6 km south of Highway 59, and may be reached by either of two roads 13.0 and 15.7 km east of Val D'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 114).

PSILOMELANE

$(Ba,H_2O)_2Mn_5O_{10}$

Psilomelane has been used in the past as a group name for several hard manganese oxides that cannot be distinguished by simple tests. X-ray and chemical studies now permit identification of the separate species. The name psilomelane is now more properly used for the hard hydrated manganese oxide in which Ba predominates.

British Columbia

92 P/4 The Clinton manganese deposit is located about 16 km northwest of Clinton on one of the foothills of Marble mountains, about 3.2 km

north of Clinton Creek. Psilomelane, manganite and pyrolusite occur as nodules, narrow stringers and irregular masses in quartzites and chloritic schists of the Cache Creek group (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 18).

93 B/15 On Baker Creek and the Lower West River, psilomelane fills fractures in chert of the Cache Creek group (A.G. Johnston and W.D. McCartney, 1964: Geol. Surv. Can., Paper 64-37, p. 16).

93 C/11
93 C/14 Psilomelane has been identified in specimens from quadrangle 29, range 3, submitted to the X-ray Laboratory, Geol. Surv. Can. The specimens were collected in the west branch of a box canyon in the Ilgachuz Mountains, 34 km north of the town of Anakim Lake.

93 K/1 Psilomelane and pyrolusite fill fractures in cherty quartzites of the Cache Creek group on the Tead property located 2 km north of the second canyon on Nechako river below Fraser Lake, or 8.8 km northeast of Fort Fraser. There is a similar occurrence on the Godwin property located about 1.6 km northeast of the Tead showing (J.E. Armstrong, 1949: Geol. Surv. Can., Memoir 252, p. 195).

93 N/6 At Indata Lake in the Fort St. James map-area, a vein of braunite and psilomelane occurs in limestone of the Cache Creek group, and has been traced for 18 m (A.G. Johnston and W.D. McCartney, 1964: Geol. Surv. Can., Paper 64-37, p. 13).

Manitoba

62 G/8 Hydrous oxides, probably manganite and psilomelane occur in swampy land at the base of an escarpment at the Roseisle deposit (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 26).

New Brunswick

21 J/4 Psilomelane, manganous manganite and rhodochrosite occur with hematite, magnetite and pyrite in slate at the Plymouth mine near Plymouth, and the Moody Hill, Iron Ore Hill and Palmer's Mine in the Jacksonville area, to the east and north of Woodstock (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 132, 135).

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The following occurrences of psilomelane have been reported by the New Brunswick Research and Productivity Council in The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, Record 2, Part B, 1965.

21 H/5 In a shear zone at Quaco Head, Saint John County.

21 H/10 Veins in sandstone at Waterside, Albert County.

21 H/11 Lenses in limestone at the Upham property, Markhamville, King's County.

21 H/14 In a shear zone on Jordan Mountain, King's County, and in granite on Gowland Mountain, Albert County.

21 H/15 In limestone at Turtle Creek, and in conglomerate at the Memel Mine, Albert County.

Northwest Territories

86 K/4 Psilomelane in botryoidal form is found as a minor constituent in two sections on the B.E.A.R. Company property at Labine Bay, Great Bear Lake. It is intimately associated with fibrous pyrolusite (E. Thomson, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 27).

Nova Scotia

11 E/5 A manganese-bearing conglomerate containing psilomelane, pyrolusite and manganite is exposed in cliffs along the west side of the mouth of the Tennycape River at a point 700 m northwest of the bridge over the river. The Tennycape Mine, located about 1.6 km south of highway 15 from a point 1 km west of Tennycape, was the largest producer of manganese ore in the province, in the years 1880 and 1900. (Ann P. Sabina, 1964; Geol. Surv. Can., Paper 64-10, p. 50)

11 E/4
21 H/1 Psilomelane is found with pyrolusite at Douglas, Hants County, 24 km south of Tennycape (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 53T).

11 E/6 Pyrolusite and psilomelane occur at Onslow, in Colchester County (E.D. Ingall, 1897; Geol. Surv. Can., Ann. Rept., X, p. 157S).

21 A/9 At New Ross, Lunenburg County, pyrolusite, manganite and psilomelane, with calcite, barite, manganiferous carbonate, iron oxides and country rock occur as lenticular veins in faults or crushed zones in Devonian granite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 48).

21 A/15 Lenses and stringers containing psilomelane, pyrolusite, iron oxides, calcite and siderite follow the general strike of quartzites, phyllites and slates at Nicholsville, Kings County (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 47).

21 H/1 Psilomelane is a supergene mineral occurring at the Magnet Cove barium-lead-zinc-silver deposit, 4 km southwest of Walton (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104).

21 H/1 Dull black fine-grained psilomelane occurs with shiny black platy ramsdellite on banded calcite in red sandstone along cliffs exposed at low tide at Whale Cove, north of Whale Creek, Hants County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 51).

Psilomelane, pyrolusite and manganite occur as nodular masses and crystal aggregates with calcite in conglomerate on the shoreline southwest of the wharf at Cheverie, Hants County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 55).

21 H/1 At Bishop's Brook, 3.2 km south of Kentville, an intergrowth of pyrolusite, manganite and psilomelane with hematite forms beds, lenses and concretions interstratified with bands of grey phyllite. Pyrolusite and psilomelane from crusts over grey quartzite at the Ford farm prospect, 3.2 km southwest of Wolfville (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 47).

21 H/8 Psilomelane, pyrolusite and manganite occur as seams, veinlets and small pockets in volcanic rocks, sandstone and shale near Parrsboro, Cumberland County, and Lower Five Islands, Colchester County (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 43).

Ontario

41 K/16 Manganite, psilomelane and manganese carbonates, along with quartz, calcite and fluorite occur in closely spaced stringers in a reddish lava flow at a deposit in Ley Township, Batchawana Bay (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 29).

52 A/10 A vein 15 cm in average width, consisting of an intimate mixture of braunite and psilomelane with local barite and quartz, has been noted in a shatter zone in chert rock near Pearl in McTavish Township (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 28).

Quebec

11 N/5 Nodules, irregular masses and lenses of pyrolusite, manganite and psilomelane occur in limestone about 1.6 km east of Cap-aux-Meules on Grindstone Island, Magdalen Islands (Ann P. Sabina, 1975; Geol. Surv. Can., Paper 74-36, p. 31).

31 H/1 Psilomelane is found in the Memphremagog area, in meadows north of South Bolton, in Brome County (T.H. Clark: Geol. Surv. Can., Unpub. File 21-C-6, p. 108).

32 I/12
32 I/13
32 I/14
32 P/3 Crystalline dolomite containing small vugs filled with psilomelane occurs on the Central Islands, Mistassini Lake, Mistassini Territory (J.N. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 16).

Yukon

105 M/14 Hydrous manganese oxides occur as supergene minerals in many of the vein faults of the Keno Hill-Sourdough Hill area, Mayo mining district. Psilomelane has been identified by X-ray diffraction pattern in a specimen from Mayo Mines Limited (X-ray Laboratory, Geol. Surv. Can.).

115 K/2 A vein consisting largely of psilomelane in rhyolitic tuff has been exposed at km 1950, Alaska Highway (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 12).

PUMPELLYITE

$$Ca_2MgAl_2(SiO_4)(Si_2O_7)(OH)_2.H_2O$$

Pumpellyite was discovered in 1925 in amygdaloidal cavities in the copper-bearing lavas of the Lake Superior region. It has since been recognized in numerous other similar occurrences and in rocks of much different composition and environment.

British Columbia

92 B/5 Veins and amygdules in the Metchosin basalt, east of the Sooke River, contain pumpellyite, prehnite, epidote, laumontite, chabazite, stilbite, analcime, quartz and calcite (W.G. Libby and Jerry Kopel, 1971: Can. Mineralogist, 10, p. 915).

92 F/12 Pumpellyite and prehnite are abundant minerals in metavolcanic rocks of the Karmutsen group in the Buttle Lake area. The pumpellyite occurs as radiating needles in amygdules and as an alteration product of calcic plagioclase (Ronald C. Surdam, 1969: Am. Mineralogist, 54, p. 256-266).

92 K/3 The pillow breccias of Quadra Island contain chlorite, epidote, pumpellyite, tremolite, quartz, chalcedony, calcite, prehnite, and zeolites as alteration products and amygdule fillings (D. Carlisle, 1963: J. Geol., vol. 71. No. 1, p. 52).

Newfoundland

1 N/6 Pumpellyite is abundant in volcanic rocks to the west of Colliers Bay (V.S. Papezik, 1974: Can. Mineralogist, 12, p. 466).

12 G/1
12 H/4 A small amount of pumpellyite occurs with xonotlite in serpentinite along the valley walls of a stream flowing down the south slope of North Arm Mountain into North Arm, Bay of Islands (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 149).

12 H/5 Small patches of light green pumpellyite are associated with xonotlite at an outcrop on the east bank of Winter House Brook near its headwaters just north of the mouth of a stream flowing from the east (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 130).

Ontario

41 N/12
41 N/13 Pumpellyite has been found on Michipicoten Island, in the Manitoulin district (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 78S).

42 D/11
42 D/12 Pumpellyite, locally known as Rossport of Nipigon Bay "greenstone", occurs as nodules and in geodes in lavas and along the beaches of Wilson, Copper, Salter, Harry, Simpson, Bowman and Agate Islands (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 22).

Quebec

21 E/13 Pale green needles about 5 mm long have been identified as pumpellyite, associated with prehnite and diopside on fine-grained albite at the Jeffrey Mine, lots 9 and 10, ranges II and III, Shipton Township, at 45°46'25"N, 71°57'12"W (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

The following occurrences of pumpellyite have been described by Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51.

31 G/11 Light greenish blue, translucent grains of pumpellyite up to 6 mm in diameter are fairly common at the Bell Graphite Mine (p. 15).

31 G/12 At the Little Rapids (Watts) Mine near Glen Almond, pumpellyite is found as silky white rosettes on pyroxene crystals and as creamy white acicular aggregates in small cavities in pyroxenite (p. 30).

31 G/12 Light bluish grey striated pumpellyite occurs in roadcuts on Highway 35 near Glen Almond (p. 31).

31 G/13 Roadcuts on Highway 35 north of Notre-Dame-de-la-Salette, contain nodules averaging 3 mm in diameter of light blue to bluish grey pumpellyite (p. 41).

PYRALLOLITE

This poorly defined hydrous magnesium silicate, near $MgSiO_3.1/2H_2O$ in composition, is reported to occur in massive form and as a 'steatitic' alteration of pyroxene. The descriptions and chemical analyses of Canadian pyrallolites suggest that these materials are steatite (soapstone) with talc as the main mineral.

Ontario

31 B/12
31 C/9 An analysis by Hunt of pyrallolite from Charleston Lake, Grenville County, is as follows: SiO_2 61.90, FeO 1.45, MgO 30.42, H_2O 6.45, total 100.31; S.G. 2.644 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 470). A specimen of the original sample, from the National Mineral Collection labelled "Charleston Lake 600 paces northeast from the head of Peninsula Bay", was checked and found to give the X-ray pattern of talc (X-ray Laboratory, Geol. Surv. Can.).

31 C/5
31 C/6 Pyrallolite is reported to occur in Rawdon Township, Hastings County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 470).

31 F/1 Pyrallolite occurs in beds of limestone on lot 8, conc. VI, of Ramsay Township, Lanark County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada. p. 798).

Quebec

31 F/9
31 F/10 Pyrallolite is reported to occur in Clarendon Township, Pontiac County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV p. 53T).

31 F/10 A chemical analysis by Harrington of pyrallolite from Portage du Fort, Pontiac County, gave the following results: SiO_2 61.33, FeO 0.67, CaO tr., MgO 31.78, H_2O 5.85, total 99.63; S.G. 2.743 (B.J. Harrington, 1876-77: Geol. Surv. Can., Rept. Prog. p. 484).

31 G/10
31 G/15 Pyrallolite occurs in beds in crystalline limestone in Grenville Township, Argenteuil County. An analysis by Hunt is as follows: SiO_2 61.60, FeO 1.53, MgO 31.06, H_2O 5.60, total 99.79; S.G. 2.757 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 470).

PYRARGYRITE

Ag_3SbS_3

Pyrargyrite and the isostructural mineral proustite, Ag_3AsS_3 are commonly called ruby silver ores because of their deep red to scarlet-vermilion colour and commercial importance as ore minerals of silver. They are formed late in the sequence of crystallization of low-temperature silver veins, and may also form by secondary enrichment. Other silver minerals, galena and calcite are usually associated.

British Columbia

82 E/2 Pyrargyrite is found in small quantities in a metalliferous quartz veins at the Providence Mine. near Greenwood (R. Bell, 1902-03: Geol. Surv. Can., Ann. Rept., XV, p. 130A).

82 E/4 Acanthite, tetrahedrite, pyrargyrite, cerargyrite, galena, sphalerite, pyrite and chalcopyrite occur as irregular concentrations and bands within a vein system at 49°03'N, 119°41'W, 16 km west-northwest of Osoyoos on Richter Mountains, from the Similkameen River road to Richter Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 43).

82 E/6 At the Highland Bell Mine, near Beaverdell, 37 km east of Penticton, pyrargyrite occurs in grains of 10-200 microns disseminated in galena and (more rarely) in sphalerite, freibergite, pyrite, and quartz. It is also found in massive form in lenses and stringers, and in crystalline form in vugs and irregular cavities. Analyses by R.N. Williams: I. (massive), Ag 58.15, Sb 21.70, As 0.52, S 18.15, Zn tr., Fe tr., Pb 0.10, insol. 0.75, total 99.37; S.G. 5.63±0.03; II. (crystal fragments), Ag 59.85, Sb 20.51, As 1.75, S 17.67, Zn 0.15, total 99.93; S.G. 5.82±0.02 (A.B. Staples and H.V. Warren, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 29).

82 E/9 Pyrargyrite occurs at the Union Mine, Franklin Mountain, near Lower Arrow Lake, in the Grand Forks mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 185).

82 F/14 Beautiful crystals and crystal groups of pyrargyrite occur at the Hewitt Mine, near Silverton in the Slocan mining division (R.A.A. Johnston, 1911: Geol. Surv. Can., Sum. Rept., p. 362).

82 K/3 Pyrargyrite was observed in small aggregations disseminated through galena on the Dardenelles claim, 8 km south of Bear Lake, Slocan mining division (G.C. Hoffmann, 1892-93: Goel. Surv. Can., Ann. Rept., VI, p. 27R).

92 F/5
92 F/12 Fissure veins in Permian volcanics contain galena, pyrite, sphalerite, tetrahedrite, pyrargyrite, owyheeite and arsenopyrite at the CREAM claims, 6.4 km south of Butte Lake at 49°29.5'N, 125°33'W, and elevations between 900 m and 1500 m (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1969, p. 219).

93 M/5 At the Silver Standard Mine, on the west side of Glen Mountain, Omineca mining division, pyrargyrite occurs in close association with argentiferous tetrahedrite, galena, meneghinite, and polybasite. Sphalerite, pyrite, pyrrhotite, marcasite, arsenopyrite, chalcopyrite, covellite and limonite are also present (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 506).

94 C/10
94 C/11 Polished sections of specimens from the Ferguson property, Ingenika River, Cassiar district, have been found to contain pyrargyrite associated with galena and sphalerite (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 83).

103 P/5
103 P/6 Pyrargyrite, pyrite, and quartz are found together at Red Bluff and Alice Arm, Observatory Inlet, Skeena mining division (R.G. McConnell, 1911: Geol. Surv. Can., Sum, Rept., pp. 49, 50).

103 P/12 The ore minerals seen under the microscope in polished sections from the Dolly Varden Mine, near the headwaters of the Kitsault River, Skeena mining division are: pyrite, argentite, galena, sphalerite, pyrargyrite, silver, chalcopyrite, tetrahedrite, polybasite and argyrodite (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 545).

103 P/12 Vein material containing some pyrargyrite and native silver was encountered in drill core at the Musketeer property at 55°42'N, 129°30'W, on the east side of the Kitsault River between Tiger and Silverwolf Creeks at about 360 m elevation (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1972, p. 508).

103 P/12 The Kitsol vein at 55°41'N, 129°31'W, immediately north of the confluence of Evidsen Creek and the Kitsault River at an elevation of 360 m contains pyrargyrite, native silver and marcasite in a quartz-calcite-barite ganque (B.C. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 489).

104 P/5 Quartz veins containing pyrargyrite, native silver, native antimony, bismuthinite, marcasite, molybdenite, pyrrhotite, arsenopyrite, chalcopyite and tetrahedrite occur at the Contact claims 4.8 km northwest of Cassiar (H. Gabrielse, 1963: Geol. Surv. Can., Memoir 319, p. 119).

New Brunswick

21 G/7 Pyrargyrite has been identified in a sample from the Fire Tower Zone at the Mount Pleasant property of Brunswick Tin Mines (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

21 G/9 Inclusions of pyrargyrite in galena have been noted in polished sections of specimens from Reserve Brook, Queen's County (R.S. Boorman, 1968: New Brunswick Res. Prod. Council, Res. Note 11).

Ontario

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
Pyrargyrite is a common silver sulphantimonide in the Cobalt-Gowganda ores. Electron probe microanalyses: (1) Ag 59.6, Sb 24.2 S 18.1, total 101.9: (2) Ag 60.0, Sb 24.2, S 18.3, total 103.1; (3) Ag 58.4, Sb 22.3, S 17.5, total 98.2; (4) Ag 59.2, Sb 20.0, As 1.4, S 16.7, total 97.3 (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 210).

31 M/4 A specimen of pyrargyrite from the Lorrain Trout Lake Mine in South Lorrain Township is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 296).

31 M/5 The following occurrences of pyrargyrite in Coleman Township are represented by specimens in the Royal Ontario Museum mineral collection: Temiskaming Mine, north half of lot 1, conc. III; Lumsden Mine, west part of northeast quarter of lot 2, conc. III; University Mine, south half of lot 4, conc. IV; O'Brien Mine, south half of lot 4, conc. VI (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 296).

41 P/10 A specimen in the mineral collection at the Royal Ontario Museum came from the Castle-Trethewey Mine, claim RSC101, Haultain Township (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 296).

42 A/11 Pyrargyrite is an accessory mineral in the ores at the Kidd Creek Mine, lots 3 and 4, conc. V, Kidd Township, about 27 km north of Timmins (R.R. Walker, A. Matulich, A.C. Amos, J.J. Watkins and G.W. Mannard, 1975: Econ. Geol., 70, p. 80).

52 L/16 Small amounts of pyrargyrite are found in a massive base metal sulphide ore located about 1,200 m south-southwest of the south end of Trout Bay in Mulcahy Township about 32 km west of Red Lake (L.J. Cabri, D.C. Harris ; and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 232).

Quebec

32 C/4 Pyrargyrite and proustite occur with native gold and native silver at the Manitou-Barvue (Golden Manitou) Mine. The mine is 1.6 km south of Highway 59 and may be reached by either of two roads 13.0 km and 15.7 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 114).

32 F/9 Pyrargyrite has been identified, partly on the basis of spectrographic analysis, as occurring with native silver and polybasite at the Coniagas Mine, 4.8 km southwest of Bachelor Lake, in Lesueur Township. It is closely associated with chalcopyrite and galena and was deposited somewhat later than sphalerite, pyrite, and pyrrhotite (K.D. Watson, 1957: Can. Mineralogist, 6, p. 26).

Yukon

105 D/2 Pyrargyrite occurs with native silver, acanthite, galena, pyrite, arsenopyrite and tetrahedrite at the Montana Mine property of Arctic Gold and Silver Mines Limited at Montana Mountain near Carcross, at 60°05'N, 134°42'W (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 59).

105 D/2 Ruby silver is present in significant amounts in some parts of the Venus vein on the property of Venus Mines Limited, on the west side of Windy Arm, Tagish Lake, 16 km southeast of Carcross at 60°01'N, 134°38.2'W (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 115).

105 M/13 Galena, zinc blende and freibergite in a siderite gangue, comprise the mineralization in the vein at the Silver King Mine, west of Galena Hill, in the Duncan Creek mining division. Pyrargyrite is common in the upper workings, and a specimen of this material has been donated to the National Mineral Collection by D.D. Cairnes (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 614).

105 M/14 Pyrargyrite has been identified by X-ray diffraction pattern (X-ray Laboratory, Geol. Surv. Can.) in specimens from the Sadie-Friendship, Lucky Queen, Calumet-Hector, and Silver King mines, in the Keno, Sourdough, and Galena Hill areas, of the Mayo mining district. The pyrargyrite is a supergene mineral associated with native silver, acanthite, calcite, sphalerite and galena in vugs, breccia zones, and late faults. For a description of the geology and geochemistry of the area, see: Geol. Surv. Can., Paper 55-30, Keno and Sourdough Hills, and Geol. Surv. Can., Paper 57-1, Galena Hill, by R.W. Boyle.

PYRITE

FeS_2

Pyrite is an extremely common sulphide mineral and is distributed widely throughout Canada. Accordingly, no attempt is made here to catalogue all of the known occurrences.

British Columbia

82 F/10 Pseudomorphs of pyrite after pyrrhotite have been found at the Bluebell Mine on the east shore of Kootenay Lake (J.D. Grice and R.A. Gault, 1977: Mineralogical Record, 8, p. 33).

92 G/11 Massive pyrite occurs with sphalerite at Britannia Beach on the east side of Howe Sound, 32 km north of Vancouver (N. Campbell and W.T. Irvine, 1960: Can. Inst. Mining Met., Bull., V. 53, No. 575, p. 153).

103 H/13 Pyrite occurs with sphalerite, chalcopyrite, pyrrhotite, galena, gold, and silver at Ecstall River, 66 km southeast of Prince Rupert (N. Campbell and W.T. Irvine, 1960: Can. Inst, Mining Met., Bull., vol. 53, No. 575, p. 153).

103 P/13
104 A/4
The ore at the Porter Idaho claim group on the east slope of the mountain between Portland Canal and Kate Ryan Creek in the Cassiar district comprises pyrite, galena, sphalerite, tetrahe-

drite, and ruby silver (pyrargyrite) (G. Hanson, 1929: Geol. Surv. Can., Mem. 159, p. 61).

104 K/12 Pyrite, chalcopyrite and sphalerite are constituents of the Tulsequah orebody, located about 24 km east of Juneau, Alaska (N. Campbell and W. T. Irvine, 1960: Can. Inst. Mining Met., Bull., vol. 153, No. 575, p. 153).

Manitoba

The following occurrences of pyrite in Manitoba are described by Ann P. Sabina (1972: Geol. Suv. Can., Paper 71-27).

63 J/10 Massive and disseminated pyrrhotite, pentlandite, pyrite, chalcopyrite and violarite are the main constituents of the Manibridge orebody of Falconbridge Nickel Mines Limited (p.70).

63 J/13 Crystals of pyrite up to 20 cm in diameter have been found in the orebody at the Stall Lake Mine at Stall (Miller) Lake (p. 61).

63 K/12 Pyrite-chalcopyrite-sphalerite ore occurs both massive and disseminated at the Mandy and Schist Lake mines on the shore of the Northwest Arm of Schist Lake (p. 38,39).

63 K/13 Two types of ore are encountered at the Flin Flon Mine: massive sulphide ore consisting of pyrite with black sphalerite, chalcopyrite, pyrrhotite and brown sphalerite in chlorite and talc (p. 41).

63 K/13 Pyrite is common in massive form, as individual pyritohedrons and cubes 1 cm in diameter, and as aggregates of cubic crystals at the rock dumps of the Baker-Patton deposit east of the north end of Sourdough Bay (p. 45).

63 K/13 Massive pyrite and crystals averaging 6 mm in diameter occur with chalcopyrite and minor pyrrhotite at the Pine Bay Mine on the shore of Sourdough Bay at the north end of Athapapusko Lake (p. 43).

63 K/16 The ore at the Chisel Lake Mine consists of a massive aggregate of sphalerite, pyrite, pyrrhotite, chalcopyrite, galena and arsenopyrite. The orebody lies below the southern end of Chisel Lake (p. 65).

63 N/3 The Sherritt-Gordon ore consisted of a coarse aggregate of pyrrhotite, pyrite, chalcopyrite, sphalerite, cubanite and small amounts of marcasite and galena (p. 48).

63 O/1
63 O/8
63 P/12
63 P/13 The Soab South, Soab North, Pipe, Birchtree, Thompson and Moak Lake Nickel Mines lie along a fault zone that extends for 160 km from Setting Lake to the Mystery Lake-Moak Lake area. The ores consist mainly of pyrrhotite, pentlandite and pyrite with lesser amounts of chalcopyrite, magnetite and marcasite (p. 71, 73, 74 75).

New Brunswick

21 O/8
21 P/5
21 P/12 Pyrite is a common constituent of the massive sulphide deposits of the Bathurst area. Pyrrhotite, galena, sphalerite, and chalcopyrite, are commonly associated with the pyrite, as well as tetrahedrite and arsenopyrite (A.L. McAllister, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 574, p. 88).

A selection of pyrites from 18 sulphide occurrences in New Brunswick was analyzed for major and minor elements. The chemical analyses, Fe:S ratios, and unit cell dimensions measured against a silicon standard are given in the following tables (J.K. Sutherland, 1967: Can. Mineralogist, 9, p. 71-83).

	(1) Keymet	(2) Nigadoo	(3) Murray Brook	(4) Devils Elbow	(5) Bruns-wick 12A	(5) Bruns-wick 12B	(5) Bruns-wick 12D
Fe	45.78	47.01	43.59	45.91	45.86	45.53	44.95
Co	0.05	0.02	0.05	0.1-0.2	0.10	0.05	0.05
Ni	0.01	0.01	0.008	0.006	0.005	0.005	0.005
S	53.18	46.86	47.06	52.39	51.84	52.72	51.20
Se	nd	0.0005	0.0005	0.003	0.0005	nd	0.0005
As	0.11	0.01	4.52	0.01	0.60	0.02	0.25
Cu	0.02	0.02	0.38	0.22	0.18	0.19	0.23
Pb	0.65	0.60	1.21	0.04	0.08	0.09	0.98
Zn	0.53	0.08	1.78	0.07	0.08	0.29	1.10
Sb	-	-	0.05	-	0.02	-	-
Ba	-	-	-	-	-	-	0.01
Bi	0.002	-	0.008	0.005	0.01	0.01	0.01
Cd	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cr	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Ga	0.001	0.001	0.001	0.001	0.001	0.001	0.001
In	0.001	0.007	0.01	0.001	0.001	0.002	0.003
Mn	0.01	0.03	0.05	0.01	0.01	0.01	0.02
Mo	0.002	0.005	0.005	0.01	0.003	0.002	0.005
Si	0.17	0.12	0.18	0.08	0.05	0.09	0.28
Ag	0.015	0.003	0.003	0.001	0.001	0.002	0.006
Sn	0.003	0.004	0.02	0.003	0.02	0.05	0.05
Ti	0.01	0.02	0.03	0.03	0.02	0.01	0.02
V	0.005	0.01	0.005	0.005	0.005	0.005	0.005
Zr	0.02	0.02	0.02	0.02	0.01	0.01	0.02
Total	100.60	100.46+	99.01	98.95	98.93	99.12	99.23
Fe:S*	1:2.01	1:2.04	1:191	1:1.98	1:1.97	1:2.01	1:1.96
a_0^+	5.4174	5.4163	5.4176	5.4173	5.4175	5.4174	5.4176

	(6) Wedge	(7) Half Mile Lake	(8) Heath Steele A	(8) Heath Steele B	(9) Domin-ion	(10) Cob-bler Sexton	(11) Petit-codiac
Fe	44.63	45.53	43.98	45.53	45.02	46.16	45.14
Co	0.05	0.04	0.1-0.2	0.04	0.02	0.05	0.01
Ni	0.007	0.003	0.001	0.001	0.008	0.005	0.01
S	53.19	51.99	50.85	52.47	51.94	52.78	51.65
Se	nd	0.0005	nd	0.0005	nd	nd	0.0005
As	0.15	0.21	0.15	0.15	0.01	0.01	0.01
Cu	1.52	0.06	0.86	0.14	0.04	0.04	0.01
Pb	0.13	0.37	0.90	0.56	1.24	0.06	0.04
Zn	0.47	0.32	1.00	0.58	0.62	0.03	0.01
Sb	-	-	-	-	-	-	-
Ba	0.01	-	0.02	0.01	-	-	-
Bi	0.01	0.01	0.02	0.01	0.002	0.002	-
Cd	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cr	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Ga	0.001	0.001	0.001	0.001	0.001	0.001	0.001
In	0.002	0.001	0.01	0.001	0.001	0.001	0.002
Mn	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Mo	0.003	0.002	0.002	0.002	0.005	0.003	0.01
Si	0.18	0.15	0.53	0.14	0.10	0.05	1.19
Ag	0.001	0.006	0.006	0.001	0.001	0.001	0.001
Sn	0.01	0.01	0.02	0.005	0.005	0.005	0.003
Ti	0.02	0.05	0.03	0.01	0.02	0.01	0.05
V	0.01	0.005	0.005	0.005	0.005	0.005	0.01
Zr	0.01	0.02	0.02	0.01	0.02	0.02	0.02
Total	100.45	98.82	98.64	99.71	99.10	98.28	98.21
Fe:S*	1:2.07	1:1.99	1:1.99	1:2.00	1:1.99	1:1.99	1:2.00
a_0^+	5.4178	5.4174		5.4173	5.4173	5.4173	5.4158

	(12) Anni-dale	(13) Lums-den	(14) Teahan	(15) Re-serve Brook	(16) Mount Pleas-ant	(17) Nerepis	(18) Back Bay
Fe	45.02	46.16	45.78	46.94	43.60	45.27	44.51
Co	0.30	0.03	0.02	0.05	0.01	0.02	0.01
Ni	0.01	0.005	0.005	0.02	nd	0.01	0.2
S	52.58	52.94	53.36	49.97	45.51	51.47	51.90
Se	nd	nd	nd	nd	nd	nd	nd
As	0.01	0.05	0.01	0.37	8.50	0.22	0.01
Cu	1.16	0.04	0.29	0.04	0.88	0.09	0.48
Pb	0.08	0.02	0.05	0.75	0.08	0.89	0.06
Zn	0.09	0.01	0.30	0.15	0.88	0.27	0.05
Sb	-	-	-	0.01	nd	-	-
Ba	-	-	0.01	-	nd	-	-
Bi	0.01	0.005	-	-	nd	-	0.002
Cd	0.005	0.005	0.005	0.005	nd	0.005	0.005
Cr	0.03	0.03	0.03	0.03	0.005	0.03	0.03
Ga	0.001	0.001	0.001	0.001	nd	0.001	0.001
In	0.002	0.001	0.001	0.005	0.01	0.005	0.001
Mn	0.01	0.01	0.01	0.02	0.005	0.03	0.01
Mo	0.005	0.005	0.01	0.01	0.01	0.005	0.005
Si	0.10	0.19	0.15	0.23	-	0.32	0.08
Ag	0.003	0.001	0.001	0.006	0.003	0.003	0.001
Sn	0.005	0.005	0.002	0.002	nd	0.005	0.003
Ti	0.02	0.01	0.03	0.005	0.10	0.02	0.04
V	0.005	0.005	0.005	0.005	0.01	0.005	0.005
Zr	0.02	0.02	0.02	0.02	nd	0.03	0.02
Total	99.47	99.54	100.09	98.64	99.60	98.70	98.41
Fe:S*	1:2.02	1:2.00	1:1.99	1:1.85	1:1.94	1:1.98	1:1.98
a_0‡+	5.4173	5.4172	5.4172	5.4177	5.4173	5.4175	5.4203

*This ratio includes Co and Ni with the iron and is obtained after the removal of some iron and sulphur into arsenopyrite, chalcopyrite, galena and sphalerite.
+Includes 5.60 per cent CO_2 present mainly as siderite but with some calcite. All af the CO_2 however was allocated to siderite. The Fe of this siderite was deducted from the total iron present, resulting in a higher Fe:S ratio the would actually occur.
‡All cell size determinatons ±0.0001 Å.

Newfoundland

1 M/10 Pyrite cubes are common in the crystal-lithic tuff in the Grande Le Pierre Harbour region (D.A. Bradley, 1962: Geol. Surv. Can., Mem. 321, p. 18).

1 N/10 Cubes of pyrite about 2.5 cm to the edge have been found with quartz crystals in veins exposed along shoreline cliffs at Outer Cove and Middle Cove in Tor Bay (Ann P Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 57).

2 E/12 The Pilleys Island Mine is a former producer of pyrite. The ore consisted of massive pyrite intergrown with chalcopyrite, minor sphalerite, and traces of galena. The mine is at tidewater on the northeast side of Pilleys Island Harbour on the south side of Pilleys Island, North Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 109).

11 O/4 Pyrite nodules, and cavities lined with pyrite cubes, occur in yellowish-brown limestone at Black Point, a headland 2600 m south of Codroy (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 73-36, p. 161).

12 H/9 The most abundant primary sulphide mineral at the Whalesback Mine is pyrite. It is associated with chalcopyrite, pyrrhotite, sphalerite, mackinawite, pentlandite, magnetite, cubanite, galena and ilmenite (K. Kanehira and D. Bachinski, 1968: Can. Jour. Eart Sci., 5, p. 1387).

Northwest Territories

48 C/1 Massive, deeply weathered pyrite associated with galena and sphalerite is found on northwest Baffin Island, near Arctic Bay (R.G. Blackadar, 1960: Can. Mining J., vol. 81, No. 4, p. 108).

48 C/1 A flat-lying ore body 90 m wide, 9 to 15 m thick, and 3 km long has been found on the south shore of Strathcona Sound. The body is nearly massive pyrite with varying amounts of sphalerite, galena and minor marcasite (P.J. Laporte, 1974: Mineral Industry Report, 1969 and 1970, Vol. 2, p. 152; Dept. Indian and Northern Affairs).

Nova Scotia

11 E/5 Chemical analysis of pyrite from Londonderry by G.C. Hoffmann, 1876: SiO_2 0.52, Al_2O_3 0.51, FeO 0.18, MgO 0.18, CaO 0.43, S 52.43, Fe 45.19, Co 0.81, Ni 0.14, total 100.39 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 301).

21 H/8 The National Mineral Collecion contains striated cubic and pyritohedral crystals of pyrite, from the area west of Swan Creek, Cumberland County.

Ontario

31 B/12
31 B/13 Large, octahedral crystals of pyrite from Elizabethtown Township, Leeds County, have been presented to the National Mineral Collection.

31 C/12 Cubic crystals of pyrite occur in steatite schist at the Eldorado Talc Mine, Madoc Township. A specimen of this material was presented to the National Mineral Collection in 1922, by Mr. A.T. McKinnon.

41 I/6 Pyrite is a minor consituent of the Sudbury ores but is of interest because of its diversity of habit, occurrence, and relationships. Varieties include: early pyrite, reaction pyrite, hypogene replacement pyrite, nickeloan pyrite, and late hypogene or supergene pyrite (J.E. Hawley, 1962: Can Mineralogist, 7, p. 66).

41 I/6 Whartonite (nickeliferous pyrite) is found on lots 1 and 2, conc. II, Drury Township, and lot 12, conc. III, Denison Township, in the Sudbury district. The whartonite at the Denison Mine has a slightly violet tinge and is associated with gersdoffite and chalcopyrite, as well as nickel-poor pyrite having the true pyrite colour. Analysis by Allen: Fe 38.54, Ni 6.50, Cu nil, S 51.39, insol. 3.80, total 100.23; S.G. 4.81 (S.H. Emmons, 1892: J. Am. Chem. Soc., XIV, pp. 205-211)(A.E. Barlow, 1901: Geol. Surv. Can., Ann. Rept., XIV, p. 97H) (E. Thomson, 1938: Univ. Toronto Stud., Geol. Stud., Geol. Ser., 41, p. 73) (E. Thomson and J.S. Allen, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 135) (M.A. Peacock and F.G. Smith, 1941: Univ. Toronto Stud., Geol. Ser., 46, p. 116).

41 I/16 Porous nodules of cellular pyrite up to 20 cm in diameter are found within massive chalcopyrite in the open pit of Temagami Mining Company Limited on Timagami Island, near the southwest

end of the long Northeast Arm of Lake Timagami (E.R. Rose, 1965: Can. Mineralogist, 8, p. 317-324).

41 I/6
42 C/7 Pyrite is a constituent of the massive sulphide deposits at Lake Timagami, Nipissing district, and at Goudreau, in the Algoma district of Ontario (J.E. Thompson, 1960: Can. Inst. Mining Met., Bull., vol. 53, No 575, p. 153).

42 E/10 Pyrite occurs with arsenopyrite, quartz, pyrrhotite, sphalerite, chalcopyrite, and gold, at the McLeod-Cockshutt and the Hard Rock Gold Mines, in Ashmore Township, District of Thunder Bay (J.E. Thompson, 1960: Can. Inst. Mining Met., Bull., vol. 53, No 575, p. 153).

42 F/4 The sulphide deposits of the Manitouwadge area, Thunder Bay district, contain appreciable amounts of pyrite, as well as pyrrhotite, sphalerite, chalcopyrite, and galena (J.E. Thompson, 1960: Can. Ints. Mining Met., Bull., vol. 53, No. 575, p. 153).

52 B/13 Abundant and unique concretions of pyrite are found in massive pyrrhotite at the Fin-Lan Copper Mines property on the west shore of Finlayson Lake, 4 km from its south end. The concretions vary in size from 1 mm to 15 cm and average about 3 cm (K.G. Fenwick, 1976: Ont. Div. Mines, GR 145, p. 65).

52 F/16 Specimens of pyrite occurring as cubes up to 2.5 cm across and as aggregates of coarse crystals are found at the Pidgeon molybdenum deposit near the east end of Lateral Lake. Access to the property is by a road, 10.1 km long, leading west from Highway 72 at a point 32 km north of Dinorwic (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 39).

Quebec

11 N/5 Pyrite nodules occur in brown sandstone along the sea-cliffs at Anse à Damase on the south shore of Alright Island, Magdalen Islands (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 17).

21 E/5
21 E/11
21 E/14 Pyrite is a constituent of the sulphide deposits in Ascot Township, Sherbrooke County, and in Weedon and Stratford townships, Wolfe County (J.E. Gilbert, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 128).

21 L/14 The National Mineral Collection contains crystals of pyrite, from the St. Foy road, in Quebec County.

24 K/4
24 K/5
25 D/15 Pyrite is a constituent of the massive sulphides deposits in the Ungava area of New Quebec (J.E. Gilbert, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 128).

31 G/12 Cubo-octahedral crystal of pyrite occur at the Marsolais Apatite Mine, Perkins Mills. Specimens from this locality have been donated to the National Mineral Collection by T. Lavictoire.

31 K/7 A pyrite-graphite association was observed in finely laminated paragneiss east of Billot, in the Percho-Portou area, of Pontiac County (R.A. Marleau, 1959: Que. Dept. Mines, Prelim. Rept., p. 383).

32 C/4 Cubes of pyrite up to several cm in diameter have been found at the Lamaque Mine in Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 11).

Pyrite occurs at the Following massive sulphide deposits in Abitibi County and territory.

32 C/4 Golden Manitou Mines Limited, Bourlamaque Township; East Sullivan Mines Limited, Bourlamaque Township.

32 C/10
32 C/11 Atlas Sulphur & Iron Company Limited, Lévy Township.

32 C/15 Opemiska Copper Mines (Que.) Limited, Lévy Township.

32 D/3 West Wasa Mines Limited, Beauchastel Township; Noranda Mines Limited (Horne Mine), Rouyn Township.

32 D/6 Waite Amulet Mines Limited, Duprat and Dufresnay townships; Lake Dufault Mines Limited, Dufresnay Township.

32 D/6
32 D/7 Quemont Mining Corporation Limited, Rouyn Township.

32 D/7 Mobrun Copper Limited, Dufresnay Township; West McDonald Mines Limited, Dufresnay Township.

32 D/14 Normetal Mining Corporation, Desmeloizes Township.

32 F/12 Mattagami Lake Mines Limited, Galinée Township.

32 F/13 New Hosco Mines Limited, Daniel Township.

32 G/12 Opawica Explorers Limited, L'Espérance Township.

32 G/14 Pichamobi marcasite zone, Guettard Township.

32 G/15 Opemiska Explorers Limited, Lévy Township.

32 G/16 Copper Rand Chibougamau Mines Limited, Eaton Bay deposit, McKenzie Township (J.E. Gilbert, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 128).

Saskatchewan

63 L/9 Pyritohedrons and cubes of pyrite up to 2 cm in diameter occur embedded in massive sulphides and in chlorite schist host rock at the Flexar Mine about 14 km southwest of Creighton (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 25)

73 P/6 Pyrite crystals up to 2.5 cm in diameter have been reported at the Anglo Rouyn Mine on a peninsula east of Waden Bay at the north end of Lac La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5).

PYROAURITE

$$Mg_6Fe_2CO_3(OH)_{16}.4H_2O$$

Pyroaurite is a rhombohedral mineral, isostructural with stichtite (Cr for Fe) and hydrotalcite (Al for Fe). Sjogrenite is the hexagonal polymorph of pyroaurite.

Ontario

31 L/6 Pyroaurite and brucite are common at the Legendre quarry located 2.7 km north of Highway 17 from a point 1.9 km east of Rutherglen. The pyroaurite occurs as greenish-blue, green and tan-coloured fine flaky aggregates and as green fibrous veinlets 6 mm wide (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 71).

31 L/7 Small green transparent crystals of pyroaurite have been found in small cavities in dolomite located 5.6 km east of Rutherglen, lot 27, conc. X, Calvin Township. Semi-micro chemical analysis by Ellsworth: MgO 35.84, MnO 0.01, Fe_2O_3 23.37, CO_2 7.30, H_2O 33.66, total 100.18. A detailed study by Frondel showed the mineral to be homogeneous and fresh, and truly rhombohedral. The morphology, optical properties and X-ray powder pattern were found to be identical to those of pyroaurite described originally from Langban, Sweden (H.V. Ellsworth, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 33)(C. Frondel, 1941: Am. Mineralogist, 26, p. 295).

42 B/1 Light blue fibrous and foliated aggregates of pyroaurite occur at the Reeves asbestos mine 1.3 km south of Highway 101 at 48°12.5'N, 82°05'W, in Reeves Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 155).

Quebec

21 E/14 Tiny flakes of bottle-green pyroaurite and colourless to pale green sjogrenite have been identified on fracture planes in massive serpentine from the Belmina Mine, near St-Jacques (Stenson), about 18 km from Disraeli (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 45).

31 F/10 Nodules of light blue and white, pearly pyroaurite are exposed in roadcuts on both sides of Highway 8 just east of the turn-off to Bryson. Pyroaurite has also been found in a road-cut on the Bryson to Grand Calumet road just south of the Bryson bridge, and in a road-cut on the adjacent road to Campbells Bay (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 99 to 102).

31 G/12 White fibrous pyroaurite occurs at the Cross Quarry near Meach Lake (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 41).

31 G/13 Roadcuts north of Val-des-Bois on Highway 35 contain pyroaurite as tiny white waxy nodules and as white satiny fibres surrounding serpentine (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 44).

31 G/15 Pyroaurite, as waxy white nodules, occurs in the dolomite at the Dobbie Mine (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 73).

31 G/15 Nodules of colourless to grey pyroaurite up to 0.5 cm in diameter are associated with greenish yellow serpentine in magnesite-dolomite ore at the Canadian Refractories Limited property at Kilmar (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 255).

31 H/8 Translucent, multi-coloured, massive serpentine occurs in pits on the shore of Webster Lake, about 6.4 km from the St-Elie-Bonsecours road. Yellowish to orange patches of pyroaurite are present on the serpentine (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 14).

31 J/4 Pyroaurite occurs as tiny white waxy nodules in crystalline limestone exposed along the south bank of the du Lièvre River downstream from des Cèdres dam (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 47).

Yukon

116 C/7 Pyroaurite occurs as colourless, silky, flaky patches on serpentine at the Clinton Creek asbestos mine (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 111).

PYROCHLORE GROUP

Minerals of the pyrochlore group have the general formula $A_{2-m}B_2O_6(O,OH,F)_{1-n}\cdot pH_2O$. Three subgroups are recognized on the basis of atomic proportions of the B-atoms Nb, Ta and Ti: pyrochlore, where Nb+Ta>2Tiand Nb>Ta; microlite, where Nb+Ta>2 Ti and Ta>Nb; betafite, where 2Ti>Nb+Ta. The subgroups are subdivided into species which are assigned chemical names based on the dominant A-atom Na, Ca, K, Sn, Ba, RE, Pb, Bi, U. The orthodox names ellsworthite and hatchettolite have been dropped in favour of the chemical name uranpyrochlore.

British Columbia

82 K/9
82 K/15 Amber-coloured grains of pyrochlore have been identified in a sample of black sand from a placer deposit in Bugaboo Creek. Associated minerals included: euxenite-polycrase, uraninite, allanite, andalusite, apatite, epidote, fluorite, garnet, hematite, ilmenite, magnetite, pyrite, sphene and zircon. The creek is located about 2 km south of the town of Golden (X-ray Laboratory, Geol. Surv. Can.)(R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 18, p. 28).

83 D/6 Reddish brown crystals of pyrochlore occur with calcite and dolomite in layered carbonate rock at the Verity property located near Mile 109 (175 km), Albreda Subdivision, Canadian National Railways, 37 km north of the village of Blue River. Chemical analysis of hand-picked crystals by Ledoux and Company and Geological Survey of Canada: Na_2O 6.80, K_2O 0.1, CaO 13.76, MnO tr., FeO 0.47, MgO tr., R.E. oxides 0.2, ThO_2 0.07, U_3O_8 3.51, PbO tr., SrO 0.83, BaO tr., Nb_2O_5 60.90, Ta_2O_5, 6.55, ZrO_2 tr., TiO_2 2.07, F 3.75, H_2O^+ 0.10, total 99.1, less O for F 1.6, total 97.5; S.G. 4.48 (D.D. Hogarth, 1961: Can. Mineralogist, 6, pp. 610-633).

83 D/6 An occurrence of pyrochlore has been reported at the Paradise property of St. Eugene Mining Corporation 6.4 km south of Lempriere Station (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962; Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 235).

93 N/9 Uranian pyrochlore has been reported as occurring in a calcite-soda pyroxene rock at the Lonnie deposit, located about 8 km east of the settlement of Manson Creek (R.B. Rowe, 1958: Geol. Surv. Can. Econ. Geol. Ser., 18, p. 30).

Manitoba

52 L/6 Microlite is a widespread mineral in beryl-bearing pegmatites around Greer Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

52 L/6 Antimonian microlite replaces stibiotantalite mainly along cleavage planes in samples from the Odd West pegmatite about 1 km north of the western end of Rush Lake. Electron microprobe analysis: CaO 8.3, FeO 1.9, Ta_2O_5 72.1, Nb_2O_5 5.1, Sb_2O_3 1.6, total 89.0 (P. Černý and D.C. Harris, 1973: Can. Mineralgosit, 12, p. 76).

31 C/13 Pyrochlore occurs as grains in a hornblende syenite pegmatite on the north half of lot 14, conc. III, Faraday Township. Selected material heated in air gave an X-ray diffraction pattern similar to that of pyrochlore (D.A. Moddle, 1960: private communication).

31 C/13 Pyrochlore-microlite was found in specimens from the property of Bonville Gold Mines Limited, on lots 21-24, conc. A, Faraday Township (D.F. Hewitt, 1960: private communication).

31 C/13 Pyrochlore-betafite has been identified by the X-ray Laboratory, Geol. Surv. Can., in specimens from the property of Greyhawk Uranium Mines Limited, lot 10, conc. XII, Faraday Township.

31 C/14 Crystals of ellsworthite (uranpyrochlore) occur with black mica and apatite in a calcite vein on lot 10, conc. XII and XIII, Cardiff Township. A yellowish brown alteration product coats most of the ellsworthite. An analysis by H.V. Ellsworth is as follows: TiO_2 15.06, Nb_2O_5 23.44, UO_3 20.46, CaO 8.94, Ta_2O_5 9.97, SiO_2 2.49, Fe_2O_3 2.74, PbO 1.73, UO_2 1.56, $(Ce,La,Di)_2O_3$ 1.49, H_2O 11.20, Al_2O_3 0.12, BeO 0.02, FeO 0.22, MgO 0.08, MnO 0.04, SnO 0.06, ThO_2 0.10, $(Yt,Er)_2O_3$ 0.12, insol. 0.21, ignition loss 11.54, total 100.05; S.G. 3.705 (H.V. Ellsworth, 1927: Am. Mineralogist, 12, p. 48)(H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 227).

31 D/9 Betafite occurs in granite pegmatite at the Cromwell property on the north half of lot 14, conc. V, Cavendish Township. A spectrographic analysis of the betafite by W.O. Taylor, gave the following results: Na_2O 2.7, CaO 4.2, MnO 0.3, PbO 1.8, MgO 0.02, Y_2O_3 13, Er_2O_3 1.9, Yb_2O_5 2.5 Ce_2O_3 0.7, Dy_2O_3 1.7, U_3O_8 10, SnO_2 0.2, ThO_2 2.7, SiO_2 1.9, Al_2O_3 0.2, Fe_2O_3 2.0, TiO_2 22, Nb_2O_5 30, Ta_2O_5 2.1, total 100.4 (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 20).

31 D/16 Pyrochlore-microlite occurs in calcite veinlets on the property of Canada Radium Mines Limited, lot 10, conc. XII, Cardiff Township; and in marble, on the property of Canadian All Metals Exploration Limited, on the north half of lot 7, conc. IX, Monmouth Township, Haliburton County (D.F. Hewitt, 1960: private communication.)

31 D/16 Betafite is found on the property of Canadian All Metals Exploration Limited, lot 6, conc. IX, Monmouth Township. Spectrographic analyis by W.O. Taylor is as follows: Na_2O 0.2, CaO 6.7, MnO 0.4, PbO 2.5, MgO 2.2, La_2O_3 0.1, U_3O_8 13, ZrO_2 0.1, SnO_2 0.2, ThO_2 0.6, SiO_2 5.1, Al_2O_3 0.6, Fe_2O_3 5.3, TiO_2 12, Nb_2O_5 36, total 85.0 (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 20).

31 D/16 Ellsworthite (uranpyrochlore), uraninite and uranothorite occur in leucogranite pegmatite on the Canada Radium Corporation property on lot 9 conc. XII, Cardiff Township. Hatchettolite (uranpyrochlore) is associated with allanite, uraninite, uranothorite and cyrtolite in pegmatitic granite at the Dyno Mine on lot 12, conc. VIII, Cardiff Township. (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Min. Rept. 21, p. 65).

31 E/1 Betafite occurs in calcite veins on the Halo Uranium Limited property on the north half of lot 6, conc. XV, Cardiff Township (D.F. Hewitt, 1960: private communication). Crystals from this property, formerly known as the Hogan property, have been analyzed by Ledoux and Company and Geological Survey of Canada: Na_2O 0.64, K_2O nil, CaO 10.64, MnO 0.52, FeO 3.15, MgO 0.32 $(Ce,La,Di)_2O_3$ tr., $(Yt,Er)_2O_3$ tr., ThO_2 0.2, U_3O_8 0.2, 22.24, PbO 1.49, SrO 0.42, BaO tr., Nb_2O_5 32.44, Ta_2O_5 0.25, ZrO_2 tr., TiO_2 16.93, SnO_2 tr., F 1.23, H_2O^+ 3.47, total 99.3, less O for F 0.5, total 93.4; S.G. 4.03 (D.D. Hogarth, 1961: Can. Mineralogist, 6, p. 615).

31 E/1 Pyrochlore-betafite has been identified by the X-ray Laboratory, Geological Survey of Canada, in specimens from the following properties: (1) lot 31, conc. XV, Faraday Township, Hastings County (Silver Crater Mines Limited); (2) lots 5, conc. XXI, Cardiff Township, Haliburton County (Fission Mines Limited); (3) lots 26 and 27, conc. XI, Cardiff Township (Bicroft Uranium Mines Limited, Centre Lake property); (4) lots 4 and 5, conc. XVIII, Cardiff Township (Halo Uranium Mines Limited).

31 E/1 Betafite occurs as small grains and cubo-octahedral crystals on the property of Peter-Rock Mining Limited, lot 39, conc. VIII, Herschel Township, Hastings County. The crystals are black to reddish brown changing by alteration (hydration)to yellow or greenish brown. Spectrographic analysis by W.O. Taylor: Na_2O 0.3, CaO 2.3, MnO 0.7, PbO 0.4, MgO 0.5, Y_2O_3 3.6, Er_2O_3 0.2, Yb_2O_3 0.5, Ce_2O_3 1.7, Dy_2O_3 0.3, La_2O_3 1.2, U_3O_8 17, ZrO_2 0.03, SnO_2 0.4, ThO_2 2.5, SiO_2 5.0, Al_2O_3 0.4, Fe_2O_3 3.1, TiO_2 11, Nb_2O_5 46, Ta_2O_5 3.4, total 100.5 (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 20). D.F. Hewitt (private communication) reports pyrochlore-microlite from the same property as above (lot 39) and also from lot 40, conc. VIII, Herschel Township.

31 E/1 Pyrochlore-microlite is reported to occur in zoned granite pegmatite on lot 30, conc. I, Herschel Township, and in pegmatite on lot 31, conc. XVI, Faraday Township (D.F. Hewitt, 1960: private communication).

31 E/1 Betafite occurs on lot 31, conc. XV, Faraday Township, Hastings County (Silver Crater Mines Limited, Basin property). Spectrographic analysis by W.O. Taylor: Na_2O 0.2, CaO 5.2, MnO 0.6, PbO 2.9, MgO 0.4, Y_2O_3 1.0, Er_2O_3 0.4, Yb_2O_3 0.3, Ce_2O_3 0.4, Dy_2O_3 0.2, La_2O_3 0.8, U_3O_8 19, ZrO_2 0.1, SnO_2 0.2, ThO_2 1.8, SiO_2 2.6, Al_2O_3 0.3, Fe_2O_3 2.6, TiO_2 12, Nb_2O_5 34, Ta_2O_5 3.3, total 88.3 (J. Satterly, 1956: Ont. Dept. Mines, Ann.Rept., vol. 65, Pt. VI, p. 20). Chemical analysis by Ledoux and Company and Geological Survey of Canada: Na_2O 0.33, K_2O nil, CaO 10.94, MnO_2 0.62, FeO 3.44, MgO tr., $(Ce,La,Di)_2O_3$ 0.2, $(Yt,Er)_2O_3$ tr., ThO_2 0.2, U_3O_8 22.79, PbO 1.43, SrO 0.21, BaO tr., Nb_2O_5 31.06, Ta_2O_5 3.33, ZrO_2 tr., TiO_2 17.50, SnO_2 tr., F 1.35, H_2O^+ 5.88, total 99.3, less O for F 0.6, total 98.7; S.G. 4.15 (D.D. Hogarth, 1961: Can. Mineralogist, 6, p. 615).

31 E/6 Pyrochlore-microlite is reported to occur in granite pegmatite near the Melissa Post Office, on lot 23, conc. V, Chaffey Township, District of Muskoka (D.F. Hewitt, 1960: private communication).

31 E/7 Pyrochlore has been reported in granite pegmatite on lot 6, concs. III and IV, Peck Township (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Min. Rept. 21, p. 65).

31 E/11 A mineral of the pyrochlore-microlite series is reported to occur in association with fergusonite and eschynite-priorite in granitic pegmatite on lot 5, conc. IX, Butt Township (R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 18, p. 91).

31 E/12 Pyrochlore-microlite has been reported on the Raney property, lot 3, conc. VIII, Chapman Township (R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 18, p. 92).

31 E/14 Small grains of brown pyrochlore occur in pink granite formerly mined as building stone at a quarry on the north side of South River village (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 76).

31 F/3 A zoned granite pegmatite on lot 15, of the southwesterly range of Miller Township, contains pyrochlore as elongate rounded, or irregular masses from 6 mm to 5 cm across, and associated with or occurring in muscovite. The Provincial Assay Laboratory, Ontario Department of Mines, obtained a clear and distinct X-ray diffraction pattern after heating specimens in air. Chemical analysis gave 12.25 per cent U_3O_8 (D.A. Moddle, 1960: private communication). Spectographic analysis of specimens of pyrochlore from this property by W.O. Taylor gave the following results: Na_2O 0.9, CaO 4.2, MnO 0.2, PbO 0.5, MgO 2.8, Y_2O_3 4.6, Er_2O_3 0.7, Yb_2O_3 1.0, Ce_2O_3 1.8, Dy_2O_3 1.0, La_2O_3 0.4, U_3O_8 13, ZrO_2 0.3, SnO_2 0.2, ThO_2 2.0, SiO_2 4.2, Al_2O_3 1.6, Fe_2O_3 2.2, TiO_2 3.9, Nb_2O_5 50, Ta_2O_5 5.0, total 100.0 (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 20).

31 F/4 Ellsworthite is abundant at the McDonald Mine in Monteagle Township, where if occurs as nodular masses in calcite and quartz. The grains are often surrounded by radial shatter patterns characteristic of radioactive minerals. Two varieties occur, one being amber yellow and the other dark brown. The yellow material appears to be an altered from of the darker variety. Chemical analyses by Todd: (1) light type, SiO_2 2.54, TiO_2 10.47, Al_2O_3 0.42, Fe_2O_3 4.10, CaO 11.73, MnO 0.43, SnO 0.10, Ta_2O_5 4.32. Nb_2O_5 34.22, PbO 0.24, UO_3 18.50, RE 0.21, H_2O 12.22, F_2 0.22, total 99.72; S.G. 3.608; (2) dark type, SiO_2 2.68, TiO_2 9.79, Fe_2O_3 3.80, CaO 13.62, MnO 0.22, SnO_2 0.25, Ta_2O_5 4.27, Nb_2O_5 34.27, PbO 0.41, UO_2 8.42, UO_3 10.68, H_2O 11.42, F_2 0.49, total 100.32; S.G. 3.758. The mine, originally worked for feldspar, is in pegmatite on lots 18 and 19 conc. VII, and has long been abandoned. It is now well known as the type locality for ellsworthite, and for its unusual assemblage of minerals (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ, Ser., 11, p. 204)(T.L. Walker and A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 16, p. 13).

Hatchettolite occurs as small nodular masses intimately intergrown with titanite and associated with cyrtolite at the McDonald Mine, an abandoned quarry in Monteagle Township, Hastings County (H.S. Spence, 1930: Am. Mineralogist, 15, p. 443).

31 F/4 Two different varieties of hatchettolite occur in the old workings of the Woodcox Mine, lot 7, conc. VIII, Monteagle Township. One of these is black and the other an amber colour. The latter appears to be secondary after the dark material. Associated minerals are: reddish feldspar, cyrtolite, and calciosamarskite. Chemical analyses by E.W. Todd of hatchettolite from this locality are as follows: (1) black type, SiO_2 1.57, TiO_2 11.37, Fe_2O_3 3.46, CaO 13.25, MgO 0.36, MnO 0.51, ZrO_2 4.12, SnO_2 1.44, Nb_2O_5 31.33, Ta_2O_5 10.29, PbO 0.54, UO_2 11.40, UO_3 4.41, ThO_2 0.52, $(Ce,La,Di)_2O_3$ 0.12, $(Yt,Er)_2O_3$ 0.62, H_2O 4.29, total 99.60; S.G. 4.509; (2) amber type, SiO_2 1.56, TiO_2 8.82, Fe_2O_3 3.63, CaO 13.62, MgO 0.20, MnO 0.43, ZrO 5.90, SnO_2 1.46 Nb_2O_5 31.70, Ta_2O_5 15.28, PbO 0.24, UO_2 5.72, UO_3 5.08, ThO_2 0.42, $(Ce,La,Di)_2O_3$ 0.50, $(Yt,Er)_2O_3$ 0.62, H_2O 5.05, total 100.23; S.G. 4.417 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, pp. 210, 262).

31 F/4 Pyrochlore-microlite is reported to occur in zoned granite pegmatite on the following properties in Monteagle Township, Hastings County: lot 20, conc. VI: lots 18 and 19, conc. VII; lots 14, 16 and 17, conc. VIII (D.F. Hewitt, 1960: Private communication).

31 F/4 Ellsworthite (uranpyrochlore) is reported to be present in granite pegmatite at the following localities in Monteagle Township; Lots 11 and 12, conc. IV; north half lot 24, conc. VI; lot 21 conc. VII. (D.F. Hewitt, 1954: Ont. Dept. Mines, 63, pt. 6, p. 42, 47. A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ, Geol. Ser. 16, 2nd ed., p. 272).

31 F/4 Betafite occurs in a calcite vein in granite pegmatite and hornblende gneiss on lot 6, conc. XV, Faraday Township, Hastings County. The betafite is present as brown crystals up to 2.5 cm across, found either singly in the calcite vein material of in the aggregates of mica books which occur in the vein (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. VI, p. 170).

31 F/4 An occurrence of pyrochlore in syenite pegmatite is reported in the north half of lot 4, conc. B, Faraday Township. (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Min. Circ. 21, p. 64).

31 F/12 Ellsworthite, euxenite, and monazite occur in a pegmatite sill on lot 27, conc. V, Dickens Township (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 142). D.F. Hewitt (private communication, 1960) reports the occurrence of pyrochlore-microlite in granite pegmatite on the same property.

31 L/5 Uraninite and uranian pyrochlore occur on the property of Nova Beaucage Mines Limited on Newman Island, 11 km west of North Bay. The uranian pyrochlore is in the form of disseminated, euhedral to subhedral crystals, ranging in size from 0.008 to 3.54 millimetres in diameter (R.B. Rowe, 1954: Geol. Surv. Can., Paper 54-5, pp. 5,7).

31 L/7 Pyrochlore-bearing pegmatite dykes extend along a northeasterly line from lot 17, through lot 16, into lot 15, all in conc. II, Calvin Township, just east of the Amable du Fond River. The pyrochlore is a deep clove-brown colour (E.Wm. Heinrich, 1962: Can. Mineralogist, 7, p. 314).

41 H/8 Pyrochlore and uranophane have been identified in a pegmatite on Wall Island, Parry Sound district (D.F. Hewitt, 1967: Ont. Dept. Mines, Ind. Min, Rept. 21, p. 65).

41 I/7 Uranian pyrochlore occurs in granite pegmatite on the property of Cubar Uranium Mines Limited, in the north half of lot 2, conc. II, Dill Township, Sudbury district (R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 93).

41 N/7 Pyrochlore has been identified by X-ray powder pattern in specimens from the Dolan Group and the McCombe property on the shore of Lake Superior near MacGregor Cove, in the Sault Ste. Marie district (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Quebec

31 F/10
31 F/15 X-ray powder photographs have confirmed the identification of pyrochlore in specimens from Calumet Island (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 G/8 Deposits that are potential large-tonnage sources of niobium occur in the Oka complex of carbonate and alkaline rocks in the Oka region, Two Mountains County, about 32 km west of Montreal. Thorian and cerian pyrochlore have been identified as the most abundant niobium minerals, and niocalite and niobian perovskite are also found (R.B. Rowe, 1958: Geol. Surv. Can., Econ, Geol. Ser., 18, pp. 65-88).

31 G/8 Chemical analyses by Ledoux and Company and Geological Survey of Canada: thorian pyrochlore from the Manny zone, Quebec Columbium Mines Limited - Na_2O 2.88, K_2O nil, CaO 17.11, MnO 1.17, FeO 1.80, MgO nil, $(Ce,La,Di)_2O_3$ 2.2, $(Yt,Er)_2O_3$ 0.2, ThO_2 7.23, U_3O_8 1.83, PbO 0.1, SrO 0.65, BaO tr., Nb_2O_5 40.53, Ta_2O_5 3.08, ZrO_2 1.99, TiO_2 10.42, SnO_2 nil, F 2.17, H_2O^+ 7.5, total 100.3, less O for F 0.9, total 99.4; cerian pyrochlore from the Bond zone, Quebec Columbium Mines Limited - Na_2O 1.46, K_2O nil, CaO 20.32, MnO 0.09, FeO 2.06, MgO tr., $(Ce,La,Di)_2O_3$ 8.87, $(Yt,Er)_2O_3$ 0.1, ThO_2 1.08, U_3O_8 0.59, PbO 0.06, SrO 0.67, BaO tr., Nb_2O_5 48.04, Ta_2O_5 2.77, ZrO_2 1.99, TiO_2 8.64, SnO_2 nil, F 2.30, H_2O^+ 0.87, total 99.9, less O for F 1.0, total 98.9; S.G. 4.33 (D.D. Hogarth, 1961: Can. Mineralogist, 6, p. 615).

31 G/8 A detailed study has been made of 5 varieties of pyrochlore from the Oka Complex, located about 32 km west of Montreal on the north shore of the Lake of Two Mountains. Chemical analyses are given below; detailed X-ray data may be obtained by reference to the original paper.

I - Fine-grained. Reddish colour in thin section. From biotite ijolite, Quebec Columbium Mines Limited, Bond Zone, Nb_2O_5 48.8, Ta_2O_5 2.10, TiO_2 7.20, ZrO_2 0.95, Fe_2O_3 1.90, SnO_2 0.00, Na_2O 2.30, K_2O 0.00, CaO 19.8, SrO 0.47, MnO 0.08, MgO 0.42, Ce_2O_3 7.06, La_2O_3 1.39, Nd_2O_3 1.82, Y_2O_3 0.07, U_3O_8 0.69, ThO_2 1.10, TlO_2 0.12, F 3.80, H_2O^+ 0.12, Al_2O_3 0.00, P_2O_5 0.02, S 0.01, SiO_2 0.83; total 101.05 less O for F 1.60, total 99.45.

II - Coarse-grained. Chocolate colour to naked eye - reddish brown in thin section. From soda-pyroxene carbonatite. St-Lawrence Columbium and Metals Company. Nb_2O_5 54.8, Ta_2O_5 0.75, TiO_2 5.80, ZrO_2 0.66, Fe_2O_3 1.66, SnO_2 0.20, Na_2O 5.10, K_2O 0.00, CaO 17.2, SrO 0.32, MnO 0.06 MgO -, Ce_2O_3 7.34, La_2O_3 1.09, Nd_2O_3 1.06, Y_2O_3 0.12, U_3O_8 0.02, ThO_2 0.02, TlO_2 0.03, F 3.92, H_2O^+ 0.18, Al_2O_3 0.00, P_2O_5 0.08, S 0.11, SiO_2 0.10; total 100.62, less O for F 1.65, total 98.97.

III - Medium grain size. Amber colour in thin section. From apatite and magnetite rich carbonatite. St-Lawrence Columbium and Metals Company. Nb_2O_5 56.3, Ta_2O_5 0.25, TiO_2 5.20, ZrO_2 2.03, Fe_2O_3 1.14, SnO_2 0.00, Na_2O 5.10, K_2O 0.00, CaO 17.9, SrO 0.76, MnO 0.05, MgO 0.68, Ce_2O_3 3.78, La_2O_3 0.68, Nd_2O_3 1.83, Y_2O_3 0.08, U_3O_8 0.08, ThO_2 1.47, TlO_2 0.03, F 2.13, H_2O^+ 0.35, Al_2O_3 0.00, P_2O_5 0.24, S 0.04, SiO_2 0.42; total 100.54, less O for F 1.00, total 99.54.

IV - Medium grain size. Dark brown to black colour. St-Lawrence Columbium and Metals Company. Nb_2O_5 47.4, Ta_2O_5 3.54, TiO_2 6.38, ZrO_2 4.10, Fe_2O_3 1.89, SnO_2 0.00, Na_2O 2.05, K_2O 0.00, CaO 19.8, SrO 0.26, MnO 0.28, MgO 0.00, Ce_2O_3 8.66, La_2O_3 1.22, Nd_2O_3 1.22, Y_2O_3 0.21, U_3O_8 0.56, ThO_2 0.03, TlO_2 0.00, F 2.15, H_2O^+ 0.36, Al_2O_3 0.00, P_2O_5 0.04, S 0.05, SiO_2 0.15, total 100.35, less O for F 0.91, total 99.44.

V - Fine grained. Beige colour. From carbonatite containing important amounts of monticellite and/or diopside. St-Lawrence Columbium and Metals Company. Nb_2O_5 65.8, Ta_2O_5 0.04, TiO_2 2.59, ZrO_2 0.60, Fe_2O_3 0.56, SnO_2 0.00, Na_2O 6.20, K_2O 0.00, CaO 15.8, SrO 0.93, MnO 0.00, MgO 0.00, Ce_2O_3 1.63, La_2O_3 0.37, Nd_2O_3 0.39, Y_2O_3 0.17, U_3O_8 0.03, ThO_2 0.20, TlO_2 0.00, F 4.61, H_2O^+ 0.59, Al_2O_3 0.00, P_2O_5 0.07, S 0.04, SiO_2 0.17; total 100.79, less O for F 1.94, total 98.85. (Guy Perrault, 1968: Can. Mineralogist, 9, p. 383-402).

31 G/9 Chemical analyses of pyrochlores from the St. Lawrence Columbium and Metals Corporation property in the Oka district, located about 32 km west of Montreal on the north shore of the Lake of Two Mountains.

I - Deep red (type 1), Nb_2O_5 46.97, Ta_2O_5 2.18, TiO_2 7.49, Fe_2O_3 1.98, ZrO_2 0.99, Na_2O 2.39, CaO 18.68, SrO 0.49, MgO 0.15, MnO 0.08, Ce_2O_3 7.70, La_2O_3 1.45, Nd_2O_3 1.89, Y_2O_3 0.07, U_3O_8 0.72, ThO_2 1.15, F 3.93, loss on ignition 1.54, less O for F 1.65, total 97.17.

II - Red (type 3), Nb_2O_5 55.80, Ta_2O_5 0.50, TiO_2 6.52, Fe_2O_3 2.70, ZrO_2 1.00, Na_2O 4.50, CaO 15.08, SrO 1.09, MnO 0.07, Ce_2O_3 3.00, La_2O_3 0.70, Y_2O_3 0.12, U_3O_8 0.45, ThO_2 0.63, Gd_2O_3 0.20, F 3.69, H_2O^+ 1.24, SiO_2 0.08, less O for F 1.55, total 95.82.

III - Red (type 3), Nb_2O_5 57.97, Ta_2O_5 0.26, TiO_2 5.36, Fe_2O_3 1.08, ZrO_2 2.09, Na_2O 5.25, CaO 15.11, SrO 0.78, MgO 0.56, MnO 0.06, Ce_2O_3 4.09, La_2O_3 0.70, Nd_2O_3 1.89, Y_2O_3 0.08, U_3O_8 0.08, ThO_2 1.51, F 2.19, loss on ignition 0.91, less O for 0.92, total 99.05.

IV - Red (type 3), average chemical composition of mill concentrate, Nb_2O_5 60.00, Ta_2O_5 0.50, TiO_2 4.50, Fe_2O_3 2.70, ZrO_2 1.00, Na_2O 3.50, K_2O 0.60, CaO 15.08, SrO 0.60, MgO 1.00, MnO 0.37, MnO 0.37, Ce_2O_3 3.00, La_2O_3 0.70, Y_2O_3 0.12, U_3O_8 0.10, ThO_2 0.23, Gd_2O_3 0.20, F 3.69, H_2O^+ 1.24, PbO 0.08, less O for F 1.55, total 97.66. (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 G/12 Octahedral crystals of uranian pyrochlore (betafite) are found in amphibole-rich veins and breccia zones within a granite-syenite batholith 32 km long and up to 16 km wide in the Meach Lake-Camp Fortune area of Hull Township. Chemical analyses by Ledoux and Company and Geological Survey of Canada, are as follows: (1) brown uranian pyrochlore from biotite-apatite breccia, lot 22, north half of range IX - Na_2O 0.31, K_2O nil, CaO 10.59, MnO 0.1, FeO 2.41, $(Ce,La,Di)_2O_3$ 0.3, $(Yt,Er)_2$ tr., ThO_2 0.1, U_3O_8 23.11, PbO 2.0, SrO 2.01, BaO nil, Nb_2O_5 33.34, Ta_2O_5 1.26, ZrO_2 tr., TiO_2 15.95, SnO_2 nil, F 1.91, H O^+ 5.60, total 98.9, less O for F 0.8, total 98.1; S.G. 4.06; (2) black uranian pyrochlore from calcite vein, lot 27, north half of range XI - Na_2O 4.04, K_2O nil,

CaO 9.1, MnO 0.17, FeO 2.15, MgO tr., R.E. oxides tr., ThO_2 0.1, U_3O_8 18.95, PbO 3.23, SrO 0.72, BaO tr., Nb_2O_5 50.06, Ta_2O_5 0.72, ZrO_2 tr., TiO_2 6.77, SnO_2 nil, F 2.18, H_2O^+ 1.61, total 99.8, less O for F 0.9, total 98.9; S.G. 4.60; (3) yellowish brown uranian pyrochlore from amphibole vein, lot 27, north half of range X - Na_2O 0.58, K_2O nil, CaO 8.70, MnO 0.28, FeO 1.67, MgO tr., R.E. oxides tr., ThO_2 0.2, U_3O_8 22.10, PbO 2.61, SrO 0.70, BaO tr., Nb_2O_5 41.24, Ta_2O_5 0.54, ZrO_2 tr., TiO_2 13.18, SnO_2 nil, F 3.06, H_2O^+ 5.85, total 100.7, less O for F 1.3, total 99.4; S.G. 3.94 (D.D. Hogarth, 1961: Can. Mineralogist, 6, p. 615).

31 H/11 Pyrochlore has been identified in veins and vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire, (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Madarino, and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 J/13 Uranian pyrochlore is reported to occur in calcite rock on lot 30 range II, Baskatong Township (R.B. Rowe, 1958: Geol. Surv. Can., Geol. Ser., 18, p. 97).

31 J/16 Yellowish brown grains of pyrochlore occur at the Maisonneuve Mine near St-Michel-des-Saints. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 78).

31 L/16 Uranian pyrochlore has been found at the Larivière and Cunningham property in Villedieu Township, near Lake Sairs (R.B. Rowe, 1958: Geol. Surv. Can., Econ. Geol. Ser., 18, p. 98).

32 C/5 Spodumene-rich dykes outcrop in Lacorne Townships, lots 52 and 53, range IX, about 420 m south of the south shore of Lake Lortie. Microlite and betafite have been identified in these dykes (L.P. Tremblay 1950: Geol. Surv. Can., Mem. 253,p. 76).

Saskatchewan

74 N/9 Grey-green to brownish black pyrochlore (betafite) occurs in rounded masses up to 4 cm in greatest dimension in a complex radioactive, pegmatite dyke on the west side of Viking Lake in the Goldfields area. Accessory minerals in addition to pyrochlore are: magnetite, titanite, uranothorite, uraninite, cyrtolite, meta-allanite and pyrite (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 5).
Chemical analysis of dark brown pyrochlore by Ledoux and Company and Geological Survey of Canada: Na_2O 0.42, K_2O nil, CaO 4.44, MnO 0.26, FeO 7.88, MgO 0.5, $(Ce,La,Di)_2O_3$ 0.2, $(Yt,Er)_2O_3$ 2.4, ThO_2 0.5, U_3O_8 21.10, PbO 0.75, SrO 0.21, BaO 2.77, Nb_2O_5 18.99, Ta_2O_5 3.64, ZrO_2 tr., TiO_2 20.65, SnO_2 nil, F 0.46, H_2O^+ 4.70, SiO_2 4.04, Al_2O_3 0.72, total 94.6, less O for F 0.2, total 94.4; S.G. 3.98 (D.D. Hogarth, 1961: Can Mineralogist, 6, p. 615).

PYROCHROITE

$Mn(OH)_2$

Quebec

21 E/13 The manganese hydroxide mineral, pyrochroite, has been identified at the Jeffrey Mine as orange yellow flexible scales on serpentine. The mine is at 45°46'25"N, 71°57'12"W, on lots 9 and 10, ranges II and III, Shipton Township, Richmond County. (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

PYROLUSITE

MnO_2

Pyrolusite is the most important ore mineral of manganese, It occurs as soft fibrous crystals or powdery crusts that soil the fingers, and is often intimately mixed with the harder oxide minerals cryptomelane and psilomelane.

British Columbia

82 F/11 A vein containing pyrolusite occurs at the Bearpaw claims which cover the tip of the southern slope of the hill between Violet and Gold Creeks in the Chapleau Creek - Lemon Creek area (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 23).

92 P/4 The Clinton manganese deposit is located about 16 km northwest of Clinton on one of the foothills of Marble Mountains, about 3.2 km north of Clinton Creek. Psilomelane, manganite and pyrolusite occur as nodules, narrow stringers and irregular masses in quartzites and chloritic schists of the Cache Creek group. (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 18).

93 K/1 Pyrolusite and psilomelane fill fractures in cherty quartzites of the Cache Creek group, on the Tead property located 2 km north of the second canyon on Nechako River below Fraser Lake, or 8.8 km northeast of Fort Fraser. There is a similar occurrence on the Godwin property located about 1.6 km northeast of the Tead showing (J.E. Armstrong, 1949: Geol. Surv. Can., Memoir 252, p. 195).

103 K/2 A deposit containing pyrolusite associated with manganite has been found on Klashwun Point on the north side of Graham Island. The manganite and pyrolusite are present as cementing material in pods up to 9 m long in a shear zone breccia (W. Petruk, 1963: Can. Mineralogist, 7, p. 670).

Manitoba

62 J/12 Most of the manganese in bogs in the Riding Mountain area occurs as pyrolusite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 26).

New Brunswick

The following occurrences of pyrolusite have been recorded by the New Brunswick Research and Productivity Council in The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, Record 2, Part B, 1965.

21 H/5 In a shear zone at Quaco Head, Saint Johns County.

21 H/10 In limestone at Albert Village, Albert County.

21 H/11 Mineralized lenses in limestone at the Upham property, Markhamville, Kings's County. Also at the Glebe Mine.

21 H/14 In limestone at the Davis Farm property, Hillsgrove, Westmorland County. Mineralized veins in granite on Gowland Mountain, Albert County.

21 H/15 In clay and limestone at Shepody Mountain, and in conglomerate at the Memel Mine, Albert County.

21 P/12 In quartz veins at Tetagouche Falls, Gloucester County.

Nova Scotia

11 E/5 A manganese-bearing conglomerate containing psilomelane, pyrolusite and manganite is exposed in cliffs along the west side of the mouth of the Tennycape River at a point 700 m northwest of the bridge over the river. The Tennycape Mine, located about 1.6 km south of highway 15 from a point 1 km west of Tennycape, was the largest producer of manganese ore in the province in the years 1880 to 1900 (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 50).

11 E/6 Pyrolusite occurs with manganite, limonite and hausmannite in veins up to 17 cm wide in dark grey limestone exposed along the shore of Minas Basin at mid-tide level. Access is through the Edgar Nelson farm located about 16 km southwest of Truro along the Clifton-Black Rock road. Nodules of pyrolusite and manganite up to 10 cm across occur in limestone and conglomerate at the East Mountain Mine on the property of Mrs. Daniel McMasters, located about 10.8 km northeast of Truro. Veins containing pyrolusite and manganite cut sandstone at an old mine on the farm of Mrs. H. Coulter, about 12.4 km from Truro (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 40-42).

11 E/6 Manganese-bearing limestone is found in Colchester County, 10 km northeast of Truro. The deposit extends for about 1.6 km and consists of pyrolusite with minor manganite and possibly psilomelane. The manganese minerals occur as compact masses of small interlocking prisms, or as veinlets of fine acicular crystals up to 2.5 cm in length, along bedding and joint planes in the limestone (I.M. Stevenson, 1958: Geol. Surv. Can., Mem. 297, p. 108) (S.M. Bancroft, 1942: Can. Mining J., 63, pp. 361-363).

11 F/5 Veinlets and segregations of pyrolusite have been noted in shales and breccia near Roachvale, Guysborough County (A.G. Johsnton and W.D. McCartney, 1965: Geol. Surv Can., Paper 64-37, p. 52).

11 F/15 Manganese minerals, mainly pyrolusite and some manganite occur in Horton-Windsor rocks of Mississippian age, as nodular masses in limestone and as frcture fillings in shale, in the Lock Lomond area. Associated minerals are hausmannite, calcite, rhodochrosite, barite and selenite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 52).

11 F/16 Pyrolusite is found in sand and clay at Catalone, Cape Breton County (A.G. Johnson and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 53).

21 A/9 At New Ross, Lunenburg County, pyrolusite, manganite and psilomelane, with calcite, barite, maganiferous carbonate, iron oxides and country rock occur as lenticular veins in faults or crushed zones in Devonian granite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 48).

21 A/15 Lenses and stringers containing pyrolusite, psilomelane, iron oxides, calcite and siderite follow the general strike of quartzites, phyllites and slates at Nicholsville, Kings County (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 47).

21 H/1 Pyrolusite occurs as a supergene mineral at the Magnet Cove barium-lead-zinc-silver deposit, 4 km southwest of Walton (R.W. Boyle, 1962: Can. Mining J., vol. 83, No. 4, p. 104).

21 H/1 Pyrolusite and manganite occur in pockets and joint planes in limestone at the Stephens Mine, about 800 m southwest of Walton. Pyrolusite, manganite and psilomelane occur as nodular masses and crystal aggregates with white to brown calcite at the Macumber Mine, on the shoreline southwest of the wharf at Cheverie. (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10).

21 H/1 At Bishop's Brook, 3.2 km south of Kentville, an intergrowth of pyrolusite, manganite and psilomelane with hematite forms beds, lenses and concretions interstratified with bands of grey phyllite. At Deep Hollow Road and Pine Brook, about 4.8 km southwest of Wolfville, pyrolusite fills cracks and cements shattered areas in quartzite, and form irregularly distributed pockets.

Pyrolusite and psilomelane form crusts over grey quartzite at the Ford farm prospect, 3.2 km southwest of Wolfville (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 47).

21 H/8 Pyrolusite, psilomelane and manganite occur as seams, veinlets and small pockets in volcanic rocks, sandstone and shale near Parrsboro, Cumberland County and Lower Five Islands, Colchester County (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 43).

Ontario

52 B/13 Pyrolusite occurs at the Steep Rock Iron Mine at Steep Rock Lake, Freeborn Township. Specimens are present in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 307).

52 E/9 Pyrolusite is associated with silver, gold, galena, sphalerite and copper sulphides at the Golden Gate Mine, Bigstone Bay, Lake of the Woods (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37 p. 27).

Quebec

11 N/5 Residual masses, mostly pyrolusite in clay, are found at various localities on the Magdalen Islands. Manganese oxides occur as veins and replacement masses in altered rock of high carbonate content at the Storer claims on Grindstone Island (A.G. Johnston and W.D. McCartney, 1965; Geol. Surv. Can., Paper 64-37, p. 34).

23 J/15 Pyrolusite has been identified by X-ray diffraction pattern in specimens submitted by G.A. Gross, from the Ruth Lake Mine, in the Knob Lake area (X-ray Laboratory, Geol. Surv. Can.).

PYROMORPHITE

$$Pb_5(PO_5.AsO_4)_3Cl$$

Phosphorus and arsenic substitute mutually in the pyromorphite series and a complete solid solution series exists. The name pyromorphite is given to the phosphorus dominant members; and the arsenic dominant members are called mimetite. These minerals are found as secondary minerals in the oxidized zone of lead deposits. They are structurally similar to apatite and are classified as members of the apatite group.

British Columbia

82 G/5 A yellow and a green variety of pyromorphite occur as fine crystals with galena and cerussite in fracture zones on the Society Girl claim, 3.2 km east of Moyie, in the Fort Steel division. Analyses by O. Bowles: (1) yellow - P_2O_5 16.12, As_2O_5 0.41, Cl 2.52, PbO 80.20, CaO 0.59, FeO 0.86, CaF_2 tr., insol. 0.08, total 100.78, less O for Cl 0.57, total 100.21, S.G. 7.031; (2) green - P_2O_5 15.65, As_2O_5 0.90, Cl 2.59, PbO 80.13, CaO 0.56, FeO 0.46, insol. 0.05, total 100.34, less O for Cl 0.59, total 99.75; S.G. 7.051 (O. Bowles, 1909: Am. J. Sci., Ser. 4, XXVIII, pp. 40-44).

New Brunswick

21 P/5 A thick gossan at the Brunswick No. 6 Mine contains a variety of secondary minerals, notably: pyromorphite, anglesite cerussite, beudantite, rozenite, szomolnokite, roemerite, copiapite, scorodite, jarosite and woodhouseite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 119).

Yukon

105 M/14 Pyromorphite has been identified by X-ray diffraction pattern (X-ray Laboratory, Geol. Surv. Can.) in specimens from the Onek Mine and from the Shamrock vein in the Keno Hill-Surdough Hills area, of the Mayo mining district. For location of properties, see: R.W. Boyle, 1955: Geol. Surv. Can., Paper 55-30.

PYROPE

$Mg_3Al_2(SiO_4)_3$

Northwest Territories

58 C/3 Chromian pyrope garnets occurs as phenocrysts in kimberlite on Somerset Island between the Aston and West Creswell rivers about 40 km north of Creswell Bay at 73°08'N, 94°07'W. Chemical analyses of two specimens gave: SiO_2 42.19, 40.35; TiO_2 0.10, 0.03, Al_2O_3 21.63, 21.68; Cr_2O_3 2.72, 4.42; Fe_2O_3 0.59, 0.00; FeO 6.99, 7.02; MnO 0.42, 0.41, MgO 20.59, 21.06; CaO 5.11, 5.49; total 100.04, 100.46 (R.H. Mitchell and P. Fritz, 1973: Can. Jour. Earth Sci., 10, p. 384).

PYROPHANITE

$MnTiO_3$

Pyrophanite is a member of the ilmenite series: isostructural with ilmenite $FeTiO_3$ and geikielite $MgTiO_3$.

Nova Scotia

11 E/1 Small grains of pyrophanite have been identified in spessartite-rich rock from Rocky Lake, 4.8 km northwest of Liscomb. The rock also contains rhodonite, quartz, rhodochrosite, mica, hornblende, magnetite and pyrrhotite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 51).

Quebec

31 H/11 Pyrophanite is found in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

PYROPHYLLITE

$Al_2Si_4O_{10}(OH)_2$

British Columbia

92 H/7 A pyrophyllite deposit is reported at 49°29.6'N, 120°37.5'W, about 4.8 km southeast of Coalmont, 610 m east of the Coalmont-Princeton Highway at about 1070 m elevation (B.C. Dept. Mines and Pet Res., Geol., Exp. and Mining in B.C., 1973, p. 551).

92 I/14 Pyrophyllite occurs at about 460 m south of Semlin siding on the Canadian Pacific railway 16.1 km east of Ashcroft (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 75).

92 L/3 Two deposits of pyrophyllite occur on the peninsula between Kokshittle Arm, and Easy Creek, Kyuquot Sound, Vancouver Island (C.H. Clapp, 1914: Geol. Surv. Can., Sum. Rept., 1913, p. 123).

92 L/11
92 L/12 Pyrophyllite occurs with dumortierite in a breccia zone at the Island Copper Mine on the north side of Rupert Inlet about 13 km south of Port Hardy (J.E. Muller, K.E. Northcote and D. Carlisle, 1974: Geol. Surv. Can., Paper 74-8, p. 57).

Newfoundland

1 N/10 Pyrophyllite occurs in large replacement lenses in schists south of Long Pond, near Manuels, in the Torbay area (J.S. Vhay, 1938: Am. Mineralogist, 23, p. 180) (E.R. Rose, 1952: Geol. Surv. Can., Mem. 265, p. 55).

PYRRHOTITE

$Fe_{1-x}S$

Pyrrhotite occurs principally in basic igneous rocks either disseminated as minute flecks and blebs or segregated in large masses, as at Sudbury, Ontario. Frequently nickeliferous, often by admixture of pentlandite, it is an important ore mineral of nickel, and a product source of sulphur. Pyrrhotite is widely distributed throughout Canada and therefore no attempt will be made here to catalogue all of the known occurrences.

British Columbia

82 F/4 Auriferous pyrrhotite usually of low grade, occurs in the Rossland area in both massive and granular form. Analysis of specimens from the Monte Cristo property gave NiO 0.13, Co trace; while specimens from the Evening Star property gave NiO 0.67, Co 1.58 (C.W. Drysdale, 1917: Geol. Surv. Can., Mem. 77, p. 75).

82 F/10 The Bluebell Mine on the east shore of Kootenay Lake is famous for fine pyrrhotite crystals up to 10 cm in diameter and usually bright and lustrous (J.D. Grice and R.A. Gault, 1977: Mineralogical Record, 8, p. 33).

82 L/15 Pyrrhotite in massive form occurs with pyrite and quartz near Malakwa, in the Kamloops mining division. Samples of this material were presented to the National Mineral Collection in 1919, by H.J. Blurton.

92 B/5 The copper ore mined at the Sunro property near River Jordan on the south end of Vancouver Island, contains pyrrhotite with chalcopyrite

and pyrite. The pyrrhotite may contain some nickel (--, 1962: Western Miner & Oil Review, vol 35, No. 3, p. 24).

92 B/6 The National Mineral Collection contains specimens of pyrrhotite in granular form from section 26, in the Lake Hill district, west of Cordova Bay. The specimens were donated by Mr. J. Richard.

92 H/6 A pale nickeliferous variety of pyrrhotite forms a coarse-grained mosaic with irregular grains of pentlandite and chalcopyrite in ultrabasic rocks at Giant Nickel Mines Limited, Hope (--, 1960: Western Miner & Oil Review, vol. 33, No. 11, p. 39).

94 F/4 Massive sulphides, including pyrrhotite, chalcopyrite, sphalerite and galena, associated with quartz and siderite, are found 96 km northwest of the Ingenika River, along the Russell range (E. Bronlund, 1959: Can. Inst. Mining Met., Bull., vol. 52, No. 565, p. 333).

Manitoba

62 N/12 Pyrrhotite occurs with pentlandite, chalcopyrite, pyrite and sphalerite at Bird Lake (J.F. Davies, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 141).

63 J/10 Disseminated and massive pyrrhotite, pentlandite, pyrite, chalcopyrite and violarite constitute the ore at the Manibridge Mine (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 70).

63 K/9
63 K/16 Nickeliferous pyrrhotite deposits are found west and north of Morton Lake, and west and southwest of File Lake, int the File-Tramping Lake area (J.M. Harrison, 1949: Geol. Surv. Can., Mem. 250, p. 47).

63 K/16
63 J/13 Pyrrhotite, pentlandite, chalcopyrite, pyrite, sphalerite, and galena occur in the massive sulphide deposits at Snow Lake and Herb Lake (J.F. Davies, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 141).

63 N/3 Massive sulphide deposits are found in the impure quartzite members of the Sherridan Group, in the Sherridan area. The East West orebodies at the Sherritt Gordon Mine, are among the largest sulphide deposits in the world. Pyrrhotite, with some chalcopyrite and sphalerite constitutes the ore in this area (J.D. Bateman, 1945: Geol. Surv. Can., Paper 45-15).

63 O/1
63 O/8
63 P/12
63 P/13 The Soab South, Soab North Pipe, Birchtree, Thompson and Moak Lake nickel mines lie along a fault zone extending for 160 km from Setting Lake to the Mystery Lake-Moak Lake area. The ores consist mainly of pyrrhotite, pentlandite and pyrite with lesser amounts of chalcopyrite, magnetite and marcasite (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 71,73,74,75).

64 C/4 The El oreody at Lynn Lake, consists of pyrrhotite, pentlandite, chalcopyrite, and pyrite (J.F. Davies, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 141).

New Brunswick

21 G/2 Nickeliferous pyrrhotite occurs at the Woodward Mine, in Charlotte County (G.S. MacKenzie, 1940: New Brunswick Mines Br., Paper 40-6).

21 G/3 A sample of massive pyrrhotite from the St. Stephen area has been donated to the National Mineral Collection.

21 J/10 Pyrrhotite, molybdenite, arsenopyrite, and pyrite are the most abundant sulphides at the Burnt Hill Mine in York County. The mine may be reached by road, 26 km north of Maple Grove Station (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 127).

21 O/8
21 P/5
21 P/12 Massive sulphide deposits occur in the Bathurst area. The ore consists of pyrite, pyrrhotite, galena, sphalerite and chalcopyrite, as well astetrahedrite and arsenopyrite (A.L. McAllister, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 574, p. 88).

Newfoundland

12 H/9 Pyrrhotite is present in massive copper ore with pyrite and chalcopyrite at the Whalesback Mine about 4 km west of Little Bay and 7 miles northeast of Springdale (K. Kanehira and D. Bachinski, 1968: Can. Jour. Earth Sci., 5, p. 1387).

Northwest Territories

55 K/16 Pyrrhotite, pentlandite, chalcopyrite, minor violarite and marcasite, as well as platinum and palladium occur at lat 62°49'N, long. 92°05'W, on Rankin Inlet 515 km north of Churchill, Manitoba (W.W. Weber and S.S. Teal, 1959: Can. Inst. Mining Met., Bull., vol. 52, No. 567, p. 462).

Ontario

31 B/12 Pyrrhotite is found on lot 19, conc. II, Elizabethtown Township, Leeds County. Twinned crystals have been described. Analysis by Harrington: S 39.02, Fe 60.56, CO 0.11, Ni 0.11, Mn 0.06, Cu 0.15, total 100.01; S.G. 4.622. Analysis by Smith: SiO_2 1.01 (gangue), S 39.24, Fe 59.88, total 100.13; S.G. 4.642 (B.J. Harrington and J.L. Smith, 1874-75: Geol. Surv. Can., Rept., Prog., p. 306).

31 M/4 Pyrrhotite and pentlandite are associated with chalcopyrite in serpentinized peridotite at a deposit on a gossan-covered knoll on the west side of a pond about 1.6 km south of Kanichee (Cedar Lake.) (Ann. P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 7).

41 I The massive sulphide deposits of the Sudbury area contain pyrrhotite with lesser amounts of pentlandite, chalcopyrite, cubanite, and arsenides such as niccolite (J.E. Thompson, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 136)(A.D. Coleman, 1916: Can. Mining J., 36, pp. 388,389).

An analysis by MacKenzie of pyrrhotite from Sudbury, is as follows: S 38.91, Fe 56.39, Ni 4.66, total 99.96; S.G. 4.51 (E.S. Dana, 1906: System of Mineralogy, 6th ed., p. 74).

41 I/11 Coarse hexagonal prisms of pyrrhotite up to 3 cm in cross-section have been found within the Footwall Ore Zone at the Strathcona Mine. The prisms are closely associated with monoclinic pyrrhotite, magnetite, pentlandite and chalcopyrite (M.K. Abel, R. Buchan and M.C. Tomlinson, 1972: Can. Mineralogist, 11, p. 568).

41 J/7 Well developed crystals of pyrrhotite from 2 to 20 millimetres in length occur at the Stanleigh Mine, at Elliot Lake. Chemical analysis by D.H. Rose: Fe 60.52, S 37.20, total 97.72; S.G. 4.63 (J.A. Mandarino and R.S. Mitchell, 1960: Can. Mineralogist, 6, p. 546).

41 J/10 Pyrite and pyrrhotite constitute the mineralization in the Samreid Lake sulphide deposit, 45 km north-northeast of Blind River, in Township 157, of the Sault Ste. Marie mining division. Magnetite is intergrown with the sulphide, and minor amounts of chalcopyrite and cubanite are also present (G.M. Freidman, 1959: Econ. Geol. 54, p. 268).

42 A/3 The ore at the Texmont Mine consists of pyrrhotite, pentlandite, pyrite and millerite with minor amounts of chalcopyrite, heazlewoodite and violarite. The mine is 50.2 km by road south of Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p.151).

42 A/5 Pyrrhotite, chalcopyrite, pyrite and sphalerite occur in a copper ore-deposit mined in Robb Township, west of Timmins. The mineralization is in a shear zone in Precambrian lavas and fragmentals (W. Hogg, 1962: Western Mines and Oil Review, vol. 35, No. 8, p. 18).

42 A/6 Disseminated pyrrhotite and millerite with minor chalcopyrite and pyrite constitute the ore at the Langmuir Mine 26 km south of South Porcupine (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 129).

42 A/9 Pyrrhotite is found at the contact of pillow lava and serpentine in conc. III, Beatty Township, along the border of Beatty and Munro Townships. A pyrrhotite sample from this locality assayed 1 per cent nickel, no gold or platinum (J. Satterly and H.S. Armstrong, 1947: Ont. Dept. Mines, Ann. Rept., vol. 56, Pt VII, p. 31).

42 A/10 Pyrrhotite and pentlandite were the main ore minerals at the Alexo Mine, a former nickel-copper producer in Clergue Township. Access to the mine is by a single-lane road to the right of Highway 67 at a point 17.8 km from its junction with Highway 101 (Ann P. Sabina, 1974: Geol. Surv. Can. Paper 73-13, p. 122).

42 F/4 Pyrrhotite is a constituent mineral of the lead-silver-copper sulphide ore mined at Manitouwadge (R.C.E. Bray, 1964: Can. Inst. Mining Met., Bull., vol. 57, No. 623, p. 269).

52 A/4 Pyrrhotite, pyrite, pentlandite, and chalcopyrite, constitute the mineralization on claim T.B. 3340, lot 13, conc. VIII, of Pardee Township (T.L. Tanton, 1937: Precambiran, vol. 10, May, p. 18).

52 B/9 The Shebandowan Mine is situated at the southwest end of Lower Shebandowan Lake. Pyrrhotite, pentlandite, chalcopyrite and pyrite are the main sulphide minerals in the orebody. Polydymite, bravoite, violarite and millerite are present in minor amounts (J.A. Morin, 1974: Ont. Div. Mines, GR110, p. 21).

52 F/13 Pyrrhotite is a consituent of the sulphide ore on the Eastern Mining and Smelting Corporation property at Gordon Lake, 88 km northwest of Kenora (J.E. Thomson, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 153).

Quebec

22 A/13 The most abundant sulphides in the Needle Mountain orebody of Gaspé Copper Mines Limited, at Murdochville, are chalcopyrite and pyrrhotite. They are intimately mixed and form fine-grained aggregates (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81).

31 F/10 Pyrrhotite containing 1.48 per cent nickel occurs on lot 11, range IX, on Calumet Island in Pontiac County (H.V. Ellsworth, 1930: Can. Mining J., 51, pp. 886-888).

31 H/1 About 1.6 km west of Knowlton Landing, an old low grade copper deposit known variously as the Lake Memphremagog, Smith's and Patton Mine contains massive pyrrhotite associated with pyrite, chalcopyrite and sphalerite. (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 8,9,11).

31 H/8 At the Ives, Bolton and Huntingdon Mines, located along the road between Eastman and Bolton Centre, crystalline to massive pyrite occurs with lesser amounts of massive chalcopyrite and pyrrhotite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 8, 9, 11).

32 D/8 Pyrrhotite and pentlandite were the main ore minerals at the No. 1 deposit at the Marbridge Mine. The former nickel producer is 8 km by road west of LaMotte (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

32 G/16 A lenticular sulphide deposit (the Merrill ore zone) on the property of Campbell Chibougamau Mines Limited, in Obalski Township, contains pyrrhotite, pyrite, chalcopyrite, sphalerite, magnetite and galena. The Bear Bay Sulphide zone, in Roy Township also has pyrrhotite, as well as pyrite and chalcopyrite (J.E. Gilbert, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 128).

Saskatchewan

73 P/8
73 P/10 Pyrrhotite is a constituent of the sulphide deposits in the Amisk Lake-Waddy Lake-Lac la Ronge areas (A.R. Byers, 1960: Can. Inst. Mining Met., Bull., vol. 53, No. 575, p. 145).

74 A/7 Pyrrhotite is the most abundant mineral in the sulphide deposits on the shore of Rottenstone Lake (J.B. Mawdsley, 1946: Geol. Surv. Can., Paper 46-24).

74 O/7 Pyrrhotite occurs on a large island lying south of Channel Island, in Lake Athabasca (J.B. Mawdsley, 1949: Geol. Surv. Can., Paper 49-27, p. 43).

74 O/12 A sulphide deposit at Dinty Lake, 39 km due northeast of Goldfields Village, consists almost entirely of pyrrhotite. Minor amounts of chalcopyrite, sphalerite and cubanite are present (H.C. Cooke, 1937: Geol. Surv. Can., Paper 37-3).

Yukon

105 K/6 The ore at the Anvil Mine consists of a massive assemblage of pyrite, pyrrhotite, galena and sphalerite, with minor chalcopyrite and magnetite. The mine is at 62°21.5'N, 133°22'W, in the Anvil Range at an elevation of 1220 m near Faro Creek, a tributary of Rose Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 87).

115 F/15 The nickel-copper sulphides pyrrhotite - pentlandite - chalcopyrite occur with sphalerite, pyrite and marcasite mainly as disseminations, less commonly as massive lenses, in very fine-grained volcanic rocks on the Canalask Nickel Mines property on the east and west banks of the White River. The property is reached by a 4.5 km access road that leaves the Alaska Highway at km 1878 (D.C. Findlay, 1967; Geol. Surv. Can., Paper 67-40, p.50)

115 G/5 Massive sulphides, mainly pyrrhotite, chalcopyrite and pentlandite with minor sphalerite, have been discovered on the Wellgreen property on Nickel Creek, a small tributary of Quill Creek, about 16 km west of Burwash Flats. The property may be reached by a 11 km access road from the Alaska Highway near km 1787 (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 52).

QUARTZ

SiO_2

Several polymorphs of silica occur as minerals. Quartz is the most common of these compounds and is one of the major constituents of the Earth's crust. Quartz crystals and many fine-grained and coloured varieties have been used as gemstones since early Egyptian times. Varietal names run into the hundreds, most of which are neither necessary nor desirable. Volume III of the System of Mineralogy (Dana) rewritten and enlarged by Clifford Frondel is devoted to Silica Minerals.

Alberta

72 E/16 Silicified wood, defined by M. Hey, as wood fossilized by opal or chalcedony (Chem. Index. of Minerals, 1950, p. 549) occurs at Ross Coulee (Creek), near the town of Irvine, in the Medicine Hat district. A specimen of this material has been donated to the National Mineral Collection (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, No. 204, p. 53T).

72 L/1
72 L/2 Silicified wood is found in the vicinity of the Elbow of the South Saskatchewan River (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, No. 204, p. 53T).

72 L/13 The National Mineral Collection contains a specimen of quartz and opal from a locality 6.4 km east of Steveville, on the Red Deer River.

82 P/7 C.H. Sternberg in 1912, donated a specimen of quartz to the National Mineral Collection. The specimen was obtained from the banks of the Red Deer River above the Canadian National Railway bridge in the Drumheller area.

82 P/7 Rhombohedral crystals of quartz resembling cubes and referred to as pseudocubic quartz occur on botryoidal quartz on silicified wood at an occurrence along the Red Deer River valley about 6 km northwest of Drumheller (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 255).

82 P/15 Silicified wood (opal) is found at a point 8 km west and 4.8 km south of Rumsey, on the Red Deer River (National Mineral Collection. Donor: C.H. Sternberg).

British Columbia

82 L/4
82 L/5 Agate has been collected in rocks of Tertiary age north of Vernon at the following localities: along Highway 97 at the south end of Monte Lake; in the hills west of Douglas Lake road about 11 km from Westwold; on the plateau east of Westwold reached by a forest access road from Highway 97; at the head of Adelphi Creek; and along a logging road leading to a plateau north of Shorts Creek.

Agate and jasper occur in basalts along the south side of Pinaus Lake and around Beauleau Lake. Agate and amethyst-lined geodes are found in bluffs of columnar basalt at Robbins Creek (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 23).

92 A/6 Quartz and calcite crystals may be found just east of the Canadian Pacific Railway line, about 4.8 km northwest of Princeton (--,1956: Canadian Rockhound, vol. 1, No. 1).

92 B/5 Agate is found with jasper and stray pieces of petrified wood near Sooke (J.S. Marshall, 1937: The Mineralogist, Feb., p. 55).

92 B/6 A considerable quantity of jasper, an impure opaque variety of quartz, is available at the beach at the foot of Dallas road, Victoria. A local green and white variety has been termed 'dallasite' and polishes well (J.S. Marshall, 1957: The Mineralogist, Feb., p. 55).

92 B/13 Good quality red jasper is found 13 km north of Mill bay on Vancouver Island (J.S. Marshall, 1957: The Mineralogist, Feb., p. 55).

92 G/2 Jasper, principally brown or yellow in colour, is found in small quantities at Crescent Beach, located 48 km south of Vancouver near the International Boundary. Good quality agate is found associated with jasper (J.S. Marshall, 1957: The Mineralogist, Feb., p. 55).

92 G/4 The National Mineral Collection contains a specimen of radiated quartz with bornite from Valdes Island, near Seymour Narrows.

92 H/7 Vermilion Bluffs and McCormacks Flats along the Tulameen River about 6.4 km west of Princeton are well-known sources of agate and petrified wood (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 18).

92 H/8 Silicified wood occurs at Agate Mountain, in the Similkameen mining division (R.A.A. Johnston, 1907-08: Geol. Surv. Can., Sum. Rept., 1907, p. 98).

92 H/15 Handsome specimens of chalcedony have been found, sometimes in quite large masses, at the Aspen Grove camp, southeast of the headwaters of Voglet Creek in the Nicola mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 6).

92 I/3 The National Mineral Collection contains specimens of agate and prase (a variety of chalcedony) from Zakwaski Mountain at the head of Nicoamen River.

92 I/4 Consideralbe quantities of good quality jasper and agate, including some excellent fortification varieties are found in the Fraser River valley, around Lytton (J.S. Marshall, 1957: The Mineralogist, Feb., p. 55).

92 I/6 Well-banded but pale coloured agates can be found in the amygdaloidal basaltic rocks of the Nicoamen Plateau, in the Kamloops mining division. The zeolite minerals stilbite and heulandite are associated with the agates (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, pp. 185, 186B).

92 I/6 Agates are common in Cretaceous volcanics of the Spences Bridge Group. The Shaw Springs area east of the Thompson River is one of the best known localities (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 32).

92 I/9
92 I/10 A few fine specimens of chalcedony have been found along the shores of Kamloops Lake.

Chalcedony has also been noted as a gangue mineral in the Iron Mask Copper Mine, near Kamloops (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 6). Agate and chalcedony also occur on Savona Mountain and on Dufferin Hill, near Kamloops (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 374B).

92 I/16 The National Mineral Collection contains a specimen of chalcedony from Scottie Creek near Bonaparte River in the Lillooet district.

92 K/3 The pillow breccias of Quadra Island, contain chlorite, epidote, pumpellyite, tremolite, quartz, chalcedony, calcite, prehnite, and zeolites as alteration products and amygdule fillings (--,1963: J. of Geology, vol. 71, No. 1, p. 52).

92 O/8 Agate, opal, jasper and "thundereggs" are found in the vincinity of Black Dome Mountain in the Empire Valley region south of Gang Ranch (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 28).

92 O/1
92 P/5 A specimen of agate-jasper from Big Bar Creek, a tributary of the Fraser River, is present in the National Mineral Collection.

93 E/15
93 F/12 Agate and chalcedony occur at Ootsa Lake, in the Omineca mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem, 74, p. 6).

93 P/15 White chalcedony is exposed in a sandstone layer between beds of fossiliferous shale along the upper part of the bank of the Kiskatinaw River 1.6 km north of Arras, 19.3 km from Dawson Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 5).

94 K/11 Specimens of colourless terminated quartz crystals associated with curved rhombohedral and platy crystals of colourless to white dolomite were collected at the Churchill Mine. The deposit is at the Headwaters of Delano Creek about 4 km southwest of Yehde Lakes and 8.8 km northwest of Mount Roosevelt (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 16).

103 F
103 G
103 J
103 K Agate and chalcedony are found as rolled pebbles along the shores and rivers of the northern part of Queen Charlotte Island. Considerable quantities of gem agate of good colour and pattern are available on the island, between Masset and Skidegate. The tertiary volcanic rocks on Graham Island, Queen Charlotte mining division, also contain agate and chalcedony (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 110R)(R.A.A. Johnston, 1915: Geol. Surv. Can., Mem 74, p 6) (J.S. Marshall, 1957: The Mineralogist, Feb., p. 56).

104 N/12 Pebbles of red jasper and dark green serpentine were noted along the shore of Atlin Lake near Atlin village (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 40).

Manitoba

52 L/6 Rose quartz of an attractive colour and somewhat opalescent has been found in a pegmatite about 640 m north of the north shore of Birse Lake at a point 460 m west of the outlet of the creek at the east end of the lake. Birse Lake is 3.2 km east of Bernic Lake (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 57).

62 J/10 Concretions consisting of quartz crystals radiating from a single centre, or groups grown together with many such radiating groups serving as nuclei, varying in size from minute bodies to large masses about 45 cm in diameter, occur in the gypsum, anhydrite, and limestone on the property of Western Gypsum Products at Amaranth (G.M. Brownell, 1942: Univ. Toronto Stud., Geol. Ser., 47, p. 7).

New Brunswick

21 B/1 Agate and chalcedony occur at Dalhousie in Restigouche County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, 1st edition, Industrial and Educational Pub., Co., Gardenvale.)

21 B/10
21 B/15 Amethyst, and red and yellow jasper, have been reported to occur in Grand Manan Island, Charlotte County (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 72S) (L.W. Bailey, 1897: Geol. Surv. Can., Ann. Rept., X, P. 126M).

21 G/9
21 H/13 Red and yellow jasper, agate and carnelian are found along the Washademoak River, in Queen's County (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, pp. 71, 72S).

21 H/5
21 H/12 Agate and chalcedony of gem quality occur at Darling Lake and Hammond, King's County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, 1st edition, Industrial and Educational Pub., Co., Gardenvale, Que.).

21 H/4
21 H/5
21 H/12 Red and yellow varieties of jasper are reported to occur at Red Head, St. John County; and at Darling Lake, Belleisle Bay, and Hampton, in King's County. Carnelian occurs with the jasper at Darling Lake, and at Hampton (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, pp. 71, 72S).

21 J/13
21 J/14 A number of varieties of quartz, including agate, chalcedony, jasper, and carnelian are reported to occur on the Tobique River, in Victoria County (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, pp. 71, 72S).

21 O/10 Amethyst is found in trap rocks about 11 km above the forks on the Upsalquitch River, Restigouche County (R.W. Ells, 1879-81: Geol. Surv. Can., Rept. Prog., p. 39D).

21 P/13 Jasper and chalcedony pebbles, derived from conglomerate, occur along the shoreline of Chaleur Bay from Belledune to Green Point and at Pointe Rochette, Gloucester County.

22 B/1 Colourful pebbles of agate, chalcedony and jasper may be collected along the shore of the St. Lawrence River between Peuplier Point and Pin Sec Point (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 103, 110).

22 B/1 Amethyst, agate, and chalcedony occur near Dalhousie (R.W. Ells, 1879-81: Geol. Surv. Can., Rept. Prog., p. 39D) (E. Coste, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 71S).

Newfoundland

1 M/10 Amygdaloidal pillowed basalt from a ridge 1.6 km west of the Paradise River bridge and 400 m south of the Terenceville road contains amygdules up to 5 millimetres in diameter filled with red jasper, epidote, and chlorite (D. A. Bradley, 1962: Geol. Surv. Can., Mem. 321, p. 24).

23 J/7
23 J/8 Jasper is found in the iron-formation along the Hamilton River. This formation is especially

well developed on the Ashuanipi branch, between the outlet of Menihek Lakes and Birch Lake (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 46).
The following occurrences of silica minerals of interest to mineral collectors are reported by Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36.

1 N/10 Quartz veins containing cavities lined with colourless to white quartz crystals averaging 6 mm in diameter occur in sandstone at the following localities: a quarry on the western slope of White Hills ridge; along shoreline cliffs at Outer Cove and Middle Cove in Tor Bay; a quarry south of Torbay; a cliff forming the south end of the White Hills at the eastern end of Quidi Vidi Lake; on signal Hill; and a quarry at the foot of the South Side Hills in St. Johns' Harbour (p. 56, 57, 58, 59).

1 N/10 Specimens of transparent colourless quartz crystals in calcite and in hematite were found on the dumps at Wabana. The crystals are stubby, terminated on one or both ends, and measure up to 2 cm in diameter (p. 62).

1 N/10 Transparent colourless to amethystine quartz crystals averaging 6 mm in diameter line crevices in purplish red conglomerate along steep barren cliffs on the shore of Logy Bay. This rock extends along the coast southward to Petty Harbour (p. 76).

1 N/14 Colourless, transparent, terminated crystals of quartz occur in massive white quartz blocks found in glacial drift on a low ridge near Forked Pond about 11 km northwest of Adams Cove on the western shore of Conception Bay. The crystals are well-formed and commonly are 2.5 to 10 cm long and 1 to 2 cm in diameter. Crystals up to 18 cm long and 9 cm in diameter have been found (p. 75).

2 C/13 Amethyst crystals about 5 cm in diameter occur in cavities and along fractures in white granitic rocks exposed along the north shore of Bonavista Bay in the Trinity area. Collecting localities are: at Diamond Head and Man Rock Cove at low tide; on the north shore of Trinity Bay 5.6 and 10.4 km from Trinity; and at Silver Fox Island (p. 94).

2 E/5 Jasper in varying shades of red occurs as veins and lenses up to 1 m wide in volcanic rocks exposed by roadcuts along Highway 380, the Pilleys Island road (p. 110).

2 E/10 Pebbles and cobbles of jasper up to several cm in diameter occur in conglomerate exposed at several localities on the northeastern end of new World Island. The most accessible localities are: a roadcut of the Twillingate Road (Highway 340) opposite its junction with the road to Herring Neck, which is 1.1 km north of the junction with the Cobbs Arm road; a quarry behind the previously described roadcut; a road cut on the Herring Neck road 0.2 km from its junction with the Twillingate Road; and along the shore at Herring Neck near Pikes Arm village (p. 102).

2 E/12 Orange red to maroon red jasper occurs in shoreline rock exposures at Harry's Harbour and is exposed in nearby roadcuts and outcrops (p. 114).

Northwest Territories

34 C/2 Agate and olive green coloured chalcedony are found on Belanger Island, at the entrance to Richmond Gulf, on the east coast of Hudson Bay (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 27T).

48 C/3 Quartz crystals several inches long and stained with hematite are present in vugs in the Society Cliffs dolomite. These vugs are most abundant near a basic dyke that cuts strata on King George V Mountain (R.R.H. Lemon and R.G. Blackadar, 1963: Geol. Surv. Can., Mem. 328, p. 78).

59 B/14 Jasper is reported to occur on Princess Royal Island (G.M. Dawson, 1886: Geol. Surv. Can., Ann. Rept., II, p. 46R).

65 K Amethyst is found in trap rocks in the Dubawnt Lake area (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 41A).

75 L Jasper occurs in the Kahochella Formation in the northeast arm of Great Slave Lake (G.M. Dawson, 1886: Geol. Surv. Can., Ann. Rept., II, p. 16R) (J.C. Brown, 1950: Geol. Surv. Can., Paper 50-21, p. 5).

Nova Scotia

11 D/12 Amethyst is found in granite near Sixmile Lake, on St. Margaret's Bay road, Halifax County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 14).

21 A/12
21 A/13
21 A/14 The basaltic trap rock along the north (Bay of Fundy) shore of Nova Scotia, from Scots Bay and Cape Blomidon west to Brier Island, contains numerous veins of both quartz and zeolites. Agate, amethyst, carnelian and jasper are among the varieties of quartz found in the area. Some of the better localities include the following: Amethyst and agate at Cape Blomidon, Kings County. Jasper at Margaretsville, Woodworth Cove, Gulliver Cove, Trout Cove, and Brier Island. Agate at Sandy Cove up to the head of St. Mary's Bay. Amethyst at Digby Neck and at Sandy Cove (G.F. Kunz, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 65S) (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, pp. 15T, 41T) (L.W. Bailey, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 21Q) (A.L. Parson, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 15) (D.S.M. Field, 1951: Can. Mining J., 72, Pt. 2, pp. 81-83).

21 A/9 Red jasper occurs as cement in a dyke of fragmentary white quartzose rock located 800 m east of New Ross, Lunenburg County (E.R. Faribault, 1902-03: Geol. Surv. Can., Ann. Rept., XV, p. 186AA).
The National Mineral Collection contains specimens of large, smoky, prismatic, quartz crystals from New Ross, Lunenburg County.

21 A/12 Large blocks of impure banded, red and yellow jasper have been found near the head of St. Mary's Bay in Digby County (G.F. Kunz, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 72S).

21 A/14 Large smoky quartz crystals weighing up to 45 kg occur at Lawrencetown, Bridgetown, and Paradise, in Annapolis County (D.S.M. Field, 1951: Can. Mining J., 72, Pt. 2, pp. 81-83).
Carnelian, a red translucent variety of chalcedony, is found at Granville, and heliotrope occurs in small nodules or fragments at the base of Chute Cove, Annapolis County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, pp. 26T, 37T).

21 B/9 Carnelian, agate, and chalcedony can be seen at Trout Cove, Digby Neck, Digby County (G.C.

Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, pp. 26, 27T).

21 H/1 Red jasper has been reported on Long Island, Kings County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 41T). The arenaceous limestone along the north shore of North Mountain and just east of the mouth of Woodworth Creek contains numerous jasper concretions up to 30 cm wide and 60 cm long (D.G. Crosby, 1962: Geol. Surv. Can., Mem. 325, p. 48).
Heulandite, stilbite, clear quartz, amethyst, agate and jasper are common as amygdules and coatings in large vesicles in basalts, in the Wolfville area (D.G. Crosby, 1962: Geol. Surv. Can., Mem. 325, p. 47).

21 H/2 Gem quality crystals of deep purple amethyst on massive magnetite occur 3.2 km southeast of Berwick, Kings County (G.G. Thompson, 1958: private communication).
Other amethyst occurrences in the same county are at (the town of) Canada Creek, and at Harbourville (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 14).

21 H/7 The National Mineral Collection contains specimens of agate from Horseshoe Cove, Cape D'Or, in Cumberland County.

21 H/8 Red jasper is found on Partridge Island, Cumberland County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 41T). Fine amethysts occur in bands, veins and geodes at Partridge Island and Cape Sharp, Cumberland County (G.F. Kunz, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 70S).
Amethyst, agate, and chalcedony occur at Amethyst Cove, and other localities along the shoreline between Cape Blomidon and Cape Split, Kings County (G.F. Kunz, 1887-88: Geol. Surv. Can., Ann. Rept., IV, p. 17T) (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., p. 15).
A few small, but good quality crystals of gem type quartz, have been found at Five Islands, Cumberland County (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 45).
Agate and chalcedony, including the variety heliotrope, occur at Two Islands (The Brothers), Cumberland County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 37T) (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 7).

21 H/8 The National Mineral Collection contains specimens of agate from Scott's Bay, Kings County. They were donated by C.W. Willimott in 1883.

Ontario

31 C/6 A specimen of drusy quartz crystals from lot 1, conc. IV, Madoc Township, has been donated to the National Mineral Collection.

31 C/7 Transparent to translucent quartz crystals as large as 12 mm across are found in pegmatite in a feldspar quarry on the north side of Sand Road, 3.2 km west of Verona, Highway 38 (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 11).

31 C/8
31 C/9 Quartz crystals have been mined commercially on a small scale in war-time at two deposits in Leeds County, one at Marble Rock and the other at Black Rapids (J.M. Harrison and Y.O. Fortier, 1944: Geol. Surv. Can., Paper 44-8).

31 C/10 At the Kingston (Bedford) mica mine, quartz occurs both in massive form and in crystals (up to 12 mm across) in quartz-feldspar veins. The mine is located about 3.2 km east of Highway 38 and about 800 m southeast of the Godfrey-Westport road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 14).

31 C/16 Smoky quartz is one constituent of a feldspar deposit at the Silver Queen Mine. The mine is located about 73.2 km (road log) north of Kingston along the Kingston-Westport-Perth road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 E/8 Quartz with pseudo-cleavage occurs in pegmatite at the McKenzie Lake (Gunter) feldspar quarry on the McKenzie Lake South Road at a point 7.4 km from its junction with Highway 127 about 17 km north of Maynooth (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

31 F/3
31 F/6 Rose quartz is found in large masses in pegmatite dykes in Lyndoch Township, Renfrew County (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 16) (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 77).

31 F/6 Amethystine and smoky quartz are reported at the Spain pegmatite deposit on the east side of Highway 41, 12.2 km south of its intersection with Highway 132 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 19).

31 F/12 Quartz crystals up to 2.5 cm in diameter occur in cavities in massive quartz and feldspar in the Deady pegmatite. The quarry is located at the west end of a small lake on the north side of Highway 60, 14.3 km west of the junction of Highways 60 and 62 at Barry's Bay. It is visible from the highway (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 52).

31 G/4 Doubly-terminated quartz crystals occur in the soil and in limestone exposures on the A.C. Blair property in Greely. The crystals are colourless and transparent with a brilliant lustre, and average about 12 mm long (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 83).

31 L/6 Amethyst crystals ranging in colour from very pale to medium dark purple occur at a deposit in French Township on a ridge 2.9 km east of Highway 63 at a distance of 31 km from its junction with Highway 17 in North Bay (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 81).

31 M/4 Banded iron formation containing bright crimson to deep brownish red jasper is mined from open pits at the Sherman Mine in the Timagami area. The pits are south of Tetapaga Lake, south of Iron Lake, and at the southeast end of Vermilion Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 9).

32 D/4 Jasper, magnetite and hematite occur in the Keewatin Formation on claim C.E. 25, south of Pancake Lake, in the Larder Lake area (P.E. Hopkins, 1924: Ont. Dept. Mines, Ann Rept., vol. 33, Pt. III, p. 5).

41 J
41 K Jasper conglomerate is found in the country north of Bruce Mines; along a ridge 800 m from the northern extremity of Goulais Bay, Lake Superior; on the St. Marys River at a point 6.4 km west of Campement d'Ours Island; on the east shore of Lake George; and on Lake Huron. The conglomerate has a white quartzite matrix, containing pebbles of red, yellow, green and black jasper (G.F. Kunz, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 72S).

41 K/15
41 K/16 Narrow bands of jasper may be seen with ellipsoidal greenstone and rhyolite at the Vulcan and Mammoth locations on the north side of the north boundary of Palmer Township in township 28, range XIII, Algoma district. This locality is part of the Batchawana iron-formation (E.S. Moore, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. II, p. 79).

41 N/12 Carnelian, varying widely in depth of colour and translucency occurs at the west end of Michipicoten Island, in Lake Superior. Large amounts of high quality agate are also present (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 76).

41 O/15 The westerly belt of the Woman River iron range, which crosses the southern boundary of Heenan Township, Sudbury district, is essentially red jaspillite, slightly fractured and cemented by minute grains of pyrite and quartz. Jasper bands up to 5 cm in width, alternate with dark cherty bands containing some specular hematite. Bands of chert and jasper are found in an iron-formation in a medium-grained nonporphyritic rock in the southwest part of Swayze Township, Sudbury district (G.D. Furse, 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. III, p. 40).

41 P/15 Large fragments of jasper are found in glassy dark quartz on the Leliever claims (9170-9178) located east of Dora Lake in the Bannockburn area (H.C. Rickaby, 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. II, p. 21).

41 P/16 Jasper occurs in an iron-formation on the north boundary of Bryce Township, Timiskaming district. A bed of banded cherty quartz, magnetite, jasper, and hematite, is discontinuous and apparently faulted, and is associated with a coarse gabbroic flow (W.W. Moorhouse, 1941: Ont. Dept. Mines, Ann. Rept., vol. 50, Pt. IV, p. 7).

42 A/1 Jasper is found in the Kirkland Lake area, in the fragments of iron-formation found in many of the Timiskaming series of rock (A.G. Burrows, 1923: Ont. Dept. Mines, revised ed., Ann. Rept., vol. 32, Pt. IV, p. 24).

42 D/13 Agate can be found on a number of beaches on Simpson Island, in Lake Superior (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 76).

42 D/13 Crystals of amethyst, colourless quartz, purple fluorite and salmon-pink barite are found in fractures in pink granite at rock cuts along the Trans-Canada Highway 10.9 to 13.3 km west of the western turn-off to Rossport (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 23).

42 D/14 Quartz veins at the southern end of a granite-syenite body about 11 km east of Schreiber in the Duck Lake area, contain chalcedony (P.E. Hopkins, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. IV, p. 6).

42 E/4 Crystals of amethyst up to 7.6 cm long have been recovered from vugs in brecciated pink biotite granite on claims north of Kabamichigama Lake near Arrell Lake (M.W. Carter, 1975: Ont. Div. Mines, GR 123, p. 20).

42 E/1
52 A/5
52 A/6
52 A/12 Jasper and chert are found in rocks of the Animiki Formation in the Thunder Bay district. These rocks have been found on the Whitefish and Kaministikwia rivers, and east of Lake Nipigon (E.D. Ingall, 1887-88: Geol. Surv. Can., Ann. Rept., p. 24H) (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 137).

52 A/5 Pale to medium-deep purple amethyst occurs with a variety of minerals, notably smoky and rose quartz, fluorite, barite and fluorescent calcite, at a number of old silver deposits that are accessible from the Silver Mountain highway (588) southwest of Stanley village at the following mileages: Victoria Mine - 30 m north of the highway at 2.7 km; Beaver Junior Mine - about 120 m southwest of the highway at 7.9 km; West Beaver Mine - 45 m south of the highway at 9.2 km; Climax Mine - 800 m by road south from the highway at 10.1 km; Badger Mine - 1.2 km by road west from the highway at 10.8 km (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 33).

52 A/6
52 A/7
52 A/10
52 A/11 The most notable occurrences of agate and chalcedony in Ontario are located along the north shore of Lake Superior and on the islands adjacent thereto. The agate occurs as beach pebbles and as nodules in basaltic trap rock, which in certain areas also contains veins of amethyst (G.F. Kunz, 1887-88: Geol. Surv. Can., Ann. Rept., III, pp. 69, 71S) (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 15) (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 76) (D.S.M. Field, 1951: Can. Mining J., 72, Pt. 2, pp. 71-83).

52 A/10 Amethyst occurs at Amethyst Harbour and at the mouth of the MacKenzie River, in veins which have yielded specimens several feet across covered with rich purple crystals from 6 mm to 12 cm long (C.F. Kunz, 1887-88: Geol. Surv. Can., Rept. III, p. 69S) (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 17T) (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 15).

52 A/10 Amethyst, smoky and colourless quartz crystals up to 12 mm across are associated with barite, galena and fluorescent calcite at the Enterprise Mine located about 1.1 km east of Highway 17, along Road No. 69-13, from a point 2.3 km north of Pearl (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 23).

52 B/1 Jasper occurs in an iron-formation north of the west end of Whitefish Lake, and midway between Whitefish and Round (now Roundtable) lakes, Hunter Island area (A.L. Parsons, 1916: Ont. Dept. Mines, Ann. Rept., vol. 25, Pt. I, p. 185).

52 B/2 Jasper occurs in trap rock associated with bodies of iron ore at Gunflint Lake in the Hunter Island area (A.L. Parsons, 1916: Ont. Dept. Mines, Ann. Rept., vol. 25, Pt. 1, p. 185).

52 B/3 Jasper occurs with hematite in an iron-formation at Emerald Lake, and at Jasper Lake, in the Hunter Island area (A.L. Parsons, 1916: Ont. Dept. Mines, Ann. Rept., vol. 25, Pt. I, p. 185) (W.H.C. Smith, 1890-91: Geol. Surv. Can., Ann. Rept., V, P. 63G).

52 B/13 The National Mineral Collection contains specimens of transparent, prismatic crystals of quartz, from the Seine River, and from Steep Rock Lake in Freeborn Township, Rainy River district.

52 F/16 A band of iron-formation outcrops on some of the islands near the west shore of Sandybeach Lake, in the Sioux Lookout area. This iron bearing horizon consists of highly contorted bands of

jasper, chert, magnetite, and slate (M.E. Hurst, 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. VI, p. 27).

52 K/14 Jasper occurs in iron-formation on the western shore of Little Shallow Lake, now known as Little Pakwash lake, or Bruce Lake, in the Upper English River valley area (E.L. Bruce, 1924. Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. IV, p. 7).

Quebec

11 N/5 A specimen of jasper from Grindstone Island, one of the Magdalen Islands, in the Gulf of St. Lawrence, has been donated to the National Mineral Collection.

21 E/5 Red jasper which is often finely clouded, occurs near Sherbrooke in Sherbrooke County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 41T).

21 E/14 A very attractive jasper breccia composed of orange-red jasper fragments in a maroon-red matrix traversed by tiny calcite veinlets occurs at the Cupra Mine. The mine is located 2.6 km south of Highway 34 at a distance of 12.4 km east of the junction of 34 with Highway 1 (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 41).

21 E/15 Specimens of drusy, transparent crystals of quartz, from lot 1, range VII, Marlow Township, Frontenac County, were donated to the National Mineral Collection in 1891 by W.F. Ferrier.

21 N/5 Banded dark green and reddish brown jasper occurs with white chalcedony on the River Ouelle, Kamouraska County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, pp. 27T, 41T).

22 A/3
22 A/4
22 A/7
22 A/8
22 A/9
22 A/16
Red and reddish brown jasper and chalcedony and a few agate pebbles are found along the shore of Chaleur Bay at New Carlisle, Black Cape, Maria and Carleton in Bonaventure County; and at Chandler, Anse-à-Beaufils, and Cap d'Espoir, Mont-Joli, Cap Barré, North Beach, Corner of the Beach, Nouvelle, Pointe St-Pierre, Anse-à-Brilliant, Tar Point, Seal Cove, Haldimand, Sandy Beach, and Cap-aux-Os, Gaspé East County (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 79-97).

22 A/7 Jasper is found with hematite in veins or beds on lots 69-72, range I, Pabos Seigniory. A band of conglomerate containing jasper occurs 1.2 km east of the wharf of L'Anse a l'Ilot. A jasper vein is located 60 m northwest of the railway and 1.6 km from the Pabos Centre crossing; there are two outcrops on lot 70, 500 feet from the shore (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 10) (H.W. McGerrigle and H. Girard, 1950: Que. Dept. Mines, Prelim. Rept., 173, revised ed., p. 6).

22 B/12
22 B/13
22 C/9
22 H/1
22 H/2
Chalcedony (flint) nodules up to 10 cm in diameter and in a variety of colours and patterns are found along the St. Lawrence River shoreline at many bays between Métis and L'Echouerie. They are most abundant near Matane, Cloridorme and L'Echouerie (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 69).

22 B/16 Pale to lilac coloured amethystine quartz occupies veins about 2.5 cm wide and cavities in quartz at the Federal lead-zinc mine. The mine is located about 1.6 km west of the Trans-Gaspésien highway, 64.8 km south of Ste-Anne-des-Monts (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 73).

22 D/6 Chalcedony, occurring in veins up to 2.5 cm wide at the Plourde et Plourde Ste - Anne Quarry near Chicoutimi Nord, is generally light to dark grey, bluish or pinkish grey and commonly banded. It also occurs in cavities (about 5 cm across) and is commonly chalk white grading to translucent grey. Colourless quartz crystals line vugs (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 106).

22 D/6 At the Pic Quarry near Chicoutimi Nord, small vugs in limestone are lined with colourless quartz crystals (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 107).

24 C/14 Jasper is found interbedded with magnetite and hematite in iron-formation on the Koksoak River from below Shale Chute or Falls to a point about 3.2 km below the mouth of the Swampybay River, and also at about 10 km below the mouth of the Swampybay River (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 44).

31 G/5 Loose blocks of bright red to chocolate brown jasper are common on lot 14, range VIII, Hull Township, Gatineau County. Some of the jasper exhibits yellow mottling (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog., p. 16L).

31 G/12 A bed of bright red to chocolate brown jasper, some of which is mottled with yellow, is exposed at Scott's Mine on lot 15, range X, Hull Township, Gatineau County (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog. p. 16L). Specimens of smoky quartz from the Nellis Mine, lot 10, range XI, Hull Township, Gatineau County, have been donated to the National Mineral Collection.

31 G/12 White massive quartz containing cavities up to 2.5 cm across lined with quartz crystals occurs at the Rainville (Dugas) Mine near Perkins Mills. Amethyst crystals in yellow massive apatite were also found here (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 11).

31 G/13 Terminated quartz crystals measuring up to 5 cm across occupy cavities in massive quartz and feldspar at the Hart Mine near Notre-Dame-de-la-Salette. The small crystals are clear but the larger ones tend to be somewhat milky (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 32).

31 G/13 Shallow cavities in quartz at the Lapointe Mine near Notre-Dame-de-la-Salette are lined with quartz crystals about 6 mm across, coated with flaky specularite. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 34).
Massive blue quartz containing inclusions of dark brown mica is found at the High Rock Mine near Notre-Dame-de-la-Salette (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 35).

31 G/13 Colourless to smoky quartz crystals measuring up to 2 cm across occur in cavities in massive quartz at the Evans-Lou Mine near Notre-Dame-de-la-Salette (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 37).

31 H/1 Large prismatic quartz crystals occur on lot 12, range XIII, of Bolton Township, Brome County. A specimen of this material has been presented to the National Mineral Collection.

31 H/12 Clear, terminated crystals of quartz (up to 5 cm long) are associated with dolomite in some

cavities at the St-Eustache Quarry, west of Montreal (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 65).

31 H/12 Colourless quartz crystals occur in cavities in the rock at the Francon Quarry, Montreal Island (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 67).

31 J/2 Well-developed quartz crystals of varying sizes are found at the Canadian Kaolin Silica Products quarry at St. Remi d'Amherst, Quebec. The crystals appear chalky due to inclusions of kaolin in the outer layers, while the central portion of the crystals consist of limpid rock crystal (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 46).

31 J/4 At the Parker Mine near Notre-Dame-de-Laus, cavities in calcite are lined with clear quartz crystals about 6 mm across and tiny crystals of dogtooth spar. The cavities are from 2.5 to 5 cm in diameter (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 48).

31 J/5 Transparent, prismatic crystals of quartz occur on lot 15, range I, Egan Township, Gatineau County. Specimens of this material have been donated to the National Mineral Collection.

31 J/8 Small irregular cavities in quartzite rock at the St. Donat Quarry contain colourless quartz crystals averaging 6 mm across (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 68).

32 A/8 Most of the quartz at the Lac Bouchette Quartz Mine is massive and milky white but some has a pink tinge. Cavities, commonly less than 5 cm across, are lined with clear to milky-white quartz crystals, with individual crystals measuring up to 2.5 cm long (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 115).

33 O/13 The National Mineral Collection contains a specimen of chalcedony obtained from a locality north of Little Whale River in the Hudson Bay area of Quebec.

34 C/1
34 C/8 A few small crystals of gem type quartz of good quality have been found at Richmond Gulf, on the east side of Hudson Bay (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 45).

34 C/2
34 C/7
34 C/10
34 C/15
34 F/2 Abundant jasper occurs with hematite in iron ores consisting of hematite, magnetite and ankerite throughout the Nastapoka Islands on the east coast of Hudson Bay (H.W. McGerrigle, 1942: Que. Dept. Mines, Prelim. Rept., 173, p. 39).

Yukon

105 D/2 Jasper occurs on Patterson Mountain, 5.6 km east of Windy Arm of Tagish Lake (G.C. Gwillim, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 31B).

105 D/5 Breccia overlooking Watson Valley about 6.4 km north of Mount Skukum contains fragments of deep orange and vermilion jasper (J.O. Wheeler, 1961: Geol. Surv. Can., Mem. 312, p. 79).

106 E/15 Iron ore consisting of magnetite and hematite, associated with red jasper, occurs as float in the wash of the Bonnet Plume and Snake rivers (C. Camsell, 1904: Geol. Surv. Can., Ann. Rept. XVI, p.46cc).

115 P/12
115 P/13
115 P/14 Specimens of drusy smoky quartz from the Clear Creek Mountains have been donated to the National Mineral Collection.

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The following occurrences of silica minerals of interest to mineral collectors have been reported along the Alaska Highway in the Yukon (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32).

105 B/1 Quartz veins at the Fiddler Yukon Mine contain vugs lined with quartz crystals up to 2.4 cm in diameter (p. 32).

105 C/2 Pebbles of jasper and chalcedony occur along the shoreline of Teslin Lake at km 1308, Alaska Highway (p. 34).

105 D/6 Vugs in massive quartz are lined with transparent quartz crystals at the Union Mine on the east side of Idaho Hill at the 1070 m level, overlooking Annie Lake (p. 43).

115 G/2 Jasper pebbles are common in the beds of Williscraft, Congdon and Nines Creeks, which are crossed by the Alaska Highway west of Kluane Lake (p. 68,69).

115 G/11
115 G/12 Pebbles of jasper and chalcedony are abundant in the beds of Quill Creek, Kluane River, Donjek River and Koidern River and may be collected where these are crossed by the Alaska Highway (p. 71,72).

115 H/1
115 H/8 Pale blue agate occurs in geodes in basalt at localities immediately north of Vowel Mountain at 61°31'N, 136°07'W; and on the east flank of Mount Copper at 61°14'N, 136°09'W. Vowel Mountain is on the west side of Nordenskiold River about 48 km east of Aishihik Lake; Mount Cooper is on the south side of the river about 32 km east of Aishihik Lake (p. 54).

QUERCYITE

Calcium phosphate

British Columbia

93 K/4 Quercyite is reported to occur in a vein located 300 m from a farmhouse 3.2 km northwest from the ferry landing on the north side of Francois Lake. The vein is from 10 to 30 cm wide and consists of botryoidal layers of collinsite and quercyite about andesite fragments, associated with some asphalt. Chemical analysis by E.A. Thompson: SiO_2 0.19, Al_2O_3 0.60, Fe_2O_3 0.12, FeO 1.90, MgO 0.62, CaO 50.22, H_2O 4.20, P_2O_5 34.96, Mn_2O_3 0.12, CO_2 5.45, F 1.83, organic 0.82, total 101.03, less O for F 0.77, total 100.26; S.G. 3.04 (E. Poitevin, 1927: Geol. Surv. Can., Bull. 46, p. 9).

RAITE

$Na_4Mn_3Si_8(O,OH)_{24}.9H_2O$

Quebec

31 H/11 Raite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

RAMMELSBERGITE

$NiAs_2$

Rammelsbergite is an orthorhombic form of nickel diarsenide that is closely related in crystal structure to marcasite. It is readily mistaken for pararammelsbergite in polished section and may be positively distinguished only by its X-ray powder pattern.

Newfoundland

2 E/13 Tilt Cove Mines, Newfoundland's oldest copper producers, are located at Tilt Cove on the Northeast shore of Notre Dame Bay. The West Mine also contained nickel ore which included maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Northwest Territories

75 L/12 Specimens from the Nix property, 16 km southwest of Taltheilei Narrows, on the northeast arm of Great Slave Lake consist of solid compact masses of niccolite and rammelsbergite in a minor amount of ankerite gangue, and partially coated with annabergite (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 507).

85 I/2 Rammelsbergite occurs near Gros Cap at a point 3.2 km north of Great Slave Lake, and 4.8 km east of Francois River. Specimens from this locality consist of compact masses of botryoidal niccolite and rammelsbergite cemented by a carbonate gangue and covered with much earthy annabergite (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 506).

86 E/9 Rammelsbergite occurs with native silver and bismuth, matildite, safflorite, skutterudite, pararammelsbergite, gersdorffite, cobaltite and niccolite at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay, at 65°36'14"N, 118°06'45"W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 F/13 An assemblage of cobalt-nickel minerals including rammelsbergite, cobaltite, safflorite-löllingite, glaucodot, niccolite and breithauptite occurs at the B.E.A.R. deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 759).

86 L/1 The rammelsbergite at the Eldorado Mine, Great Bear Lake, is generally in a massive aggregate of crystals of prismatic habit which are associated with skutterudite, smaltite, and chloanthite. A few isolated crystals of rammelsbergite are also found associated with metallic minerals such as uraninite, chalcopyrite, native silver, and tetrahedrite. The gangue consists of quartz and carbonate with some chloritic mica (E. Thomson, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 46).

Ontario

Much of the so-called rammelsbergite from the Cobalt camp, reported below, may really be pararammelsbergite, a mineral having the same composition but different crystal structure (see: M.A. Peacock and A.S. Dadson, 1940: Am. Mineralogist, 25, p. 561).

31 M/5 Rammelsbergite showing a fibrous structure and prismatic cleavage, occurs at the University Mine, in the Cobalt area. Analysis of the ore gave the following results: Ni 27.84, Co 1.80, Fe tr., As 67.32, S 2.03, Sb 0.83, total 99.82 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 228).
At the M.J. O'Brien Mine at Cross Lake, 3.2 km southeast of Cobalt, rammelsbergite occurs in veins in volcanics and sediments of Keewatin age and in diabase of Nipissing age. It is associated in different proportions at different levels and parts of the veins with skutterudite, argentite, cobaltite, chloanthite, safflorite, gersdorffite, smaltite, niccolite, chalcopyrite, tetrahedrite, arsenopyrite, sphalerite, galena, pyrite, pyrargyrite, marcasite, silver, and a little breithauptite (E. Thomson, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 41; and 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 33).

Rammelsbergite at the Silver Bar Mine, near Cobalt, shows a radiating structure and is found with arsenopyrite, cobaltite and ullmannite. Niccolite and gersdorffite are also present. Chemical analysis of rammelsbergite, by E.W. Todd: Ni 26.21, Co 2.70, Fe 0.66, As 66.60, Sb 0.85, S 2.97, SiO_2 0.21, total 100.20; S.G. 6.999.

Rammelsbergite is also found at the Hudson Bay Mine, and the Timiskaming Mine, in the Cobalt area. Chemical analysis by E.W. Todd, of rammelsbergite from the Hudson Bay Mine: Ni 27.08, Co 1.94, Fe 0.56, Cu 0.16, As 65.78, S 3.05, Sb 0.91, total 99.48; S.G. 7.02 (T.L. Walker and A.L. Parsons, 1921: Univ. Toronto Stud., Geol. Ser., 12, pp. 27-31).

41 P/9 Compact, fine-grained, tin-white masses of rammelsbergite occur at the Moose Horn Mine, in James Township. Chemical analysis by G.W. Rogers: Ni 28.1, Co 0.4, As 68.5, S 2.6, total 99.6; S.G. 7.12 (M.A. Peacock and C.E. Michener, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 95).

41 P/10 Veins in the O'Brien Mine at Miller Lake, Gowganda district contain the following minerals (in order of abundance): silver, loellingite, skutterudite, safflorite, rammelsbergite, tetrahedrite, smaltite, chloanthite, arsenopyrite, cobaltite, galena, niccolite, breithauptite, chalcopyrite, and sphalerite. Calcite and quartz are the main gangue minerals (E. Thomson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 61).

31 M/5
31 M/12
41 P/10 Electron probe microanalyses of rammelsbergites in the Cobalt-Gowganda ores: Siscoe Mine, Ni 25.8, Co 3.1, Fe 0.1, As 69.8, Sb 0.0, S 0.6, total 99.4; Siscoe Mine, Ni 20.8, Co 7.6, Fe 0.2, As 66.9, Sb 0.0, S 2.8, total 98.3; Silverfields Mine, Ni 20.9, Co 6.6, Fe 0.8, As 68.6, Sb 1.2, S 0.7, total 98.8; Langis Mine, Ni 29.5, Co 2.6, Fe 0.0, As 69.0, S 1.0, total 102.1; Hi-Ho Mine, Ni 29.0, Co 2.0, Fe 0.0, As 69.0, S 2.0, total 102.0 (W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 165).

Saskatchewan

74 N/8 Rammelsbergite is found in the Number 4 vein of the Nicholson Group claims, on the north shore of Lake Athabasca, 3.2 km east of Goldfields. It occurs with hematite, pitchblende, and other cobalt-nickel arsenides, as well as thucholite, chalcopyrite, arsenopyrite, galena, pyrite and sphalerite, in a carbonate and quartz gangue (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 96).

RAMSAYITE

$Na_2Ti_2Si_2O_9$

British Columbia

82 N/1 Ramsayite occurs in several veins on the northeast slopes of Zinc Mountain at 51°10'24"N, 116°23'06"W, as sheaves up to 2 x 2 x 10 cm in

size. (K.L. Currie, 1975: Geol. Surv. Can., Bull. 245, p. 45) Chemical analysis of a specimen of Zinc Mountain ramsayite by J.L. Bouvier: SiO_2 36.37, Al_2O_3 1.56, TiO_2 41.60, CaO 1.13, MgO 0.02, Na_2O 17.39, K_2O 0.04, H_2O 1.25, total 99.52 (Geol. Surv. Can.).

Quebec

31 H/11 Ramsayite has been found in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

RAMSDELLITE

MnO_2

Nova Scotia

11 E/7
11 E/8
11 E/10 The only occurrence of this manganese oxide mineral thus far reported in Canada is in Pictou County, Nova Scotia, along the East River (M. Fleischer and W.E. Richmond. 1943: Am. Mineralogist, 28, p. 615; and 1943: Econ. Geol., 38, pp. 269-286).

21 H/1 Ramsdellite occurs as shiny black platy aggregates with dull brown to black fine-grained psilomelane on white and brown banded crystalline calcite, in a red sandstone exposed at low tide along the cliffs at Whale Cove, north of Whale Creek. From the turn-off from highway 15 to Whale Cove, proceed west 320 m along a rough road to the shore; bear right and walk 137 m to the occurrence (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 51).

21 H/8 Ramsdellite has been found at Cape Split, Kings County (H.H. Majmundar, 1969: Can. Mineralogist, 9, p. 718).

RAUVITE

$CaO.2UO_3.2V_2O_5.16H_2O$

Prince Edward Island

21 I/16 Rauvite has been identified as a soft yellowish mass in a radioactive sample collected from an outcrop 1.6 km north of Little Miminegash Pond. Francevillite is associated (V.K. Prest, H.R. Steacy and T.J. Bottrill, 1969: Geol. Surv. Can., Paper 68-74, p. 5).

REALGAR

AsS

Realgar occurs commonly as a minor constituent of certain ore veins associated with orpiment and other arsenic minerals, with stibnite, and with lead, silver, and gold ores. On exposure to light it alters to orpiment and arsenolite.

British Columbia

92 F/14 Realgar, minor arsenopyrite and native arsenic occur in calcite in a shear zone at the Good Hope claims near a small creek flowing northeasterly into the west end of Wolf Lake (M.E. Hurst, 1927: Geol. Surv. Can., Econ. Geol. Ser. 4, p. 36).

92 F/14 Realgar is reported to be one of the main minerals in the quartz vein of the Mount Washington Copper deposit located near the summit and on the northeast slope of Mount Washington about 24 km northwest of Courtenay. (J.E. Muller and D.J. T. Carson, 1969: Geol. Surv. Can., Paper 68-50, p. 42).

92 L/2 Realgar is found in a calcite vein on the Good Hope claim near Wolfe Lake, west of the headquarters of the Comox Logging Company (19 km from Courtenay) (National Mineral Collection, donor: M.E. Hurst, 1919).

92 O/1 Realgar, associated with native arsenic is found in small quantities along Watson Bar Creek, a tributary of the Fraser River (R.A.A. Johnston, 1909: Geol. Surv. Can., Sum,. Rept., p. 250).

Newfoundland

2 E/10 Realgar and scorodite occur in pockets in calcite at the Stewart Mine on the east side of the opening of Little Harbour, a small inlet on the east side of Moreton's Harbour (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 100).

Ontario

31 F/4 Very small quantities of bright red realgar associated with orpiment and mispickel occur on conc. IX, Faraday Township, 11 km due west of L'Amable Station (F.D. Adams and A.E. Barlow, 1910: Geol. Surv. Can., Mem. 6, p. 211).

31 M/4 A specimen of realgar from the Keeley Mine in South Lorrain Township is in the mineral collection at the Royal Ontario Museum. (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 325).

52 K/13 Realgar was found in the form of coatings and small irregular aggregates in highly silicified ore at the Madson Mine, in the Red Lake area, Baird Township (M.H. Frohberg, 1960: private communication).

Yukon

105 D/2 The National Mineral Collection contains a specimen of realgar from Windy Arm, Tagish Lake. Quartz, arsenopyrite, and orpiment are also present. The specimen was donated to the collection by D.D. Cairnes in 1916.

115 F/15 Realgar is found in small quantities distributed through an andesite dyke on Pan Creek, a tributary of the Upper White River (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 193).

RETGERSITE

$NiSO_4.6H_2O$

Quebec

21 L/9 Pale green to apple-green retgersite forms soft, thin crusts on millerite and quartz at the Eastern Metals Mine near St-Fabien (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 66).

32 D/8 Retgersite and morenosite occur together as alteration products of ore at the Marbridge Mine on lot 9, range 5, LaMotte Township. (R. Stavely, 1976: Mineralogical Record, 7, p. 174).

RHABDOPHANE

$(Ce,La)PO_4.H_2O$

Quebec

31 H/11 Rhabdophane has been identified from Mont St-Hilaire. (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

RHODOCHROSITE

$MnCO_3$

Rhodochrosite is a member of the calcite group and commonly contains some Fe and Ca in solid solution. It is found as a gangue mineral in moderately low temperature hydrothermal ore veins; also in relatively high temperature metasomatic deposits and as a secondary mineral in sedimentary manganese oxide deposits.

British Columbia

82 E/5 Rhodochrosite is found with other manganese minerals in a bedded deposit of manganiferous chert on the Iron King prospect, which is on the south side of the ridge separating the north and middle forks of Olalla Creek, 5.6 km by trail from the highway at Olalla (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

82 F/10 Lead-zinc-silver ore minerals with a gangue of rhodochrosite and quartz occur at the Shepherd Mining Company deposit at Riondel, Kootenay Lake area. (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 24).

82 K/13 Rhodochrosite has been reported to occur at Sproat Mountain, 9.6 km north of Arrowhead (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 95).

93 L/2 The vein system at the Silver Queen Mine contains abundant rhodochrosite. The mine is at 54°05'N, 126°43.8'W, east of Owen lake about 34 km due south of Houston (B.N. Church, 1970: B.C. Dept. Mines & Pet. Res., Geol. Exp. and Mining in B.C., 1970, p. 134).

Manitoba

52 L/5 Rhodochrosite is present in small amounts in the lithium-cesium ore mined at Bernic Lake (R. Brinsmead, 1960: Precambrian, vol. 33, No. 8, p. 25).

New Brunswick

21 J/4 The mineral rhodochrosite is a constituent of the manganese ore at a deposit 8 km west-northwest of Woodstock and about 13 km east of Houlton, Maine. The orebody lies on the south side of the Meduxnekeag River (E.W. Heinrich, 1962: Can. Mineralogist, 7, p. 291).

21 J/4 Manganiferous hematite and silicified shales constitute the most important manganese-bearing units of the manganese ores at Woodstock in Carleton County. The hematite is locally cut by narrow quartz stringers and veinlets of rhodochrosite. The primary ore mineral, braunite, occurs with minor amounts of piedmontite and axinite (G.C. Monture, 1957: Can. Mining J., 78, Pt. 1, pp. 117-120).

21 J/4 Rhodochrosite, psilomelane and manganous manganite occur with hematite, magnetite and pyrite in slate at the Plymouth Mine, near Plymouth, and the Moody Hill, Iron Ore Hill and Palmer's Mines in the Jacksonville area, to the east and north of Woodstock (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 132-135).

21 J/7 Rhodochrosite occurs in dolomite in the Napadogan area (X-ray Laboratory, Geol. Surv. Can.).

21 J/10 Rhodochrosite is found in Northumberland County on the east bank of the Southwest Miramichi River, about 18 km above Boiestown and 1.8 km below the mouth of Trout Brook. The mineral was identified by X-ray diffraction pattern at the X-ray Laboratory of the Geological Survey of Canada.

21 J/10 Rhodochrosite occurs at Fall Brook in York County (W.H. Poole, 1960: Geol. Surv. Can., Paper 60-15).

Newfoundland

1 N/10 Manganese-bearing red and green shale is exposed along the steep banks of the Manuels River downstream from the Highway 60 bridge at Manuels. Birnessite, the chief manganese mineral, is associated with brownish red irregular fragments of rhodochrosite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 70).

Nova Scotia

11 E/1 At Rocky Lake, 4.8 km northwest of Liscomb, a spessartite-bearing rock consists mainly of spessartite, rhodonite and quartz. Other minerals include rhodochrosite, pyrophanite, mica, hornblende, magnetite and pyrrhotite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 51).

Ontario

42 A/8 Rhodochrosite has been reported to occur at the Ross Mine in the community of Holtyre on Highway 572, 8.8 km from Highway 11, in Hislop Township (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 111).

52 A/3
52 A/7 Rhodochrosite is reported to occur on Silver Islet, and on McKellar Island, in Lake Superior (E.D. Ingall, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 27H).

Quebec

31 H/11 Rhodochrosite occurs in vuggy and veined nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

32 C/12 Rhodochrosite is reported to have been present at the Barvue Mine at Barville, 61.8 km from Val d'Or via Highway 64 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 110).

34 C/1
34 C/8 Rhodochrosite is a constituent of the lead-zinc sulphide deposits on the properties of the Labrador Mining & Exploration Company, and of the Hollinger North Shore Exploration Company. These properties are located near Richmond Gulf, on the east shore of Hudson Bay (J.E. Gilbert, 1953: Que. Dept. Mines, Geol. Rept., 56, p. 19).

RHODONITE

$MnSiO_3$

The composition of rhodonite is somewhat variable and Mn may be replaced by Ca and Fe to a considerable extent. Rhodonite has a characteristic rose-red colour resembling rhodochrosite but is distinguished by its superior hardness.

British Columbia

82 E/4 A locality for collecting rhodonite is situated on the north side of Highway 3 at the west end of Keremeos. Rhodonite also occurs on the north slope of Orofino Mountain and along Orofino Creek about 1.6 km by road from the turn-off on Meyer's Flats, west of Oliver (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 57).

82 E/5 A bedded deposit of manganiferous chert on the Iron King prospect is traversed by a network of minute veins containing rhodonite which merge laterally into zones of hard black manganese ores (braunite) containing small irregular masses of rhodonite and chert.
The property is located on the south side of a ridge separating the north and middle forks of Olalla Creek, 5.6 km by trail from the highway at Olalla (R.M. Thompson, 1951: Am. Mineralogist, p. 505).

82 F/15 The National Mineral Collection contains specimens of rhodonite from Kaslo.
Rhodonite, formed by metamorphism of rhodochrosite in crystalline limestone, is found in massive, deep pink bunches or lens-like masses in calcareous footwall rocks of a vein in the Harp Group. The property is near Zwicky, in the Slocan mining district (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 127).

92 C/9 Near Cowichan Lake, on Vancouver Island, beautiful rhodonite can be found at the site of an old manganese mine. The mine is at the summit of a mountain about 600 m above sea level and about 8 km east of Lake Cowichan (--, 1957: Canadian Rockhound, vol. 1, No. 5).

92 C/16 Eight localities for rhodonite are known in the vicinity of Cowichan Lake. The best known of these are: the Holling's claims on Saltspring Island; and Hill 60 near Cowichan Lake. A locality north of Youbou has been staked by a Nanaimo rock club (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 55).

92 O/16 Rhodonite boulders occur along the Fraser River near Sheep Creek bridge on Highway 20 about 22.5 km southwest of Williams Lake (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 59).

92 P/8
92 P/9 Rhodonite occurs near Boulder Creek (Joseph Creek), a tributary of the North Thompson River. A specimen is included in the National Mineral Collection: donor, M.F. Bancroft, 1917.

93 K/13 A rhodonite vein occurs on Tsitsutl Mountain in the Fort St. James area in Cache Creek sedimentary rocks. The vein consists of 70% rhodonite, 2-3% arsenopyrite, and calcite, garnet (spessartite) and ilmenite (J.E. Armstrong, 1949: Geol. Surv. Can., Mem. 252, p. 134).

93 N/13 Boulders of rhodonite and jade have been found in placer diggings on Quartzite Creek, which flows into Falls River 9.6 km west of Old Hogem (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 59).

104 P/5
104 P/6 Jade and rhodonite are recovered from the gravels of Snowy Creek in the vicinity of the Cassiar Road where it bridges the creek 123.6 km from the Alaska Highway, and also from McDame Creek at Centreville (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 27).

New Brunswick

21 J/4 Rhodonite is one of the minerals comprising the Plymouth orebody on the south side of the Meduxnekeag River, 8 km west-northwest of Woodstock (E.W. Heinrich, 1962: Can. Mineralogist, 7, p. 291).

21 J/10 Rhodonite occurs in breccia at Fall Brook, and in slate on Lower Birch Island, in York County (W.H. Poole, 1960: Geol. Surv. Can., Paper 60-15).

21 P/12 Rhodonite occurs in quartz veins at Tetagouche Falls in Gloucester County (K.O.J. Sidwell, 1952: New Brunswick Res., Dev. Bd., Fredericton).

Nova Scotia

11 E/1 The principal minerals in a sample of spessartite-bearing rock from Rocky Lake, 4.8 km northwest of Liscomb, are spessartite, rhodonite and quartz. Other minerals present include rhodochrosite, pyrophanite, mica, hornblende, magnetite and pyrrhotite (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 51).

Quebec

23 C/1 Rhodonite has been identified in a specimen from the Mount Reed property, 52°05'N, 68°05'W, in the Mount Wright area (X-ray Laboratory, Geol. Surv. Can., specimen submitted by S. Duffell, 1956).

RICKARDITE

$Cu_{4-x}Te$

The crystal structure of this rare telluride has been shown by S.A. Forman and M.A. Peacock (Am. Mineralogist, 34, p. 441, 1949) to be similar to Cu_2Sb. The structure is deficient in Cu, with $x = 1.2$.

British Columbia

103 I/9 Rickardite is present in traces at the Grotto Group on Hardscrabble Creek, 2.4 km from Pitman, and 1.6 km west of the Canadian National Railway tracks in the Skeena mining division. The rickardite as observed on a small cleavage mass of tellurium adjacent to an area of chalcopyrite, in a quartz vein containing values in copper, silver and gold. Pyrite, specularite and empressite were also present (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 527).

Quebec

32 D/3 Rickardite has been listed among the telluride minerals occurring at the Horne Mine, at Noranda (R.M. Thompson, 1959: Am. Mineralogist, 34, p. 359).

RIEBECKITE

$Na_2Fe_3^{++}Fe_2^{+++}Si_8O_{22}(OH)_2$

This blue alkali amphibole, together with glaucophane, forms a subgroup that is characterized by substitution of bivalent magnesium for ferrous iron, and aluminium for ferric iron. Glaucophane is known only as a metamorphic mineral occurring in schists, whereas riebeckite is best known as a constituent of acid igneous rocks. Riebeckite also occurs as a blue fibrous (asbestiform) mineral which is known as crocidolite or blue asbestos.

British Columbia

104 O/3
104 O/6 Several alkali rhyolite dykes, generally displaying spherulitic structure, and containing riebeckite, acmite, or decomposition products of riebeckite, occur in the Atsutla Range of northern British Columbia (W.H. Mathews and K.D. Watson, 1953: Am. Mineralogist, 38, pp. 432-447).

Newfoundland

1 M/10 Blue riebeckite was observed in the microcrystalline groundmass of a specimen of felsite from Sugarloaf Hill, southeast of Bay L'Argent (D.A. Bradley, 1962: Geol. Surv. Can., Mem. 321, p. 12).

2 D/10 Riebeckite granite froms a small group of relatively high hills just east of the village of Traytown in the Bonavista map-area (S.E. Jenness, 1963: Geol. Surv. Can., Mem. 327, p. 97).

13 K/5 Riebeckite occurs with beryllium mineralization in alkali syenite at Seal Lake, Labrador. Most of the mafic minerals are in clusters, vein-like aggregates or disseminated microlites. Riebeckite replaces aegirine (E.W. Heinrich and R.W. Deane, 1960: Am. Mineralogist, vol. 47, Nos. 5, 6, p. 758).

Northwest Territories

44 A/1 A blue amphibole, believed to be riebeckite, occurs along slickensided surfaces in iron-formation at the southwest end of Kugong Island. One or two tiny veinlets contain cross-fibres of a blue mineral, possibly crocidolite (G.D. Jackson, 1960: Geol. Surv. Can., Paper 60-20, p. 13).

Ontario

31 C/12 Riebeckite occurs in nepheline syenite at the Indusmin quarries on lots 14 and 15, conc. VIII and IX, Methuen Township. Specimens are in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 326).

31 F/6 Crocidolite fibres have been found on feldspar at the Smart apatite deposit. The deposit is on the left side of the Lake Clear cottage road which leaves Highway 512, 10.6 km from Eganville (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 35).

41 N/15 Riebeckite occurs in the Michipicoten area as greyish blue and lavender to deep blue, earthy to radiating aggregates. It has formed as a hydrothermal alteration product accompanying lamprophyre dykes and was locally introduced in quartz veins. The riebeckite was observed quite frequently in small quantities at the Darwin Mine and at the Parkhill Mine (M.H. Frohberg, 1960: private communication) and has also been reported to occur at other mines in the area (M.H. Frohberg, 1939: Am. Mineralogist, 24, p. 382) (J.E. Hawley, 1937: Am. Mineralogist, 22, p. 1099).

41 O/11 Riebeckite occurs about 2.4 km northeast of the village on the Mountbatten Indian Reserve in Mountbatten Township, Sudbury mining division. The mineral was identified by X-ray diffraction pattern and optical properties by the X-ray Laboratory of the Geological Survey of Canada, from hand specimens submitted by Mr. R.C. Johnston, Superintendent, Chapleau Indian Agency. The specimens consisted mainly of riebeckite, associated with quartz and magnetite.

42 C/7
42 C/8 Riebeckite was observed in and near a lamprophyre dyke which cuts the gold veins of the Edwards Mine, in the Goudreau-Lochalsh area, District of Algoma (M.H. Frohberg, 1939: Am. Mineralogist, 24, p. 386).

42 D/10 A specimen of riebeckite in syenite was collected from Foster Island in Lake Superior adjacent to Coldwell Township. The specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 326).

Quebec

23 O/2
23 O/3 Crocidolite, the fibrous variety of riebeckite is found in iron formation near Trough Lake at 55°05'N, 66°55'W, and Lac Hanson at 55°04'N, 67°11'W (W.R.A. Baragar, 1967: Geol. Surv. Can., Memoir 344, p. 164).

31 H/11 Crocidolite, the fibrous variety of riebeckite, is reported to have been found at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

RINKITE

$(Na,Ca)_{12}(Ce,Ti)_5Si_8(O,F)_{36}$

Quebec

31 H/11 A mineral believed to be a member of the rinkite (or mosandrite) group occurs in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 L/16 Rinkite is reported to occur with mosandrite, eudialyte, vlasovite, britholite, miserite and agrellite in pyroxenite-amphibolite rocks in an alkalic complex in Villedieu Township on the Kipawa River at 46°47'49"N, 78°29'31"W (H.M. Aarden and J. Gittins, 1974: Can. Mineralogist, 12, p. 241).

ripidolite

(see CHLORITE)

ROBINSONITE

$7PbS.6Sb_2S_3$

British Columbia

82 F/3 Robinsonite is a rare sulphosalt previously reported only from the type locality (Red Bird mine, Nevada) and at Madoc, Ontario. Examination of a specimen from the Dodger Tungsten Mine, Salmo, led to the identification of bismuthian robinsonite associated with kobellite. Electron probe microanalysis gave: Pb 41.5, Bi 22, Sb 20, S 18, total 101.5. As in the analysis of the Madoc robinsonite, the lead value is considerably higher than the theoretical formula value (J.L. Jambor and G.R. Lachance, 1968: Can. Mineralogist, 9, p. 426).

Ontario

31 C/6 A single grain of robinsonite was identified in specimens from a small prospect pit on lot 12,

concession XIV, Huntingdon Township, on the farm of Mr. Ed Taylor of Madoc. Electron probe analysis showed considerably higher lead and lower antimony than the theoretical composition (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 211).

ROMARCHITE

SnO

Ontario

52 L/3 Tin pannikins lost from the overturned canoe of a voyageur between 1801 and 1821 were recovered 4.5 m below the surface of the water at Boundary Falls, Winnipeg River. Some of the surfaces of the pannikins have a thin crust consisting of white crystals and black crystals. The black crystals give an X-ray powder patten identical to that of SnO. The mineral, previously unreported in nature, is named romarchite, after Royal Ontario Museum Archaeology (R.M. Organ and J.A. Mandarino, 1971: Can. Mineralogist, 10, p. 916).

ROMEITE

$(Ca,Na,Fe,Mn,Pb)_2(Sb,Ti)_2O_6(O,OH,F)$

Ontario

42 B/1 The secondary minerals romeite and valentinite are reported as coatings and stains on antimony minerals at a deposit explored by Card Lake Copper Mines Limited in Sewell Township at about 48°12'N, 82°00.5'W. The occurrence is 6.7 km by road south of Highway 101 from a junction 19.3 km west of the Little Star Lake road (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 154).

ROMERITE

(Roemerite)

$FeFe_2(SO_4)_4.12H_2O$

British Columbia

92 I/11 Reddish orange romerite has been identified on specimens from the Spatsum claim 17.6 km south of Ashcroft Manor on Highway 1, south of Cache Creek (X-ray Laboratory, Geol. Surv. Can.).

New Brunswick

21 P/5 The gossan at the Brunswick No. 6 Mine, located 3.2 km from highway 331 on the road to Grand Falls, contains a variety of secondary minerals including soft pink powdery romerite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

ROQUESITE

$CuInS_2$

New Brunswick

21 G/7 This rare mineral is reported to occur as rounded grains up to 10 microns in size on chalcopyrite and sphalerite grain boundaries in specimens from the Mount Pleasant tin deposit. The identification was not confirmed by X-ray diffraction and is based solely on the results of electron probe analyses which gave the following average values: Cu 24.80, Fe 1.44, Zn 0.65, In 47.98, S 26.55, total 101.42 (J.K. Sutherland and R.S. Boorman, 1969: Am. Mineralogist, 54, p. 1202).

ROSCOELITE

$K(V,Al)_3Si_3O_{10}(OH)_2$

British Columbia

104 M/8 Flaky masses of green roscoelite have been reported from the underground workings of the Engineer gold mine on the east shore of Taku Arm of Tagish Lake 48 km from Atlin. Roscoelite is a vanadium rich mica, probably vanadian muscovite (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 40).

ROZENITE

$FeSO_4.4H_2O$

British Columbia

92 I/11 Rozenite is associated with hexahydrite on specimens from a locality 0.8 km west of Highway 1, 27 km south of Cache Creek (X-ray Laboratory, Geol. Surv. Can.).

Manitoba

63 K/13 Rozenite and leonhardtite were identified as white powders coating sulphides and associated minerals and rocks at the Pine Bay Mine on the shore of Sourdough Bay at the north end of Athapapusko Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 43).

New Brunswick

21 J/10 White powdery patches and coatings of rozenite on pyrrhotite have been identified on specimens from the Burnt Hill Mine. The deposit is accessible by road, 26 km north of Maple Grove Station (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 127).

21 P/12
21 P/15 Rozenite has been identified as powdery white coatings on sulphides and host rocks from the Sturgeon River, Key Anacon and Brunswick No. 6 Mines in the Bathurst-Newcastle area (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 114).

Newfoundland

12 H/16 Ore specimens coated with rozenite, siderotil, leonhardtite and goethite are present at the site of the old Terra Nova Mine. The mine dumps are at the side of Highway 410, opposite the junction with the road to Seal Cove, 3.5 km south of Baie Verte village (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 119).

Nova Scotia

11 J/4 Rozenite is associated with melanterite, epsomite, sideronatrite, pickeringite, aluminocopiapite and halotrichite at the No. 26 Colliery, Glace Bay. Rozenite, melanterite and fibroferrite have been identified at the Prince Mine, Point Aconi (E.L. Zodrow and K. McCandlish, 1978: Can. Mineralogist, 16, p. 17-22).

Ontario

30 M/5 White to yellowish, irregular encrustations of rozenite have been identified at the Royal Ontario Museum on limestone specimens from the Dundas quarry, Dundas (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 378).

31 C/10 Rozenite is abundantly exposed on the north wall of a pit at the Enterprise Mine about 42 km north of Kingston and 16 km west of Godfrey. It occurs as white, yellowish white and occasionally colourless loose granular to globular masses on pyrite (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

The following occurrences of rozenite are reported by Ann P. Sabina, 1971, in Geol. Surv. Can., Paper 70-50, pp. 9,16,19,21,30.

31 F/2 White powdery encrustations of rozenite on the rock dumps at the old Caldwell Mine on lot 2, conc. I, Blithfield Township.

31 F/6 Rusty weathered specimens with white coatings of rozenite on rock dumps at the Spain Mine on lot 31, conc. IV, Griffith Township, on the east side of Highway 41, 12.2 km south of its intersection with Highway 132; and at the Jamieson Mine on lot 5, conc. VIII, Lyndoch Township.

31 F/7 Rozenite occurs as a white powdery coating on weathered ore specimens at the old Hunt molybdenum mine on lot 9, conc. XI, Brougham Township.

31 F/11 Weathered pyrite-bearing rock encrusted with white botryoidal rozenite and acicular gypsum is exposed in road cuts on both sides of Highway 60, 5.9 km west of Douglas.

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41 I/4 A pale green encrustation on nickel ore at the Worthington Mine, lot 2, concession II, Drury Township, originally described as morenosite by G.C. Hoffmann (1892-93), has been re-examined and found to be nickelian rozenite. Partial X-ray fluorescence analysis by G.R. Lachance: FeO 17.3, NiO 13.0), CoO 0.4 (X-ray Laboratory, Geol. Surv. Can., 1965).

Quebec

21 E/10 Snow-white encrustations of rozenite on marcasite have been identified at a molybdenite deposit on the Joseph Grégoire farm, Ste-Cécile Station.

21 E/11 Rozenite occurs as white coatings on massive sulphides at the Weedon Mine near Fontainebleau (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 38, 43).

31 G/11 Rozenite forms white encrustations on gabbro at the Dominion Mine near Buckingham; on pyrite and rusty feldspar at the Jack Lake and Burnt Lake mines near Glen Almond; and on pyrite at the Smith Lake Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 7, 23, 24, 26).

31 G/12 A white coating of rozenite occurs on rusty pyroxenite at the Rainville (Dugas) Mine near Perkins Mills (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 11).

31 G/13 Roadcuts on Highway 35 north of Notre-Dame-de-la-Salette contain biotite gneiss which in places is coated with white to yellow, finely-crystalline rozenite (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 44).

31 G/14 At the Cole Lake Mine near Glen Almond, white powdery rozenite occurs on rusty pyrite and feldspar (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 28).

31 I/16 White rozenite has been noted on the surfaces of tremolite rock at the Tetreault Mine near Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 88).

31 I/16 The secondary sulphate rozenite occurs as a snow white coating or encrustation on ore-bearing gneiss at the Montauban Mine near Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 89).

31 J/4 Coatings of white rozenite occur on rusty-weathered gneiss at the Canastata Mine near Notre-Dame-du-Laus (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 50).

31 J/7 Coatings of white rozenite occur on rusty-weathered gneiss at the Labelle and McLean-McNicholl properties near Labelle (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 61).

31 M/7 Rock specimens encrusted with white rozenite occur on mine dumps at the Lorraine copper-nickel mine west of Belleterre. A road 5.0 km long leads south from Highway 62 at a point 9.9 km east of the bridge at Latulipe. The turn-off is 20.1 km west of Belleterre (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 94).

32 C/4 Ore specimens encrusted with white botryoidal rozenite are present on rock dumps at the Aumaque Mine 1.3 km south of Highway 59 and 6.1 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 113).

32 C/5 Rozenite-coated specimens are present on the rock dumps at the Vendome Mine about 1.6 km southwest of Barraute (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 108).

Yukon

105 M/14 Rozenite has been identified in several of the oxidized zones at Keno Hill. It is formed principally by the weathering of pyrite (R.W. Boyle, 1965: Geol. Surv. Can., Bull. 111, p. 155).

115 F/15 Rozenite has been identified as a secondary mineral on rock dumps at the Canalask Mine on the east side of the White River overlooking Miners Ridge and Nutzotin Mountains (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 73).

ruby silver

(see PROUSTITE, PYRARGYRITE)

RUTHENIRIDOSMINE

Os,Ir,Ru

Rutheniridosmine has been re-defined as "hexagonal (Os,Ir,Ru) alloys where Os<80 atomic per cent of (Os+Ir+Ru), and Ru is 10 to 80 atomic per cent of (Os+Ir+Ru), also where no single other element >10 atomic per cent of total"

British Columbia

92 H/7
104 N/11
104 N/12 Rutheniridosmine has been found in placer concentrates from Granite Creek in the Tulameen River area and from several localities in the Atlin district, notably Spruce Creek, Ruby Creek and Discovery. Electron microprobe analyses are as follows:

	(1)	(2)	(3)	(4)	(5)
Ir	29.4	42.2	35.9	41.4	41.0
Os	54.0	44.2	40.4	33.1	48.7
Ru	7.9	9.3	15.8	19.0	6.7
Pt	2.9	1.4	3.7	1.6	0.9
Pd	0.6	0.3	0.5	0.7	0.2
Rh	3.8	1.2	2.1	2.3	0.9
Fe	0.1	0.1	0.1	0.1	0.1
Total	98.7	98.7	98.5	98.2	98.5

	(6)	(7)	(8)	(9)	(10)
Ir	38.3	30.9	42.2	42.9	32.4
Os	42.5	39.2	50.3	42.2	45.4
Ru	13.5	19.0	5.6	9.9	10.0
Pt	1.3	4.3	-	2.2	6.3
Pd	0.5	0.8	0.2	0.4	0.5
Rh	1.7	3.0	0.5	1.4	1.1
Fe	0.1	0.1	0.1	0.1	1.3
Total	97.9	97.3	98.9	99.1	97.0

(D.C. Harris and L.J. Cabri, 1973: Can. Mineralogist, 12, p. 104)

RUTILE

TiO_2

Titanium dioxide occurs in nature in three polymorphous forms, rutile, anatase and brookite. Rutile is the most common form and an economic source of titanium. It is isostructural with oxides of manganese, tin and lead but little or no mutual substitution of these elements takes place. Rutile is regarded as high temperature mineral.

Manitoba

52 L/6 Niobian rutile has been identified in beryl-bearing pegmatites around Greer Lake (P. Cerny and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

63 K/12 Rutile has been reported from the Mandy Mine on a peninsula in the Northwest arm of Schist Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 38).

New Brunswick

21 G/7 Needle-shaped crystals and grains of rutile are of frequent occurrence at the Mount Pleasant deposit of Brunswick Tin Mines (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

Newfoundland

12 H/15
12 H/16
12 I/1 Concentrations of rutile in metamorphic rocks of the Fleur de Lys supergroup have been reported on Pigeon Island at 49°51'50"N, 56°32'30"W, and Partridge Point at 50°09'18"N, 56°09'30"W, on the eastern shore of White Bay. Dark reddish brown crystals ranging in length from 2 cm to more than 10 cm have been found along the shore between Seal Cove and Big Cove. The best localities lie about 4.8 to 6.4 km south of Seal Cove at 49°54'41"N, 56°26'00"W, and 49°54'07"N, 56°26'33"W (V.S. Papezik and M.J. deWit, 1973: Can. Mineralogist, 12, p. 224).

Nova Scotia

11 D/15 Crystals of rutile in quartz were found at the Mooseland gold mine, located at Sluice Brook, northeast of Lake Charlotte, Halifax County (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 9).

21 H/8 Rutile (var. sagenite) occurs in the form of needles in quartz at Scots Bay, in Kings County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 56T).

Ontario

31 C/6 Small crystals of rutile from lot 9, conc. XIV, Huntingdon Township, Hastings County, were presented to the National Mineral Collection by A.T. McKinnon in 1919.

31 D/15 The mineral collection at the Royal Ontario Museum includes rutile from a marble-granite contact on lot 18, conc. XIV, Galway Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 329).

31 E/11 Rutile occurs in garnet amphibolite at the Tiffany deposit on the south half of lot 15, conc. VII, Bethune Township. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 329).

31 F/2 Dark red granular aggregates in specimens from Flower Station near Clyde Forks, Lanark County, have been identified as rutile (X-ray Laboratory, Geol. Surv. Can.).

31 F/5 Tan-coloured rutile is reported to occur at the Burgess corundum mine in Carlow Township on lot 14, conc. XIV (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 46).

31 F/6 Tantalian-niobian rutile is reported from the Quadeville pegmatite on lot 23, concession XV, Lyndoch Township (E.R. Rose, 1960: Geol. Surv. Can., Paper 59-10, p. 25).

31 F/10 Black metallic grains of rutile occur sparsely in dolomitic marble of the Dominion Magnesium quarries at Haley Station (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 58).

31 K/4 Brown rutile is an accessory mineral in the Carey pegmatite quarry 3.2 km north of Mackey and accessible from the road to the Deep River Cub camp north of Highway 17 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 64).

Quebec

21 L/3 Patches of transparent, granular, reddish brown rutile, occur in soapstone at the Broughton soapstone quarry near St-Pierre (West Broughton) (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 56).

21 M/10 Veinlets of brownish red rutile are locally abundant in the General Electric pit. Rutile is also found in the Bignell, Coulombe and Furnace deposits in the St-Urbain area, Charlevoix County (E.R. Rose, 1961: Geol. Surv. Can., Paper 61-7).

31 G/11 Reddish brown prisms of rutile occur in pegmatite at the Pedneaud Quarry near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 21).

31 G/12 The National Mineral Collection contains specimens of prismatic, vertically striated crystals of rutile collected from lot 13, range XIII, Templeton Township, Papineau County, Quebec.

31 H/11 Rutile is reported to occur in altered veins in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao,

D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

32 C/4 A minor amount of rutile is associated with the ore at the Louvem Mine 3.2 km north of Highway 59, 20.1 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 120).

32 D/1 Rutile is a constituent of gold-bearing quartz veins at the Canadian Malartic and East Malartic mines at Malartic (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 92, 93).

Yukon

115 O/3 Specimens of rutile from Thistle Creek are present in the National Mineral Collection.

SABUGALITE

$HAl(UO_2)_4(PO_4)_4.16H_2O$

British Columbia

93 F/15 This mineral is reported to have been found in a dyke on Nithi Mountain, Nithi River. The sabugalite occurs sparingly as aggregates of small plates lining vugs, coating quartz crystals, and on joint surfaces in a partly brecciated, pyritic, devitrified vitrophyre dyke, which is said to occur in granite. Earthy metatorbernite is an associated mineral (R.M. Thompson, 1960: private communication).

SAFFLORITE

$(Co,Fe)As_2$

Safflorite is a common constituent of Co-Ni-Ag vein deposits throughout the world. It is found associated with smaltite, rammelsbergite, nickeline, loellingite, silver and bismuth. The mineral has a variable and usually considerable iron content.

British Columbia

92 H/8 Mineralization on the Oregon property, between Sixteen Mile and Eighteen Mile creeks, about 4.8 km east of Hedley, consists of massive garnet, hedenbergite, wollastonite, calcite, and minor quartz, with sparsely disseminated sulphides. Hedleyite and joseite B are seen together in polished sections as rounded grains with smooth boundaries. Native bismuth, molybdenite, and gold are closely associated with the tellurides, while bornite, chalcopyrite, cobaltite, and safflorite occur apart and are locally abundant (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

93 M/4 Safflorite occurs with chalcopyrite, and variable amounts of magnetite, pyrrhotite, arsenopyrite, pyrite, tetrahedrite, and molybdenite at the Rocher Deboule Mine near Hazelton. The gangue consists of hornblende, actinolite and quartz with subordinate amounts of calcite and siderite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 42).

Northwest Territories

86 E/8 Zoned grains and rosettes of safflorite-rammelsbergite, often with niccolite nuclei, occur in the pink dolomite of the central filling of the silver ore at the Camsell Silver Mine, 14.4 km from the mouth of the Camsell River, in the District of Mackenzie (D.F. Kidd, 1936: Geol. Surv. Can., Mem. 187, p. 32).

86 E/9 Safflorite occurs with native silver and bismuth, matildite, skutterudite, rammelsbergite, pararammelsbergite, gersdorffite, cobaltite and niccolite, at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay on Great Bear Lake, at 65°36'14"N, 118°06'45"W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 F/13 An assemblage of cobalt-nickel minerals, namely: safflorite-löllingite, cobaltite, glaucodot, niccolite, gersdorffite, rammelsbergite and breithauptite, occurs at the B.E.A.R. silver deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol. 34, p. 759).

Ontario

31 M/4 A hand specimen from the Wood's vein of the Keeley Mine, South Lorrain Township, consisted chiefly of safflorite and loellingite with minor amounts of cobaltite and skutterudite. Niccolite was seen in small amounts (J.M. Bell and E. Thomson, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 26).

31 M/5 The following occurrences of safflorite in the Cobalt district, Coleman Township, are represented in the mineral collection at the Royal Ontario Museum: Kerr Lake Mine, southeast part of north half of lot 3, conc. IV; Bailey (Glen Lake) Mine, southwest quarter of north half of lot 4, conc. IV; Penn-Canadian Mine, north half of lot 4, conc. IV; Silverfields Mine, southeast quarter of north half of lot 5, conc. IV; Cobalt Townsite Mine, northwest quarter of north half of lot 6, conc. V; McKinley-Darragh Mine, southeast quarter of north half of lot 6, conc. V; Buffalo Mine, southwest quarter of south half of lot 6, conc. VI; Trethewey Mine, southwest quarter of north half of lot 6, conc. VI (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 330-331).

31 M/5 Safflorite occurs with loellingite at the Kerr Lake Mine, near Cobalt (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 223).
Safflorite occurs in veins at the M.J. O'Brien Limited Mine on the shore of Cross Lake, 3.2 km southeast of Cobalt. The safflorite is associated in different proportions at different levels and parts of the veins with rammelsbergite, skutterudite, argentite, niccolite, cobaltite, chloanthite, gersdorffite, smaltite, chalcopyrite, tetrahedrite, arsenopyrite, sphalerite, galena, pyrite, pyrargyrite, marcasite, silver and in some places breithauptite and dyscrasite (E. Thompson, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 41; and 1932: Geol. Ser. 32, p. 33).

31 M/12 Safflorite is found in small amounts in dark coloured calcite along with arsenopyrite, argentite, and native silver, at the Casey Mine, lot 5, conc. I, Casey Township, District of Timiskaming. The property is owned by the Langis Silver and Cobalt Mining Company (D.A. Moddle, 1960: private communication).

41 P/10 Safflorite also occurs at a number of mines in the Gowganda area. At the O'Brien Mine at Miller Lake, safflorite is associated with (in order of abundance) the following minerals: silver, loellingite, skutterudite, rammelsbergite, tetrahedrite, smaltite, chloanthite, arsenopyrite, cobaltite, galena,

niccolite, breithauptite, chalcopyrite and sphalerite. The ore is found in veins varying in width from 2 to 35 cm, average 8 cm, which traverse diabase country rock. the gangue in the veins consists of calcite with minor quartz (E. Thomson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 61) (E.W. Todd, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. III, p. 67).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16

Safflorite-lollingite is the most common arsenide in the Cobalt-Gowganda ores. The variable composition is shown by the following electron probe microanalyses:

Fe	Co	Ni	As	S	Total
28.0	0.0	0.8	72.0	0.0	100.8
20.7	7.9	0.8	68.5	1.8	99.7
15.7	3.2	10.8	70.1	0.4	100.2
11.0	17.5	1.5	68.0	1.3	99.3
10.8	7.3	10.8	70.1	0.4	99.4
6.7	22.5	1.0	68.8	2.0	101.
5.5	15.3	8.7	69.6	1.2	100.3
5.5	21.5	2.9	69.6	1.2	100.7
5.0	23.1	3.6	66.0	3.0	100.7
3.9	23.6	1.5	66.5	1.4	96.9

(W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 154)

Quebec

23 B/11

Safflorite has been identified by X-ray powder diffraction in specimens from Mount Wright, near Hesse Lake, Labrador (E.W. Nuffield and D.H. Gorman, 1960: private communication)

SAL-AMMONIAC

NH_4Cl

Alberta

84 C/3

Sal-ammoniac occurs with native sulphur as a deposit from the 'Bocannes' or smokes of the Smoky Hills, in the Peace River area. The smokes are thought to be due to burning coal or lignite and the resulting surface deposits are found along the Smoky River up to 22 km from its confluence with the Peace River. The colour of the sal-ammoniac varies from canary yellow to red to white, and an analysis of the material gave the following results: S (native) 46.517, NH_4Cl 50.422, $(NH_4)_2SO_4$ 1.807, K_2SO_4 0.035, Na_2SO_4 0.274, $CaSO_4$ 0.146, $FeSO_4$ and $MgSO_4$ 0.014, extraneous matter 0.922, total 100.137 (G.C. Hoffmann, 1875-76: Geol. Surv. Can., Rept. Prog., pp. 58, 420).

SAMARSKITE

$(Y,Ce,U,Ca,Pb)(Nb,Ta,Ti,Sn)_2O_6$

British Columbia

82 F/5

Samarskite, fergusonite, thorite and monazite are reported in pegmatite 1.6 km south of the Slocan River and 0.8 km west of Crescent Valley radio station (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 234).

Ontario

31 E/4

Samarskite is reported to occur in granite pegmatite on lots 9 and 10, conc. IX, Conger Township, Parry Sound district (D.F. Hewitt, 1960: private communication).

31 F/4

A zoned granite pegmatite on lots 16 and 17, conc. VIII, Monteagle Township, is reported to contain samarskite (D.F. Hewitt, 1960: private communication).

31 F/6

Samarskite is reported to occur on lot 23, conc. XV, Lyndoch Township, Renfrew County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 196).

Quebec

21 M/16

Samarskite occurs in the Lac Pied des Monts area of Charlevoix County (J. Obalski, 1906: Mining Operations in Que., p. 42).

31 J/16

Samarskite occurs in a pegmatite dyke at the Maisonneuve Mine on lots 1 and 2, range II, Maisonneuve Township, Berthier County. The mineral is abundant in portions of the dyke, and is found in the form of small masses varying from a few milligrams to 450 gm or more. Muscovite, biotite, tourmaline, beryl, fergusonite and euxenite are also present in the dyke (W.G. Miller and C.W. Knight, 1917: Que. Dept. of Mines, 26, p. 316) (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 248) (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 153).
An analysis of samarskite from Maisonneuve Township by G.C. Hoffmann (1882) gave the following results: Nb_2O_3 + Ta_2O_3 55.41, SnO_2 0.10, Y_2O_3 14.34, Ce_2O_3 4.78, UO_3 10.75, MnO 0.51, FeO 4.83, CaO 5.38, MgO 0.11, K_2O 0.39, Na_2O 0.23, F tr., H_2O 2.21, total 99.04; S.G. 4.9478.

SAMSONITE

$Ag_4MnSb_2S_6$

Ontario

31 M/5

Samsonite was identified by crystallographic measurements and X-ray diffraction by Dr. P. Ramdohr, in a specimen from the Brady Lake property of the Silver Miller Mine near Cobalt. The specimen is a semi-transparent, prismatic crystal, about 3 millimetres long, and similar to pyrargyrite, in appearance, having been taken as such by M.H. Frohberg who submitted the mineral for identification. Positive identification of samsonite has been made only in this one specimen, which is now in the Heidelberg collection (M.H. Frohberg, 1960: private communication).

SANBORNITE

$BaSi_2O_5$

Yukon

105 J

Sanbornite is reported to occur with pellyite, barite, hedenbergite, quartz, andradite, taramellite, gillespite, chalcopyrite and witherite at a contact metasomatic deposit near the headwaters of the Ross and Pelly Rivers approximately 3.2 km southwest of Gillespite Lake (J.H. Montgomery, R.M. Thompson and E.P. Meagher, 1972: Can. Mineralogist, 11, p. 444).

sanidine

(see POTASSIUM FELDSPAR)

SAPONITE

A number of occurrences of clay-like material, believed to be an aluminosilicate of magnesium were reported in the early literature as saponite. These may be unrelated to the particular species and group of clay minerals to which the name has been applied in recent years.

Ontario

52 A/5 Saponite is reported to occur in the Thunder Bay district at the Beaver Mine, and at other mines in the Port Arthur Group (E.D. Ingall, 1887-88: Geol. Surv. Can., Ann. Rept. III, pp. 126, 127H).

Prince Edward Island

11 L/12 Saponite is reported to occur on the northeast coast of Hog Island, in Richmond Bay, north coast of Prince Edward Island (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 56T).

11 L/12 Saponite occurs in cavities in trap on George Island in Malpeque Bay, Prince County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 56T). Analysis of saponite from George Island by B.J. Harrington: SiO_2 43.91, Al_2O_3 6.47, Fe_2O_3 1.23, CaO 0.59, MgO 27.18, H_2O 19.64, total 99.02; S.G. 2.23-2.27 (B.J. Harrington, 1875: Can. Nat., Ser. 2, VII, p. 179).

Quebec

31 K/8
31 K/9 Saponite occurs as an alteration of amphibole in Egan Township, Gatineau County. An analysis of this material by Johnston gave the following results: SiO_2 42.76, Al_2O_3 4.32, Fe_2O_3 2.57, CaO 1.92, MgO 25.30, H_2O 23.13, total 100.00; S.G. 2.162 (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., 1910, p. 259).

SAPPHIRINE

$(Mg,Al)_8(Al,Si)_6O_{20}$

Sapphirine is a comparatively rare, high-temperature metamorphic mineral, found associated with spinel, corundum, calcic plagioclase, biotite, sillimanite, cordierite, anthophyllite, kornerupine, and hypersthene, in rocks relatively high in Al and Mg and low in Si.

Newfoundland

13 E/7 Greenish-blue sapphirine is a constituent of aluminous layers in paragneiss and in concordant lenses composed mainly of titaniferous hematite at Wilson Lake, 53°20'N, 62°50'W (Leong Khee Meng and John M. Moore Jr., 1972: Can. Mineralogist, 11, p. 777).

14 C/13 Sapphirine has been identified in grain mounts from cordierite-rich rocks that outcrop at two places in the Hellasch Lake-Port Manvers area; north of Webb Bay at 56°50'55"N, 61°47'10"W, and south of Deep Lake at 56°57'35"N, 61°55'W (S.A. Morse et. al., 1974: Contrib. 13, Geol. Dept. Univ. of Massachusetts).

Quebec

21 M/10 Sapphirine is intimately associated with plagioclase, rutile and ilmenite at St. Urbain in Charlevoix County. Chemical analysis: SiO_2 13.44, Al_2O_3 62.98, FeO 9.08, MgO 15.28, total 100.78; S.G. 3.5 (C.H. Warren, 1912: Am. J. Sci., Ser., 4, vol. XXXIII, p. 267).

31 I/15 Bluish gray sapphirine occurs as lenses up to 6 mm thick in garnetiferous biotite shist in Mekinac Township, Laviolette County, off of highway 19, about 6 km west of the bridge on the Mekinac River, on the first important road cut opposite the curve.
Identification has been confirmed by X-ray diffraction pattern (X-ray Laboratory, Geol. Surv. Can.).

SCAPOLITE

Scapolite occurs typically in metamorphosed limestones and calcareous rocks especially around intrusive igneous rocks. The general formula for the scapolite group may be written $W_4Z_{12}O_{24}R$, where: W is mainly Ca, Na and K; Z is Si and Al; and R is (1) Co_3, SO_4, $(OH)_2$, Cl_2 or F_2 for meionite, and (2) Cl, F, HCO_3, HSO_4 or OH for marialite. Composition varieties are: marialite (Ma) Me_0-Me_{20}, dipyre Me_{20}-Me_{50}, mizzonite Me_{50}-Me_{80}, and meionite (Me) Me_{80}-Me_{100}. The name wernerite was proposed at about the same time and has been used in the same sense as scapolite (D.M. Shaw, 1960: J. Petr., vol. 1, pp. 218-260).

Ontario

31 C/7 At the Freeman Mine, lot 12, conc. VIII, Loughborough Township, scapolite occurs with phlogopite and apatite in calcite veins. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 333).

31 C/8 A specimen of scapolite in the mineral collection at the Royal Ontario Museum is from lot 20, conc. VII, rear of Leeds and Lansdowne Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 336).

31 C/9 Scapolite has been found at the Glendower Iron Mine, Bedford Township (B.J. Burley, E.B. Freeman, and D.M. Shaw, 1961: Can. Mineralogist, 6, p. 670).

31 C/10 Scapolite was noted at Eel Lake in Bedford Township, Frontenac County (G.O. Smith, 1894: Johns Hopkins Circular, Map 112).

31 C/10 Scapolite occurs at the Bobs Lake Mine, conc. VI, lot 30, and in conc. VIII, lot 6, Bedford Township, Frontenac County (H.S. de Schmid, 1912: Can. Dept. Mines, Mines Br., 118, pp. 296, 297).

31 C/10 Light green to brownish green scapolite crystals about an inch across are found in crystalline limestone at the Enterprise Mine. The mine is situated about 42 km north of Kingston and 16 km west of Godfrey. Other minerals in association with scapolite are pyrite, pyrrhotite, calcite, apatite, hornblende and pyroxene (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

31 C/10 Scapolite has been found in crystalline limestone at a roadcut on the Westport Road, about 11 km east of Godfrey. It occurs as light yellowish green transparent crystalline aggregates, about an inch across, with vitreous to greasy lustre (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 16).

31 C/10 Scapolite occurs as greenish yellow transparent crystals (about 12 mm long) and turbid crystalline aggregates in veins cutting gabbro at the Eagle Lake (Blessington) Mine. The mine is located on the west side of Highway 38 about 63 km north of Kingston, near Tichborne (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 21).

31 C/15 Greyish green scapolite is rather abundant in white, coarse-grained crystalline limestone that outcrops along Highway 38 about 1.6 km north of the causeway of the narrows of Sharbot Lake (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 22).

31 C/16 Massive, granular, greenish to yellowish gray scapolite which fluoresces rose red under "short" ultraviolet rays occurs on the W. Fournier farm located 24 km from Perth along the Christie Lake road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 39).

31 C/16 Analysis of scapolite from Perth, Drummond Township, Lanark County yielded: SiO_2 46.30, Al_2O_3 26.20, FeO 0.60, CaO 12.88, MgO 3.63, K_2O 2.88, Na_2O 4.30, H_2O 2.80, total 99.59; S.G. 2.640-2.667 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 474).

31 C/16 Scapolite was noted in Bathurst Township, Lanark County, conc. IX, lot 20 (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog., p. 156).

31 C/16 Scapolite occurs in North Burgess Township, Lanark County, at the Baby Mine, conc. VIII, lot I, and also in conc. V, lot 13 (H.S. de Schmid, 1912: Can. Dept. Mines, Mines Br., 118, p. 296).

31 D/9 Scapolite occurs in Burleigh Township, Peterborough County, in conc. V, lot 12 (F.D. Adams and A.E. Barlow, 1910: Geol. Surv. Can., Mem. 6, p. 212).

31 D/10 Scapolite occurs with magnetite and calcite in a skarn zone at the Victoria Mine, lot 20, conc. I, Snowdon Township. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 334).

31 D/15 Scapolite was noted in the southeast part of Lutterworth Township at the Paxton Iron Mine (F.D. Adams and A.E. Barlow, 1910: Geol. Surv. Can., Mem. 6, pp. 211, 212).

31 D/16 Blue-grey granular and pegmatitic scapolite was found in Haliburton County, Glamorgan Township, along highway 500, 3.9 km east of Gooderham. Chemical analysis: SiO_2 57.89, Al_2O_3 21.62, TiO_2 0.01, Fe_2O_3 0.07, MgO 0.03, MnO 0.01, CaO 4.81, Na_2O 10.50, K_2O 1.16, H_2O^+ 0.44, H_2O^- 0.06, CO_2 1.11, Cl 2.96, SO_3 0.03, F 0.00, less O for Cl, F 0.67, total 100.03; S.G. 2.619. Me content 19.4 (D.M. Shaw, 1960: J. Petrol., 1, pp. 218-260).

31 D/16 Scapolite was noted in Glamorgan Township, Haliburton County, conc. V, lot 7, east of Maxwells crossing, south side of Burnt (Irondale?) River (F.D. Adams and A.E. Barlow, 1910: Geol. Surv. Can., Mem. 6, pp. 211, 212).

31 E/1 A yellow-white granular aggregate of scapolite occurs in Monmouth Township, Haliburton County, conc. XVI, lot 13, Chemical analysis: SiO_2 54.73, Al_2O_3 22.85, TiO_2 0.01, Fe_2O_3 0.08, MgO 0.03, MnO 0.00, CaO 8.29, Na_2O 8.55, K_2O 1.08, H_2O^+ 0.13, H_2O^- 0.00, CO_2 1.69, Cl 2.19, SO_3 0.39, F 0.00, less O for Cl, F 0.49, total 99.53; S.G. 2.660. Me content 33.5 (D.M. Shaw, 1960: J. Petrol., 1, pp. 218-260).

31 E/1 A pale yellow scapolite of gem quality was found at Drag Lake in Dudley Township, Haliburton County (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 77).

31 E/1 Scapolite was noted in Monmouth Township, lot 28, conc. XIV (F.D. Adams and A.E. Barlow, 1910: Geol. Surv. Can., Mem. 6, pp. 211, 212).

31 E/1 Scapolite has been identified at the X-ray Laboratory, Geological Survey of Canada in specimens from the following mining properties: Burma Shore Uranium Mines Limited, Cardiff Township, conc. XX, lot 7; Cardiff Uranium Mines Limited, Cardiff Township, concs. XVII, XVIII, and XIX, lots 1, 2 and 3; Centre Lake property (Bicroft Uranium Mines Limited), Cardiff Township, Haliburton County, conc. XI, lots 26 and 27; Croft property (Bicroft Uranium Mines Limited), Herschel and Faraday Townships, Haliburton and Hastings Counties at intersection of Cardiff Township; Halo Uranium Mines Limited, Cardiff Township, Haliburton County, conc. XVII, lots 4 and 5; Nu-Age Uranium Mines Limited, Cardiff Township, Haliburton County, conc. XXI, lot 8.

31 E/1 Chemical analysis of white, coarsely crystalline scapolite from calcareous gneiss, lot 32, concession XVII, Monmouth Township, by E. Martinec: SiO_2 54.84, CO_2 1.50, SO_3 0.05, Al_2O_3 22.81, Fe_2O_3 0.10, TiO_2 0.02, MgO 0.08, MnO 0.00, CaO 8.33, Na_2O 8.83, K_2O 1.06, H_2O^+ 0.26, Cl 2.48; total 100.46, less O for Cl 0.56, total 99.80 (C.O. Ingamells and J. Gittins, 1967: Can. Mineralogist, 9, p. 229).

31 E/2 The mineral collection at the Royal Ontario Museum includes scapolite from Eagle Lake quarries, lots 24 and 25, conc. IV, Guilford Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 334).

31 E/5 A specimen of scapolite from granite pegmatite on lot 24, conc. IV, Christie Township is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 336).

31 F/2 Scapolite occurs on lot 34, conc. VIII, Brudenell Township (B.J. Burley, E.B. Freeman, and D.M. Shaw, 1961: Can. Mineralogist, 6, p. 670).

31 F/4 Good crystals of scapolite have been found in Monteagle Township, Hastings County, conc. VI, lots 24 and 25 (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 98A).

31 F/4 The ore of the Monteagle nepheline-corundum-mica deposit, Hastings County, contains about 7 per cent scapolite. The prismatic cleavage of the scapolite distinguishes it from nepheline and andesine feldspar in the outcrops. The scapolite, yellow when freshly broken, turns light blue upon exposure to the sunlight for a few months (L. Moyd, P. Moyd, and H.L. Noblitt, 1962: Can. Inst. Mining Met., Bull., vol. 55, No. 604, p. 567).

31 F/5 Light green scapolite is associated with corundum at the Craigmont deposit in Raglan Township, lots 2-4, conc. XVIII, and at the Burgess pegmatite on lot 14, conc. XIV, Carlow Township (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 43, 46).

31 F/6 Scapolite was found in Sebastopol Township, Renfrew County, on Turner's Island in Lake Clear (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 65T).

31 F/6 Scapolite from Rockingham Mines Limited, Brudenell Township, Renfrew County, conc. X, lot 24, has been identified by X-ray diffraction (X-ray Laboratory, Geol. Surv. Can.).

31 F/6 A single gem-quality crystal was found at the 'Old Spain Mine' in Griffith Township, Renfrew County (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 77).

31 F/6 The following occurrences of scapolite have been reported: Sunset molybdenite deposit, lot 36,

conc. XIV, Brougham Township; Meany Mine, along the cottage road to Lake Clear 4 km from Highway 512 at a point 9.6 km from its junction with Highway 41; at a corundum occurrence on the Gutz farm about 800 m from Rosenthal; at a road-cut about 0.6 km from Brudenell on the road to Rockingham (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, pp. 18,33,40,49,51).

31 F/7 Grey scapolite is present at the Zenith molybdenite deposit on lot 28, conc. IV, Bagot Township, about 8 km south of Renfrew; and at the Hunt deposit on lot 9, conc. XI, Brougham Township (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 15, 16).

31 F/10 Scapolite was noted in Ross Township, Renfrew County, conc. I, lot 7: conc. VI, lot 13; and conc. IX, lot 7 (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog., pp. 5, 6, 8L).

31 F/11 Bronze yellow prismatic aggregates of scapolite, dark green pyroxene, pyrite and titanite occur in syenite pegmatite exposed in a roadcut on Highway 60, 9.5 km west of Douglas (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 30).

41 J/1 An erythrite-bearing scapolite vein cuts Nipissing diabase at the Richer occurrence on lot 7, conc. V, Harrow Township. Specimens are in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 336).

52 H/7 White scapolite was found in a recent fall of fresh trap on the main shore of Lake Nipigon, south of Gros Cap (T.L. Walker and A.L. Parsons, 1926: Univ. Toronto Stud., Geol. Ser., 22, p. 19).

Quebec

31 F/9 Scapolite is present at the Godwin mica mine located about 6.4 km north of Highway 8 via the Hammond road, about 4 km east of Quyon. It is also found in amphibolite at the Hilton iron mine 6.9 km south of Highway 8 from a point 12 km west of Quyon, and in pyroxenite at the Kirkham molybdenite deposit on the Clarendon 13 Line Road 12.4 km north of Shawville (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 89,91,93).

31 F/15 Chemical analysis of yellow-brown granular aggregate of scapolite from range V, lots 16 and 17, Huddersfield Township: SiO_2 52.10, Al_2O_3 23.79, TiO_2 0.02, Fe_2O_3 0.23, MgO 0.18, MnO tr., CaO 11.13, Na_2O 6.86, K_2O 0.87, H_2O^+ 0.07, H_2O^- 0.10, CO_2 2.14, Cl 1.85, SO_3 0.80, F 0.11, less O for Cl, F 0.46, total 99.79; S.G. 2.689; Me content 46.2 (D.M. Shaw, 1960: J. Petrol., 1, pp. 218-260).

31 F/15 Chemical analysis of white granular aggregate of scapolite from Huddersfield Township, lot 22, range V: SiO_2 51.83, Al_2O_3 24.29, TiO_2 0.03, Fe_2O_3 0.07, MgO 0.02, MnO tr., CaO 11.66, Na_2O 6.40, K_2O 1.16, H_2O^+ 0.22, H_2O^- 0.04, CO_2 2.28, Cl 1.66, SO_3 0.72, F 0.02, less O for Cl, F 0.38, total 100.02 (D.M. Shaw, 1960: J. Petrol., 1, pp. 218-260).

31 F/15 A dead white bladed aggregate of scapolite was found in Huddersfield Township, range IV, lot 26. Chemical analysis: SiO_2 47.17, Al_2O_3 26.29, TiO_2 0.03, Fe_2O_3 0.15, MgO 1.00, MnO 0.01, CaO 14.31, Na_2O 3.82, K_2O 1.01, H_2O^+ 0.93, H_2O^- 0.50, CO_2 2.66, Cl 0.56, SO_3 1.42, F 0.04, less O for Cl, F 0.14, total 99.76; S.G. 2.705; Me content 66.2 (D.M. Shaw, 1960: J. Petrol., 1, pp. 218-260).

31 F/10
31 F/15 A lilac coloured scapolite was found on Calumet Island Pontiac County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 65T).

31 F/15 Fairly large white prismatic crystals of scapolite, somewhat resembling feldspar, were found at the Yates Uranium Mine, Huddersfield Township, Pontiac County, range V, lots 19, 20 (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 40).

31 F/15 The rocks of lot 31, range VI, Grand Calumet Township, contain scapolite (B.J. Burley, E.B. Freeman, and D.M. Shaw, 1961: Can. Mineralogist, 6, p. 670).

31 F/16 Scapolite was found in Low Township, Gatineau County, range IX, lot 31 (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 65T).

31 F/16 White scapolite crystals are reported at a cordierite occurrence in Leslie Township about 5.6 km northwest of the village of Otter Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 95).

31 G/5 Grey to green scapolite occurs at the Fortin and Gravelle Mine, and at the Payne property, north of Aylmer (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 10).

31 G/10 A large yellow single-crystal of scapolite was collected at Grenville. Chemical analysis: SiO_2 45.91, Al_2O_3 28.19, TiO_2 0.07, Fe_2O_3 0.11, MgO 0.46, MnO 0.01, CaO 15.76, Na_2O 2.44, K_2O 2.21, H_2O^+ 1.12, H_2O^- 0.03, CO_2 2.86, Cl 0.05, SO_3 0.94, F 0.01, less O for Cl, F 0.02, total 100.75; S.G. 2.703; Me content 70.1 (D.M. Shaw, 1960: J. Petrol., 1, pp. 218-260).

31 G/10 Lemon-yellow to light green scapolite suitable for gem purposes occurs on the property of Lawrence McGill near Pointe-au-Chêne (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 78).

31 G/11 Scapolite was found in Ripon Township, Papineau County, range VIII, lot 13 (B.J. Harrington, 1877-78: Geol. Surv. Can., Rept. Prog., p. 32G).Chemical analysis by Adams of scapolite from Ripon Township: SiO_2 54.859, Al_2O_3 22.448, Fe_2O_3 0.486, CaO 9.092, MgO tr., K_2O 1.127, Na_2O 8.365, Cl 2.411, SO_3 0.796, H_2O^+ 0.141, H_2O^- 0.722, total 100.447; less O for Cl 0.59, total 99.857; S.G. 2.605-2.654 (F.D. Adams, 1879: Am. J. Sci., Ser. 3, vol. XVIII, pp. 315-320).

31 G/11 Scapolite occurs at the Emerald apatite mine on the T. Lauzon farm near Glen Almond. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 20).

31 G/12 Scapolite was found in Templeton Township, Papineau County, range XII, lots 14, 21 (B.J. Harrington, 1877-78: Geol. Surv. Can., Rept. Prog., p. 31G).

31 G/12 Scapolite collected at Portland West, Labelle County, range III, lot 14, is included in the National Mineral Collection.

31 G/12 Scapolite crystals, along with some well-formed pyroxene crystals and a few well-developed

pyrite crystals were found in Templeton Township, Papineau County, range VIII, lot 21. The crystals were remarkably well developed and enormous in size. The largest crystal weighed 34 kg (A.L. Parsons, 1930: Univ. Toronto Stud., Geol. Ser., 29, p. 27).

31 G/12 Glassy blue scapolite occurs at the King Edward Mine in the north part of Templeton Township, lot 8, west shore of Rheaume Lake. Exceptionally coarse and abundant fragments of scapolite were found in the Nellie and Blanche Mine, Hull Township, Gatineau County, range X, lot 10, 3.2 km southwest of Cantley Village (K.K. Landes, 1938: Am. Mineralogist, 23, p. 379).

31 G/12 Scapolite was found in Hull Township, Gatineau County, range XI, lot 10, Nellie and Blanche Mine; and at range XVI, lot 6, Horseshoe Mine (H.S. de Schmid, 1912: Can. Dept. Mines, Mines Br., 118, p. 296).

31 G/12 Abundant scapolite can be found in the contact zone between microclinic pegmatite and pyroxenite at the Dacey Mine in Hull Township, Gatineau County, range XV, lot 12A, 2.4 km southwest of Wilson Corners (K.K. Landes, 1938: Am. Mineralogist, 23, p. 379).

31 G/12 Scapolite was found in Templeton Township, Papineau County, range XII, lot 13 (H.S. de Schmid, 1912: Can. Dept. Mines, Mines Br., 118, p. 296).

31 G/12 Scapolite is fairly abundant in the St-Pierre-de-Wakefield area at the Breckin, Seybold, Gemmill and McGlashan Mines (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 27, 29, 31).

31 G/15 Chemical analyses by R.J.C. Fabry of scapolites from Harrington Township, Argenteuil County: (1) lot 3, range III, greenish grey, SiO_2 44.16, Al_2O_3 29.91, Fe_2O_3 1.21, MgO 0.40, CaO 18.89, Na_2O 2.17, K_2O 0.98, H_2O 1.31, CO_2 0.99, Cl tr., total 100.02; (2) lot 3, range III, lemon-yellow, SiO_2 42.88, Al_2O_3 29.58, Fe_2O_3 0.76, MgO 0.36, CaO 22.11, Na_2O 1.33, K_2O 0.36, H_2O 0.93, CO_2 1.62, Cl 1.04, total 100.97, less O for Cl 0.23, total 100.74; (3) north quarter of lot 18, range II, greenish yellow, SiO_2 44.20, Al_2O_3 28.87, Fe_2O_3 0.96, MgO 0.18, CaO 21.52, Na_2O 2.03, K_2O 0.73, H_2O 0.28, CO_2 nil, Cl 1.91, total 100.68, less O for Cl 0.43, total 100.25 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, pp. 389-391).

31 G/16 Scapolite occurs in pyroxenite on the farm of Albert Morrow located about 6.4 km from Lost River. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 71).

31 I/15 Grey translucent massive scapolite occurs in the marble at the Ste-Thècle marble quarry (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 85).

31 I/16 Scapolite occurs as euhedral crystals up to 5 cm long and also as a replacement of anorthite in Portneuf County, Montauban-les-Mines, Tetreault Mine (J.J. O'Neill and F.F. Osborne, 1938: Que. Dept. Mines, Prelim. Rept., 136, p. 17).

31 I/16 Scapolite was found in Montauban Township, Portneuf County, range I, lots 33-36, 37-41; range II, lots 38-41; and range I, lots 312-322 (J.R. Smith, 1956: Que. Dept. Mines, Geol. Rept., 65, p. 30).

31 J/11 Yellow scapolite occurs in crystalline limestone in Campbell Township, Labelle County, range I, lot 19, near Clement Station (E. Aubert de la Rue, 1948: Que. Dept. Mines, Geol. Rept., 23, p. 56).

31 J/12 Dark green bladed actinolite occurs with striated prismatic aggregates of colourless to light green scapolite in roadcuts on both sides of Highway 35 north of St-Aimé (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 55).

31 K/1 Scapolite was found at the Chaibee Mine, Wright Township, Gatineau County, range A, lot 6 (H.S. de Schmid, 1912: Can. Dept. Mines, Mines Br., 18, p. 296).

31 K/2 Colourless to grey scapolite occurs at a molybdenite deposit on a slope above the eastern end of Squaw Lake in Huddersfield Township about 7.2 km north-norhtwest of Otter Lake village (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 98).

Saskatchewan

73 P/6 Grey granular scapolite has been identified at the Anglo-Rouyn Mine on the east shore of a peninsula on the east side of Waden Bay at the north end of Lac La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5).

74 O/13 Green, yellow and red scapolite occurs in apatite-rich veins associated with hyalophane feldspar, tremolite, anthophyllite, garnet, and epidote in the Nisikkatch and Northwest Lakes region, 56 and 64 km northwest of Uranium City (D.D. Hogarth, 1957: Can. Mineralogist, 6, pp. 140-150).

SCHEELITE

$CaWO_4$

Scheelite, an important ore mineral of tungsten, occurs in a variety of geological environments including high and moderate temperature hydothermal veins, pegmatites, and contact metamorphic deposits. It is characterized by a bright bluish white fluorescence under short ultraviolet radiation.

British Columbia

82 F/3 Scheelite occurs with tungstite and wolframite at Sheep Creek in the Nelson mining division (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, pp. 37-39).

82 F/3 Coarse crystals of scheelite occur in a quartz mass with abundant sericite mica, some molybdenite and minor pyrite, about 90 cm above a flat-lying granite contact at the Dodger Tungsten Mine, near Salmo in the Nelson mining division (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 526).

82 F/3 Scheelite occurs with tungstite and wolframite at the Kootenay Belle Mine in the Nelson mining division (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, pp. 37-39).

82 F/3 A scheelite orebody occurs in skarn a few hundred m below ground with altered limestone in a trough that plunges gently southward, flanked on the east by a fine-grained granite stock (H.W. Little, 1950: Geol. Surv. Can., Paper 50-19, p. 41).

82 F/3 The following scheelite occurrences have been noted: Bunker Hill group on the east side of Limpid Creek at about 49°04'N, 117°23'W; Molly group on the south side of Lost Creek at about 49°05'N, 117°12'W; Tungsten King group, Ballanger's claims, and the Emerald, Feeney and Dodger deposits between Lost and Sheep Creeks at about 49°07'N, 117°13'W; Victory Tungsten on the west side of Bennet Creek at about 49°09'N, 117°08'W (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 100-114).

82 F/4 Occurrences of scheelite in the Rossland area are as follows: Santa Rosa group on the west side of Big Sheep Creek 1.6 km south of the main Cascade highway; Velvet Mine near the Cascade highway on the west side of Big Sheep Creek about 19.3 km west of Rossland; St. Elmo and Cliff claims less than 1.6 km northwest of Rossland; Blue Moon group 5.6 km north of Rossland (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 98).

82 F/5 Scheelite-bearing skarn rock is exposed in a rock cut on the Christina Lake-Kinnaird highway about 1.6 km northeast of the Rossland turnoff, and at several places northwest of the highway (49°16.7'N, 117°55'W) (P.E. Olson, 1970: B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 436).

82 F/6 Scheelite occurs with tungstite and wolframite at the Granite-Poorman Mines in the Nelson mining division (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, pp. 37-39).

82 F/6 Scheelite is reported with pyrite, chalcopyrite, sphalerite, tetrahedrite, galena, aikinite, gold and silver at the Golden Age (Euphrates) property at 49°23'N, 117°13'W, 12 km south-southeast of Nelson on each side of Highway 6 at elevations of 900 to 1200 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 65).

82 F/6 Several bands of scheelite-bearing skarn are exposed on the property of Arrow Tungsten Mines Limited on the south side of Stewart Creek about 4.8 km west of its junction with Salmo River (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 115).

82 F/8 The Cariboo showings at an elevation of 2000 m on the southwest side of the basin at the head of North Moyie Creek (49°22'N, 116°10'W) consist of iron carbonate and sericite schist mineralized with scheelite, galena and sphalerite (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 347).

82 F/9 Scheelite and stolzite are associated with sulphides in a quartz vein on a property known successively as Mascot, Wellington, Old Glory and Leader. The property is at an elevation of 1740 to 1800 m east of Angus Creek, which flows north into St. Mary River (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 120).

82 F/14 Scheelite was found at Meteor Mines, Slocan City mining division, Springer Creek (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, p. 39).

82 F/16 Scheelite and cassiterite have been found in small quartz veins and in float and soil samples on the crest and slopes of "Rusty Ridge" at the head of a north tributary of Skookumchuck Creek at about 49°57'N, 116°15'W (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 87).

82 G/11
82 G/12 Disseminated scheelite occurs in tremolitic dolomite at about 1500 m elevation at 49°44'N, 115°29'W, on East Wild Horse River 19 km northeast of Fort Steele (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 473).

82 K/7 A skarn zone containing scheelite occurs at an elevation of 2750 m between Farnham and Horsethief Creeks immediately east of Lake of the Hanging Glacier 40 km southwest of Invermere (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 73).

82 K/10 A scheelite-bearing skarn is reported at 50°40'N, 116°36'W, at 2400 m elevation north of Whirlpool Lake at the head of Forster Creek 40 km northwest of Invermere (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 75).

82 K/12 Scheelite was discovered in 1942 on two old properties about 4.8 km due west of Trout Lake village. The properties, known as the Lucky Bay group and Horseshoe claim had been worked for lead and silver in the 1900's (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 93).

82 M/13 Scheelite occurs in a skarn deposit at 1200 m elevation on Maxwell Creek at 51°50.5'N, 119°43'W, 4.8 km northwest of its confluence with the Raft River and 27.3 km west of Avola (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1972, p. 94).

82 N/4 Scheelite is common in the veins at the Columbia Lead and Zinc Mine (formerly Stannite Mines and Regal Silver). It occurs with galena, sphalerite, stannite, pyrite and some cassiterite. The mine is located on Clabon Creek about 6.4 km north of Albert Canyon (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

82 N/4 Skarn zones containing scheelite occur at 2100 m elevation at the head of Albert Creek at 51°02'N, 117°43'W, 12.8 km southeast of Albert Canyon and 32 km east of Revelstoke; and at 2440 m elevation on Albert Creek at 51°03' to 51° 09'N, 117°42' to 117°53'W, southeast of Albert Canyon 33.7 km east of Revelstoke (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 95).

92 I/7 Scheelite is associated with chalcopyrite, pyrrhotite and pyrite at the Last Chance claims on the northern slope of Swakum Mountain 20.9 km north of Nicola (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 80).

92 I/8 Scheelite occurs in quartz veins at Stump Lake, an expansion of Stump Lake Creek, northeast of Nicola, Kamloops district. The scheelite content of the veins is low but small pockets of plentiful amounts have been found (W.E. Cockfield, 1942: Geol. Surv. Can., unpublished file 21-C-18).

92 J/9
92 J/16 Skarn dykes in limestone carry scheelite, powellite and molybdenite on the Lubra claims at 1800 m elevation on Nosebag Mountain at 50°45.3'N, 122°22.3'W, 8 km northwest of Seton Portage (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1970, p. 225).

92 O/2 Scheelite occurs in an epithermal vein about 5 cm wide, at Tyaughton Creek valley, 22 km north of Minto City, Bridge River district. The nearly pure white scheelite exhibits a well

defined comb structure that results from pyramidal shaped crystals arranged normal to the walls of the vein fissure, and is associated with stibnite, quartz, and carbonate. A partial analysis yielded: WO_3 79.7, CaO 19.3, MoO_3 trace, total 99.0 (J.S. Stevenson, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 95).

93 A/14 Scheelite occurs in a narrow quartz vein that is exposed for a length of about 5 m in the Taylor scheelite prospect, Cariboo district, 48 km southwest from Wells, southwest rim of Snowshoe Plateau. It is associated with stolzite, tungstite, and cube pyrite. The resin-coloured scheelite is massive to crystalline, and well-shaped tetragonal crystals (6 to 18 mm in diameter) are common. Much of it has oxidized to yellow tungstite. The scheelite fluorescences brilliantly and is seen either to be laced by a network of nonfluorescent tungstite veinlets, or to be more completely replaced by large irregular patches of tungstite (J.S. Stevenson, 1941: Univ. Toronto Stud., Geol. Ser., 46, p. 137).

93 A/14 A chemical analysis of scheelite from Nugget Gulch, Cariboo district, yielded: WO_3 76.79, MoO_3 1.06, CaO 18.90, total 96.75 (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, p. 42).

93 A/14 Scheelite is present in quartz veins with small amounts of tetrahedrite, galena and sphalerite at the Rand claims on Penny Creek on the southwesterly slope of Roundtop Mountain near the headwaters of Cunningham Creek south of Barkerville (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 68).

93 A/14
93 H/3 Scheelite has been found in placer deposits in Antler Creek at Nugget Gulch; and at Chinaman Creek claims extending from the junction of Wolf and Antler creeks south and parallel to Antler Creek towards Sawmill Flat, Cariboo mining division (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, p. 42).

93 E/6 A stockwork of scheelite-bearing quartz stringers occurs on the property of Deer Horn Mines Limited on the south slope of Lindquist Mountain at the head of Whitesail Lake. The scheelite deposit is to the west of and separate from gold-bearing veins on the same property (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 59).

93 H/4 Analysis of a scheelite sample from Hardscrabble Creek, Cariboo mining division (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 348A).

93 H/4 Analysis of a scheelite sample from Hardscrabble Creek in the Cariboo mining division: WO_3 73.68, MoO_3 0.66, CaO 20.00, total 94.34 (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, p. 41).

93 H/4 Several tons of scheelite concentrate were produced in the 1930's from a property situated on Hardscrabble Creek about 0.8 km above its junction with Willow River. The shaft was about 8 km from Wells (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 62).

93 L/14 Scheelite and powellite are reported with molybdenite, wolframite and chalcopyrite in quartz vein sheetings and stockworks cutting volcanic rocks in Glacier Gulch at 900 to 1200 m elevation on the east side of Hudson Bay Mountain 8 km northwest of Smithers (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 419).

93 M/4 A scheelite deposit occurring as a shear zone in diorite is located at the Red Rose Mine near Hazelton, 285 km northeast of Prince Rupert. The lenticular form, coarse to pegmatitic texture, and mineralogy of the scheelite vein imply formation at high pressure and temperature. All workings are on one main zone which is mineralized with hornblende, quartz, biotite, pyrite, chalcopyrite, pyrrhotite, arsenopyrite, wolframite, and ferberite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 42) (J.S. Stevenson, 1947: Am. Mineralogist, 32, p. 209).

93 M/4 Scheelite occurs with uraninite, cobaltite, glaucodot and erythrite in veins at the Rocher Déboulé Mine on Rocher Déboulé Mountain at the head of Juniper Creek about 12.8 km northeast of Skeena Crossing. Variable amounts of scheelite and wolframite are present in quartz veins and sheared granodiorite at the Black Prince and Blue Lake properties on the east slope of Rocher Déboulé Mountain; molybdenite, chalcopyrite, tetrahedrite and uraninite are also reported. Individual crystals, veinlets and bands of scheelite are present at the Red Rose Mine on the north side of Balsam Creek 12.8 km east of Skeena Crossing railway station (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 46-58).

93 N/1 A deposit of disseminated scheelite, powellite, molybdenite and chalcopyrite occurs at a fracture zone at the contact of a granite stock and silicified andesite, 14 km south of the east end of Chuchi Lake, Cassiar and Coast districts (J.E. Armstrong, 1949: Geol. Surv. Can., Mem. 252, p. 134).

93 N/9 Quartz stringers carrying scheelite are present on the BILLY and GLO claims at 750 m elevation near Manson Creek at 55°40'N, 124°29'W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 182).

103 P/5 Scheelite-bearing quartz veins have been explored on the Esperanza claims on the west side of Kitsault River valley about 1.6 km north of Alice Arm (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17. p. 42).

103 P/13
104 A/4 Several showings of scheelite have been reported in the Portland Canal area. Little Pat, Badland and Hogback claims are on the northeast side of Bitter Creek Valley east and southeast of Bitter Creek bridge on the Bear River road 14.4 km north of Stewart. Louise and Dot claims are on the steep lower slopes of the west wall of the Bear River valley 7.2 km north of Stewart. The Molly B group of 10 claims are on the east bank of Bear River opposite Stewart on the Skamakoonst Indian Reserve. The Ranier claim is on a mountain side about 3.2 km southeast of Stewart at an elevation of 520 m above Portland Canal (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 40-42).

104 I/9 Scheelite occurs in limestone skarn at 58°40'N, 128°06' to 128°14'W, on the north side of Turnagain River west of the junction of Cassiar River at 1800 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 48).

104 O/9 The main showing at the Blue Light claims is a scheelite-rich skarn. The claims are at 59°39'N, 130°28'W (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 80).

104 P/3 Galena, sphalerite, chalcopyrite, scheelite and hydrozincite occur in a shear zone in limestone

at the McDame Belle property, on McDame Creek about 1.6 km east of Centerville (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 114).

104 P/4 Quartz veins in prophyritic granite north of Cassiar contain scheelite, molybdenite and bismuthinite (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 109).

Manitoba

52 E/11 Scheelite deposits are associated with shear zones and minor folds in pillow lavas near their contact with pink porphyritic granodiorite, 10 km north of Barren Lake in the Falcon Lake area (G.P. Springer, 1952: Man. Dept. Mines, Mines Br., Publ., 50-6, p. 17).
A belt of schist containing scheelite and molybdenite deposits is located northwest of Shoal Lake near the Ontario boundary in the Falcon Lake district. Epidote and garnet are associated with the scheelite deposits (J.S. Delury, 1918: Can. Mining J., vol. 39, pp. 186-188).

63 K/16 Quartz veins containing seams and patches of scheelite occur on the property of Northern Tungsten Limited on the west shore of Snow Lake (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 152).

New Brunswick

21 G/7 Scheelite occurs with tin mineralization at Mount Pleasant in Charlotte County (A.A. Ruitenberg, 1963: M.Sc. thesis, Univ. of New Brunswick).

21 P/12 Scheelite occurs in a contact zone on the Sturgeon River property at Nicholas Denys, in Gloucester County (M. Tauchid, 1964: Geol. Surv. Can., Paper 64-31).

Newfoundland

2 E/8 A large quartz vein containing scheelite and tungstite is located a short distance inland from Charles Cove at a point 5.6 km north of the wharf at Victoria Cove on the west side of Gander Bay (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 202).

Northwest Territories

85 F/11 A skarn-type replacement deposit of scheelite ore occurs on the Flat River property of Canadian Tungsten Mining Corporation Limited (--, 1960: Can. Mining J., vol. 81, No. 12, p. 122).

85 H/11 Scheelite and ferberite have been mined from deposits on Outpost Islands, Great Slave Lake. (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 143).

85 I/7 Scheelite occurs at Gilmour Lake (62°29'N, 112°55'W) chiefly in quartz veins which contain large amounts of calcite and minor amounts of zoisite and grossularite. The veins which are a few cm to several m wide follow bedding planes in greywacke and arkose sediments (S.W. Walker, 1942: Can. Mining J., vol. 63, March, pp. 145-149).

85 I/8 The C.O.D. group of claims was staked following the discovery of scheelite-bearing quartz veins about 2.4 km south of Francois Lake (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 141).

85 I/11 About 150 quartz veins containing scheelite have been found in a zone 0.8 to 1.6 km wide and 9.6 km long that extends north from the south end of Peninsula Lake along the east side of Tibbit Lake and Cameron River. A large number of occurrences were also found along a belt of gossans extending southeasterly 11 km from the Ruth group on Victory Lake. (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 126, 132).

85 I/12 Scheelite occurs on an island and on the northeast and northwest shores of a small lake 400 m north of the east end of Prelude Lake (H.W. Little, 1959; Geol. Surv. Can., Econ. Geol. Ser. 17, p. 125-129).

85 I/14 Two occurrences of scheelite are reported at Dome Lake about halfway between Tumpline Lake and Gordon Lake. One is near the inlet to the lake and the other is near the south end of the S-shaped lake about 1.6 km north of the inlet of Dome Lake (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 131).

85 J/8 The vein systems of the Con, Rycon and Negus Mines on the west side of Yellowknife Bay south of Yellowknife contain some scheelite (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 121).

85 P/3 The Storm group of claims and the property of Goodrock Gold Mines Limited are scheelite prospects on the east side of Gordon Lake (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 130).

95 E/13 At the M.B. prospect, situated 29 km southeast of Canada Tungsten Mine, scheelite is finely disseminated in pyroxene-garnet-vesuvianite skarn (S.L. Blusson, 1968: Geol. Surv. Can., Paper 67-22, p. 35).

105 H/16 The Canada Tungsten ore deposit, one of the highest grade tungsten orebodies in the world, is exposed on a cirque on the southwest side of the Flat River valley at 61°58'N, 128°15'W. The deposit consists of pyroxene-garnet-calcite skarn partly replaced by scheelite, pyrrhotite, and chalcopyrite, and cut by scheelite-bearing quartz veins. The Baker prospect, 4.8 km southeast of the Canada Tungsten Mine has a more varied mineralogy which includes major vesuvianite and accessory fluorite (S.L. Blusson, 1968: Geol. Surv. Can., Paper 67-22, p. 28-34).

Nova Scotia

11 D/13
11 D/15 Quartz veins containing abundant scheelite outcrop near Moose River Gold Mines, Waverley, Halifax County (E.R. Faribault, 1911: Geol. Surv. Can., Sum. Rept., p. 334).

11 D/15 The National Mineral Collection includes a specimen of scheelite found at the Touquoy Mine, 4.8 km east of McCallum's, Moose River, Halifax County.

11 D/15 Scheelite was found near Stillwater Brook which runs into the Fish River, Halifax County (T.L. Walker, 1909: Can. Dept. Mines, Br., Rept. 25, p. 25).

11 D/15 A deposit on the west side of Lake Charlotte was worked for scheelite in the 1930's and since 1963 has been mined for gold by Lake Charlotte Mines Limited. At the Moose River Tungsten Mine, located 3.2 km by road west of Moose River

Mines village, scheelite was found as pale to orange-yellow grains and masses and less commonly as crystals about 12 mm across (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 8, 10).

21 A/2
21 A/7 Scheelite was found near Fifteenmile Brook in Queens County (E.R. Faribault, 1911: Geol. Surv. Can., Sum. Rept., p. 334).

21 A/7 A quartz vein carrying scheelite, arsenopyrite and pyrite intersects the main auriferous vein at the Balboa or Old American Mine at Molega, Queens County (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept. VII, P. 14R).

21 A/7 Chemical analysis of scheelite from Molega, Queens County, by Johnston: WO_3 79.01, CO2 0.71, CaO 19.8, insol. 0.11, total 99.63; S.G. 6.002 (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 9R).

21 A/7 Scheelite was found at Huey Lake, near Baker settlement, in Lunenburg County (E.R. Faribault, 1911: Geol. Surv. Can., Sum. Rept., p. 339).

21 A/8 Pale buff coloured scheelite occurs as small masses in white quartz at the Indian Path Mine. The mine is located about 6.4 km south from highway 3 along highway 32 (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 85).

21 A/9
21 A/16 Scheelite occurs with cassiterite, chalcopyrite and sphalerite in quartz porphyry near Wallaback Stream, New Ross, Lunenburg County (E.R. Faribault, 1908: Geol. Surv. CAn., Sum. Rept., p. 154).

Ontario

32 D/4 Scheelite has been reported as a minor constituent of orebodies in the Kirkland Lake-Larder Lake camps at the following mines: Bidgood Kirkland, Morris Kirkland, Bulldog, Upper Canada, Omega, Kerr-Addison and Chesterville Larder Lake. (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 174-176).

41 I/4 A specimen of scheelite associated with vesuvianite from Leonard Lake on lot 8, conc. III, Foster Township, is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 338).

41 I/6 Small grains of scheelite, sometimes translucent, having a vitreous lustre are found at the Victoria Mine, Denison Township, Sudbury district; concs. II, III, IV, lot 8 (T.L. Walker, 1908: J. Can. Mining Inst., XI, p. 370). Analysis of scheelite from the Victoria Mine, Sudbury district yielded: WO_3 79.36, CaO 19.96, total 99.32 (T.L. Walker, 1909: Can. Dept. Mines, Mines Br., Rept. 25, p. 34).

41 N/2 The mineral collection at the Royal Ontario Museum includes a specimen of scheelite from the Tribag Mine in Nicolet Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 337).

41 N/14 Scheelite is reported to occur with molybdenite and powellite in a strong shear zone in Township 32, Range 23, near Big River 2.4 km north of the shore of Lake Superior 14.4 km west of Michipicoten (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 169).

42 A/6 Reddish brown scheelite occurs with ore at the Hollinger and Dome mines, Porcupine area. It is found in small masses with quartz as a very early constituent; generally fractured with quartz or calcite veinlets, and associated with cassiterite, topaz, and wolframite (A.D. Burrows, 1924: Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. II, p. 54).

42 A/6 Scheelite has been reported in gold-bearing quartz-carbonate veins at the following mines in the Timmins area: McIntyre, Hollinger, Paymaster, Preston, Dome, DeSantis and Kenilworth (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 133-150).

42 E/10 Scheelite occurs in quartz veins at Little Long Lac Mine, Errington Township. Scheelite fills fractures in earlier quartz veins (second generation) at Hard Rock and McLeod-Cockshutt mines, Ashmore Township. The scheelite itself is fractured and cemented by tourmaline, a mineral introduced during the third stage in the mineralization sequence (H.C. Horwood and E.G. Pye, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. V, p. 44).
Scheelite occurs as small bunches and segments in quartz veinlets at Little Long Lac and Tomhill mines, Little Long Lac area (H.S. Armstrong, 1944: Am. Mineralogist, 29, p. 314).

42 E/12 A specimen of scheelite collected near Jackpine station, McComber Township, is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 338).

42 M/12 Disseminated scheelite is found with gold and sulphides in a shear zone on the property of Dome Mines Limited situated on the north side of Reserve Creek on the east boundary of the Indian Reserve (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 163).

52 F/16 Scheelite is reported from the property of Newlund Mines Limited, with native gold, altaite, pyrite, chalcopyrite, sphalerite, galena, ilmenite and tourmaline. Access to the property is by road, 3.2 km west from Highway 72 at a point 28 km north of Dinorwic (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 38).

52 H/9 Scheelite has been identified in quartz veins on the property of Leitch Gold Mines Limited in Eva and Summers Township and on the Sand River property in Eva Township south of Standingstone River near Lake Nipigon (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 164).

52 N/1 Quartz veins containing gold and scheelite are exposed on the property of Uchi Gold Mines west of Uchi Lake in Earngey Township (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 161).

52 N/4 Scheelite is reported in the orebodies at the following mines in the Red Lake gold camp: Madsen Red Lake, Scheelam, Hasaga, Howey, Gold Eagle, McKenzie Red Lake, McMarmac Red Lake, Durham Red Lake, Rugged Red Lake, May-Spiers, Cole and Humblin (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 159-161).

52 N/8 Gold-bearing quartz veins at the Argosy Mine at the east end of Casummit Lake contain some scheelite (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 161).

52 O/8 Scheelite is associated with the gold ores at the Central Patricia mine east of Pickle Lake and south of Crow River, and at the Pickle Crow Mine which adjoins the Central Patricia Mine on the northeast (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 162).

52 P/9 A quartz vein carrying coarse scheelite is reported on a high hill between Rich Creek and Opikeigan Lake on the claims of Rich Lake Patricia Syndicate (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 162).

Quebec

21 E/15 Scheelite is found in quartz veins cutting Cambrian slates in Marlow Township, Beauce County, range VII, lot 1 (A.R.C. Selwyn, 1890: Geol. Surv. Can., Ann. Rept., V, p. 74A).

21 E/15 Chemical analysis of scheelite from Marlow Township, Beauce County, range VII, lot 1: WO_3 79.90, CaO 19.37, FeO 0.70, insol. 0.27, total 100.26; S.G. 6.059 (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., Pt. II, p. 21R).

22 A/13 Scheelite is erratically distributed and abundant in parts of the orebodies of Gaspé Copper Mines Limited at the headwaters of York River near Murdochville (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 190).

31 M/6 A shear zone containing quartz veinlets and disseminated pyrite and scheelite has been exposed on lot 29, range IV, Gaboury Township about 3.2 km northwest of Timber Lake. A scheelite-bearing pegmatite is reported on lot 20, range X, Laverlochère Township (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 188-189).

32 C/3
32 C/4 Scheelite was found in a quartz vein associated with pyrite, chalcopyrite, and tellurbismuth at Buffadison Gold Mines, Louvicourt Township, Abitibi County (J. Claveau, W.N. Ingham, and W.R. Robinson, 1957: Que. Dept. Mines, Prelim. Rept., 256, p. 44).

32 C/4 Minor amounts of scheelite are present in most of the gold deposits in the Bourlamaque area. It has been reported at the following: Siscoe, Sullivan and Shawkey near DeMontigny Lake in Dubuisson Township; Lamaque and Sigma in the western part of Bourlamaque Township; and Beaucourt, Cournor, Pascalis and Perron in Louvicourt and Pascalis Townships (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 184-186).

32 C/5 Quartz veins at the Lacorne Mine, which have been worked for their molybdenum and bismuth content, also contain scheelite. The mine is in the southwest corner of Lacorne Township 35.3 km northwest of Val d'Or (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 181).

32 D/1 Scheelite has been identified in the orebodies at the following gold mines in Cadillac and Fournière Townships: O'Brien, Consolidated Central Cadillac, Pandora Cadillac, Canadian Malartic and East Malartic (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 182-183).

32 D/2
32 D/3 The following scheelite occurrences have been reported in Temiscamingue County: McWatters gold mine in the east-central part of Rouyn Township 9.6 km east of Rouyn; O'Neill-Thompson Mine on the west side of Joannès Township west of Kinojevis River; Upstream Gold Mines property in Dasserat Township on a narrow neck of land separating the west arm of Desvaux Lake and the southeast arm of Dasserat Lake; Halliwell Gold Mines in the central part of Beauchastel Township (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 187).

32 D/9 Two occurrences of scheelite have been reported in Dalquier Township: at the Kayrand Mining and Development Company property 11.2 km north of Ames; and at the Colonial property immediately west of the Kayrand property on lots 10 and 11, ranges VI and VII (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 179-181).

32 D/14 Quartz veins containing sparse gold and scheelite have been explored on the property of Manley Quebec Gold Mines in LaReine Township about 6.4 km southwest of Dupuy village on lots 28 to 30, range IV, and lots 30 and 31, range V (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 179).

Saskatchewan

63 K/12 Scheelite-bearing quartz veins lie along and near the contact of granite and greenstone at the south end of Phantom Lake (L.S. Beck, 1959: Can. Dept. Mines, Mines Br., Rept. 36).

Yukon

105 A/15 Scheelite-bearing skarn occurs at the Bailey claims at 60°47'N, 128°50'W, about 12.8 km south-southwest of Mount Murray and 80 km north of Watson Lake. The claims are 22.5 km east of the Campbell Highway and 19.3 km south of the Nahanni Range Road (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 151).

105 B/1 Scheelite occurs with wolframite, cassiterite, galena and fluorite at the Fiddler (Yukon Tungsten) property at 60°08'N 130°26'W, located on a ridge north of Boulder Creek at an elevation of 1560 m. The property may be reached by a secondary road about 9 km long that leaves the Alaska Highway just west of the Boulder Creek bridge at km 1129 (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 80).

105 D/11 Small amounts of scheelite occur at the Anaconda, Copper King and Carlisle copper deposits, about 3.2 km northwest of Whitehorse. Larger amounts are found at the Scheelite group and Pueblo Tungsten deposits located about 4.8 km west of Whitehorse and 2.1 to 3.2 km southwest of the Alaska Highway (E.D. Kindle, 1964: Geol. Surv. Can., Paper 63-41, p. 14-27).

105 H/16 A deposit of scheelite with chalcopyrite in pyrrhotite-bearing skarn is located at lat. 61°50'N, long. 128°03'W (R. Skinner, 1961: Geol. Surv. Can., Paper 61-23, p. 46).

105 H/16 Scheelite is the ore mineral at the Canada Tungsten Mine at 61°57'N, 128°15'W, in the Logan Mountains at 1680 m elevation overlooking the Flat River. Associated minerals in the skarn are: pyroxene, garnet, actinolite, epidote, axinite, sphene, tourmaline, antigorite, cubanite, chalcopyrite, pyrrhotite, quartz and calcite (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 22).

105 I/7 A scheelite-bearing skarn zone about 30 m wide is located in the Nahanni map-area, District of Mackenzie (R. Skinner, 1961: Geol. Surv. Can., Paper 61-23, p. 47).

105 J/5 Chalcopyrite and scheelite are disseminated in pyrrhotite-bearing skarn zones on the south shore of Dragon Lake (R. Skinner, 1961: Geol. Surv. Can., Paper 61-23, p. 43).

105 M/11 Scheelite is found in the gold washings of Highet Creek, Duncan Creek mining division (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 340A).

105 M/12
105 M/13 Scheelite is found in the gold washings at Haggart Creek, Minto Creek, Mayo River and Stewart River, Duncan Creek mining division (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 340A).

105 O/8 Skarn zones in impure limestone contain scheelite and form large reserves of low-grade tungsten ore at 63°15'N, 130°05'W, and 63°17'N, 130°07'W, about 6.4 km and 11.2 km northwest of MacMillan pass on the Yukon-Northwest Territories border (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 20-21).

106 D/3
106 D/4 Quartz veins containing some scheelite grains are associated with a granitic stock in the northwestern part of the Erin group claims at 64°02'N, 135°35'W, north and west of the south McQuesten River and east of Lynx Creek, 19 km northwest of Elsa (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. I, Dept. Indian Affairs and Northern Development, p. 16).

106 D/4 Scheelite occurs in important amounts in the stream gravels along Dublin Gulch and some of its tributaries, and also in lode deposits (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 17).

115 F/9
115 F/16
115 G/12
115 G/13 Crystals of scheelite occur with garnet and other contact silicate minerals in places where granitic intrustions are in contact with limestone, in the northwest Shakwak Valley directly north of the Alaska Highway between Kluane and Donjek rivers (H.S. Bostock, 1952: Geol. Surv. Can., Mem. 267, p. 42).

115 J/14 The Toni Tiger claim group lies in the Dawson Range on the crest of a northeast trending ridge at the headwaters of the west fork of Coffee Creek (62°49'N, 139°28'W). Scheelite, molybdenite and chalcopyrite occur in quarz veins, in small streaks and blebs and as disseminations in a skarn zone in metasediments within the Klotassin batholith (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 40).

115 P Scheelite is found in the gold washings of the McQuesten River, Duncan Creek mining division (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, p. 340A).

SCHOEPITE

near $4UO_3.9H_2O$

Northwest Territories

86 D
86 E Schoepite was observed as a yellow crust on a specimen of massive uraninite from the Hottah Lake district (C. Frondel, 1956: Am. Mineralogist, 41, p. 556).

schorlomite

(see ANDRADITE)

SCOLECITE

$CaAl_2Si_3O_{10}.3H_2O$

New Brunswick

21 B/10
21 B/15 Scolecite occurs with heulandite, laumontite, analcime, natrolite, epistilbite, thomsonite and stilbite as crystal aggregates and radiating fibres in cavities and seams in basalt on Grand Manan Island. The zeolite-filled amygdules are largest and most numerous along the coastline known as Seven Days Work (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 10).

Nova Scotia

21 A/12 Scolecite is found below high tide level in the form of cream-white radiating masses several cm in diameter. Analysis of a sample from the east side of Digby Gut, Annapolis County, yielded: SiO_2 45. 78, Al_2O_3 26.23, Fe_2O_3 0.07, CaO 13.66, Na_2O 0.70, K_2O 0.11, H_2O 13.44, total 99.99; S.G. 2.252 (T.L. Walker, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 67).

21 B/8 White radiating scolecite is common in small cavities in the basalt at East Sandy Cove (St. Mary's Bay). Access to St. Mary's Bay wharf is by a road 1 km long leading east from highway 17 opposite the turn-off to the Champlain camp. Analcime, stilbite, chalcedony and jasper are also present (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 75).

21 H/3 Scolecite is one of several zeolites, laumontite being the most common, that occur in the cliffs at Margaretsville, Annapolis County (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 71).

21 H/7
21 H/8 Scolecite has been noted at Cape D'Or and Two Islands, Cumberland County (E. Gilpin, 1881: Nova Scotia, Inst. Nat. Sci., vol. V, p. 293).

Quebec

21 L/3 Scolecite was found at Black Lake, Coleraine and Ireland townships, Megantic County (A.R.C. Selwyn, 1890: Geol. Surv. Can., Ann. Rept., V, p. 68A).

21 L/3 Scolecite occurs as crystals with diopside at the Jacob Asbestos Mine, Thetford, Megantic County (E. Poitevin, 1916: National Mineral Collection).

SCORODITE

$FeAsO_4.2H_2O$

British Columbia

92 F/14 Scorodite has been identified as a greenish to greyish white crust on native arsenic from the Mount Washington copper mine about 24 km northwest of Courtenay on the northeast slope and near the summit of Mount Washington (X-ray Laboratory, Geol. Surv. Can.).

New Brunswick

21 G/7 Scorodite occurs as an oxidation product in tin ore at Mount Pleasant (K.F.G. Hosking, 1963: Precambrian, vol. 36, No. 4, p. 20).

21 P/5 Scorodite is reported to occur in the gossan at the Brunswick No. 6 Mine south of Bathurst (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

Newfoundland

2 E/10 Scorodite and realgar occur in pockets in calcite at the Stewart Mine. The mine is located in a clearing on the east side of the opening of Little Harbour, a small inlet on the east side of Moreton's Harbour (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 100).

Ontario

31 E/1 Scorodite has been identified in a specimen from the property of Nu-Age Uranium Mines Limited, Cardiff Township, Haliburton County, conc. XXI, lot 8 (X-ray Laboratory, Geol. Surv. Can.).

31 F/4 A deep green scorodite is found associated with quartz, arsenopyrite, and realgar, 11 km west of L'Amable Station on the Central Ontario Railway, conc. IX, Faraday Township, Hastings County (F.D. Adams and H.E. Barlow, 1910: Geol. Surv. Can., Mem. 6, p. 205).

31 M/5 Scorodite occurs in very minute crystals associated with erythrite at the Nipissing Mine (vein 49), Cobalt area, Timiskaming district. Chemical analysis of scorodite gave: As_2O_5 41.09, FeO 21.55, NiO 8.87, CaO 4.57, H_2O by diff. 23.92, total 100.00 (R.P.D. Graham, 1913: Trans. Roy. Soc. Can., vol. VII, Ser. 4, p. 7).

31 M/5 Earthy incrustations of scorodite occur on oxidized smaltite at the Timiskaming and Hudson Bay mines in the Cobalt area. Chemical analysis of a yellowish pink sample which contained a very large amount of ferric iron: Fe_2O_3 8.73, CaO 21.43, NiO 3.95, As_2O_5 38.45, H_2O 24.22, CuO tr., As_2O_3 tr., insol. 2.90, S tr., total 99.68 (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol. 25, Pt. I, p. 240).

42 B/1 The secondary mineral scorodite forms green to brown coatings on ore minerals at an antimony-arsenic deposit explored by Card Lake Copper Mines Limited in Sewell Township at about 48°12'N, 82°00.5'W. The occurrence is 6.7 km by road south of Highway 101 from a junction 19.3 km west of the Little Star Lake road (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 154).

Yukon

105 D/2 Scorodite is common at the Arctic Caribou Mine which was worked for gold and silver. The mine is at an elevation of 1710 m on the west side of Sugarloaf Hill, a peak on the north side of Montana Mountain (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 44).

105 M/14 Scorodite has been identified by X-ray diffraction pattern (X-ray Laboratory, Geol. Surv. Can.) in specimens from the Silver Basin and Comstock properties and the Cream vein in the Mayo mining district, Keno, Sourdough and Galena Hill areas. The scorodite occurs as earthy greyish green coatings and crusts in the oxidized parts of vein faults (R.W. Boyle, 1956; Geol. Surv. Can., Paper 55-30) (R.W. Boyle, 1957: Geol. Surv. Can., Paper 57-1).

106 D/4 Scorodite is found coating a quartz ledge, between the heads of two small streams known as Twenty Pup and Forty Pup, which flow into Dublin Gulch, a tributary of Haggart Creek, Duncan Creek mining division (R. Bell, 1904: Geol. Surv. Can., Ann. Rept., XVI, pp. 38, 39A).

115 I/3 Scorodite is a constituent of the vein material at Mount Nansen Mines Limited (62°03'30"N, 137°10'30"W). Often sufficient scorodite is present to colour the vein material pale green (L.H. Green, 1965: Geol. Surv. Can., Paper 65-19, p. 33).

selenite

(see GYPSUM)

SELENIUM

Se

Ontario

41 N/2 Selenium was identified by X-ray powder pattern in a sample from Consolidated Ranwick Uranium Mines Limited, Sault Ste. Marie district (E.W. Nuffield and D.H. Gorman, 1960: private communication).

SEMSEYITE

$9PbS.4Sb_2S_3$

Northwest Territories

85 J/8 Semseyite is one of a suite of sulphosalt minerals that is widely distributed in highly mineralized parts of shear zones in the Con, Negus-Rycon, Giant-Campbell and Crestaurum systems in the Yellowknife camp (R.W. Boyle, 1961: Geol. Surv. Can., Memoir 310, p. 55).

Ontario

31 C/6 Semseyite is a fairly abundant constituent of the suite of sulphosalt minerals discovered in a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed Taylor of Madoc (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 212).

SENARMONTITE

Sb_2O_3

Senarmontite is a secondary mineral formed by the oxidation of antimony-bearing minerals. It is dimorphous with valentinite.

Ontario

52 N/4 Transparent, colourless to white, octahedral crystals of senarmontite, up to 1 millimetre in size, were found together with kermesite on quartz and on partly leached stibnite at the Cochenour Willans Mine, Red Lake area. The senarmontite was identified by chemical tests and X-ray diffraction (M.H. Frohberg, 1960: private communication).

Quebec

21 E/12
21 E/13 Senarmontite occurs with native antimony, stibnite, valentinite and kermesite in South Ham Township, Wolfe County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept. IV, p. 57T).

Yukon

105 M/14 Coatings of earthy senarmontite have been identified on specimens of jamesonite from the Galena Hill-Keno Hill area (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 91).

106 D/4 Senarmontite was identified by X-ray diffraction pattern in a mineral concentrate from a gold placer deposit from Dublin Gulch, Mayo mining district (X-ray Laboratory, Geol. Surv. Can.).

SEPIOLITE

$Mg_4Si_6O_{15}(OH)_2.6H_2O$

Ontario

31 D/16 Pockets of sepiolite are present in massive diopside-bearing calcite at the north showing of Canadian All-Metals Explorations Limited near Tory Hill (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 256).

31 E/1 Sepiolite (meerschaum), an alteration product of serpentine and magnesite has been found as silky matted fibres forming crusts on crystalline limestone at the Cardiff Uranium Mines property near Wilberforce. Specimens were collected from mine dumps adjacent to the shaft in the South zone (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

Quebec

31 H/11 Sepiolite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

SERANDITE

$Mn_2NaSi_3O_8(OH)$

Quebec

31 H/11 Serandite, the manganese analogue of pectolite, commonly forms the core of veins cutting nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

SERENDIBITE

$Ca_4(Mg,Fe,Al)_6(Al,Fe)_9(Si,Al)_6B_3O_{40}$

Northwest Territories

46 K/14 A dark blue mineral collected by J.R. Henderson from a skarn zone in marble on southern Melville Peninsula at 66°57'50"N, 85°25'26"W, has been identified as serendibite. It is associated with black tourmaline, diopside and calcite (X-ray Laboratory, Geol. Surv. Can., 1975).

sericite

(see MUSCOVITE)

SERPENTINE

$H_4Mg_3Si_2O_9$

The structures of the serpentine minerals consist of interlayered tetrahedral Si_2O_5 sheets and octahedral brucite sheets. Variations of the arrangement of these sheets give rise to several polymorphs, notably: clino-, ortho- and para-chrysotile; antigorite; lizardite; and 6-layer ortho-serpentine. Most fibrous serpentine (asbestos) is clino-chrysotile. Platy serpentine is commonly antigorite, and massive serpentine is often lizardite.

British Columbia

92 H Serpentine deposits occur along or near fracture or shear zones in the greenstone underlying the Ladner series; Cache Creek Group; Coquihalla River, Yale district. The pure serpentine has a beautifully bladed structure and blue birefringence. It is intersected by talc and calcite veinlets. A few grains of magnetite are present. The texture is minutely fibrous and bladed and seems to have resulted from gradual but complete replacement of both the feldspathic and the mafic minerals of the greenstone. Analysis by M.F. Connor: SiO_2 38.84, Al_2O_3 0.10, Fe_2O_3 6.49, FeO 3.60, MgO 36.90, CaO traces, Na_2O+K_2O 0.13, H_2O^+ 13.03, H_2O^- 0.27, MnO 0.14, CO_2 0.23, Cr_2O_3 0.37, NiO 0.16, total 100.26 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 372).

92 J/16 Cross-fibre asbestos occurs in serpentinized peridotite at a deposit at 50°45'N, 122°01.2', at 1600 m elevation just south of a B.C. Hydro power line right-of-way where it crosses the ridge summit on the southeast side of Moon Creek, 4.8 km southwest of Bridge River at the mouth of Moon Creek and 9.6 km northwest of Lillooet (J.W. McCammon, 1969: B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 380).

93 G Four occurrences of asbestos-carrying peridotite bodies are known in the west half of the Prince George map-area: (1) Sinkut Mountain, in a road cut 800 m from the British Columbia forestry lookout; (2) on Bobtail Mountain, between elevations 1130 m and 1280 m on the extreme southwest ridge, 2.4 km from the south end of Naltesby Lake (fibre lengths 6 to 12 mm); (3) on the west side of Telegraph Range from a point 10.4 km on bearing 110 degrees from Tagai Lake (fibre 6 mm); (4) at a point 9.6 km on a bearing 280 degrees from Baldy Hughes Mountain, 40 km southwest of Prince George (fibre 1.5 mm) (--, 1961: Can. Mining J., vol. 82, No. 4, p. 156).

104 I/6 Chrysotile veinlets up to 2.5 cm in width occur in peridotite on the ASB claims east of Serpentine Lakes and south of Eaglehead Lake 48 km east of Dease Lake (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 540).

104 I/7 Cross-fibre chrysotile asbestos occurs in serpentinized peridotite at the Kutcho Creek Asbestos property at 58°20'N, 128°44'W, about 4 km northeast of Letain Lake at 1800 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 486).

104 P/5 The Cassiar Asbestos property, on the northwest flank of Mount McDame about 4.8 km north of Cassiar, contains chrysotile asbestos, in a serpentine body intrusive into argillite, chert, quartzite and greenstone (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 123). Chemical analysis by J.A. Maxwell (1955) of typical fibrous asbestos from cross fibre veinlets up to 5 cm wide: SiO_2 42.24, Al_2O_3 0.48, Fe_2O_3 1.37, FeO 0.16, MgO 41.88, CaO nil, Na_2O nil, K_2O nil, H_2O^+ 12.49, H_2O^- 0.90, TiO_2 nil, P_2O_5 nil, MnO 0.05, CO_2 0.06, Cr_2O_3 0.16, NiO 0.17, total 99.96 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 374).

Newfoundland

12 B/15 Asbestos occurs in cross-fibre veins up to 2.5 cm wide in serpentinized rock in the Lewis Brook and Mine Cove regions of the Stephenville map-area (G.C. Riley, 1962: Geol. Surv. Can., Mem. 323, p. 55).

12 G/1
12 G/8 Asbestos occurs along the northeast side of Blow Me Down Mountain, northwest and southwest of

Blow Me Down Brook, and in small ultrabasic layers in the gabbro that extends along the coast from Chimney Cove to north of Trout River, Bay of Islands area (C.H. Smith, 1958: Geol. Surv. Can., Mem. 290, p. 93).

12 H/16 A commercially developed asbestos orebody occurs in the Baie Verte region of Burlington Peninsula (Can. Mining J., vol. 81, No. 11, p. 135).

Ontario

31 C/15 Light grey asbestos, a fraction of a cm in width, occurs in thin lenses of greenish serpentine in limestone, in the Olden-Bedford area, Oso Township, conc. V, lot 11, Frontenac County (W.D. Harding, 1947: Ont. Dept. Mines, Ann. Rept., vol. 56, Pt. VI, p. 40).

31 F/7 Slip-fibre asbestos forms veins from paper thin to 7 cm in width in Blithfield Township, conc. IV, lot 22. The workings are 200 m northwest of the Black Donald-Calabogie road (J. Satterly, 1944: Ont. Dept. Mines, Ann. Rept., vol. 53, Pt. VI, p. 19).

31 F/10 Chrysotile asbestos occurs in serpentinized limestone, 800 m east of Foresters Falls in lot 8, conc. IX, Ross Township (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept. Prog., Pt. L. p. 14).

32 D/4 Asbestos is found in the serpentinite sill that trends diagonally across the southwest corner of McElroy Township into Boston Township. Some veinlets are of good quality cross-fibre asbestos (E.M. Abraham, 1950: Ont. Dept. Mines, Ann. Rept., vol. 59, Pt. VI, p. 37).

32 D/11
32 D/12
32 D/13 Chemical analysis of serpentine from Abitibi Lake, Timiskaming district, by Harrington: SiO_2 38.48, Al_2O_3 4.15, FeO 9.24, NiO 0.28, MgO 35.73, H_2O 11.60, chromic iron 0.51, total 99.99, S.G. 2.77 (B.J. Harrington, 1872-73: Geol. Surv. Can., Rept. Prog., pp. 299, 300).

41 I/4 Serpentinized peridotite occurs at the J.F. Owen prospect on lot 11, conc. VI, Mongowin township. A specimen of chrysotile from this locality is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 340).

41 P/14
41 P/15 Asbestos stringers in highly serpentinized peridotite, lying at right angles to one another and confined to a band 1.8 m in width have been found at claim TR 1,930 on the north shore of Lloyd Lake in Midlothian Township (H.J. Marshall, 1947: Ont. Dept. Mines, Ann. Rept., vol. 56, Pt. V, p. 21).

41 P/15 Veinlets of asbestos up to 6 mm wide have been found in a lenticular body of peridotite on the south shore of Rahn Lake in the Bannockburn area (C.H. Rickaby, 1941: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. II, p. 12).

42 A/6 Portions of serpentinite carry as much as 12 per cent asbestos veins at Campsell claim HR 968 in the Cochrane district, Deloro Township (M.B. Baker, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 274).

42 A/6 Serpentinite carrying 12 per cent asbestos veins was found at Slade-Forbes claim HR 368 in Deloro Township in the Cochrane district. The fibre is 5 cm in length and of good quality (H.G. Burrows, L.W. Knight, P.E. Hopkins, and A.L. Parsons, 1919: Ont. Dept. Mines, Ann. Rept., vol. 28, Pt. II, p. 66).

42 A/9 Asbestos deposits of varying quality occur on the property of Normalloy Explorations Limited, 40 km east of Matheson (--, 1962: Can. Mining J., vol. 83, No. 1, p. 89).

42 A/9 Asbestos stringers, some of which are 12 mm in width, occupy an area of 15 m by 90 m in serpentinite at Abitibi-Night Hawk, Warden Township, conc. I, lots 6 and 7 (L.W. Knight, P.E. Hopkins, A.L. Parsons, and H.G. Burrows, 1919: Ont. Dept. Mines, Ann. Rept., vol. 28, Pt. II, p. 66).

42 A/9 Veinlets of chrysotile are exposed in an old pit on claims L.40537 and L.40538 in Harker Township about 210 m south of its north boundary. The asbestos occurs in serpentinized dunite and has been estimated to constitute about 1 per cent of the rock (J. Satterly, 1951: Ont. Dept. Mines, Ann. Rept., vol., 60, Pt. VII, pp. 34-24).

42 A/9 Chrysotile is present in serpentinized peridotite and dunite in McCool Township, conc. II, lot 4; and conc. IV, lots 2 and 10 (J. Satterly, 1952: Ont. Dept. Mines, Ann. Rept., vol. 61, Pt. V, pp. 14-23).

42 A/9 Asbestos was found in Munro Township, Cochrane district, at the following localities: conc. IV, lots 2, 3, 6; Strongford Asbestos Company Limited, conc. IV, lot 10, and conc. V, lot 1; Quebec Asbestos Corporation, conc. V, lots 5, 6, 7; and Flagro Mines Limited, conc. VI, lot 1 (J. Satterly, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. VIII, p. 39).

42 A/9 Cross-fibre veins of asbestos ranging in width from 0.8 mm to 95 mm and from harsh to semi-harsh variety occur at Orebody A, in Munro Township, Cochrane district, conc. II, lot 10 (J. Satterly, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. VIII, p. 39).

42 A/9 Veinlets of picrolite cut serpentinized black peridotite and poikilitic pyroxene in McCool Township, conc. III, lots 1 and 3, and conc. IV, lots 2, 3, 4 (J. Satterly, 1952: Ont. Dept. Mines, Ann. Rept., vol. 61, Pt. V, p. 14).

42 A/9 Serpentinite containing asbestos fibres 2.5 cm in length occurs in the Abitibi-Night Hawk area, McCool Township, conc. IV, lots 8 and 10; and in Munroe Township, conc. II, lot 8 (A.G. Burrows, L.W. Knight, P.E. Hopkins, and A.L. Parsons, 1919: Ont. Dept. Mines, Ann. Rept., vol. 28, Pt. II, pp. 26-66).

42 A/10 Veinlets of chrysotile up to 6 mm in width are present in the intensely crushed and fractured peridotite and dunite in lot 7, conc. V, Munro Township. Chrysotile at the Munro Mine property, Munro and Beattie townships, has been partly replaced by carbonates where the veins cut a talc-carbonate rock. The fibrous form however is retained (J. Satterly, 1951: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. VIII, pp. 35, 37).

42 B/1 Asbestos of the picrolite variety occurs in a large outcrop of serpentinite at Dulama Gold Mines Limited, in the Keith-Muskego area, southwest corner of Keith Township, Sudbury district (V.K. Prest, 1950: Ont. Dept. Mines, Ann. Rept., vol. 59, Pt. VII, p. 39).

42 B/1 Veinlets of light yellowish green asbestos up to 7.5 cm wide and averaging 6 mm wide are mined at the Reeves Mine in Reeves Township at 48°12.5'N, 82°05'W, about 1.3 km south of Highway 101 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 155).

42 B/5 Serpentinized pyroxenite occurs at Butter Lake in the northeast part of Rennie Township. A specimen from this locality is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 341).

42 D/14 Veinlets of asbestos are found in a dyke of serpentine in the Schreiber-Duck Lake area, on the south shore of Bear Lake (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 6).

52 M/1
52 N/4 Serpentine asbestos occurs in veinlets or stringers with some carbonate at the Basin of Red Lake, between Trout Lake and Pipestone Bay (E.L. Bruce, 1924: Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. IV, p. 18).

53 C/13 Narrow veinlets of chrysotile have been observed in greenstone in the Favourable-Sandy Lake area between Rathouse Bay and North Trout Lake (M.E. Hurst, 1925: Ont. Dept. Mines, Ann. Rept., vol. 38, Pt. II, p. 69).

Quebec

What are probably the largest deposits of asbestos in the world occur in a narrow band in the Eastern Townships. Producing mines are located mainly in the vicinities of Asbestos (21 E/13), Thetford Mines, Black Lake and East Broughton (21 L/3). The Jeffrey Mine at Asbestos is the world's largest asbestos mine.

Chemical analysis of coarse-fibre asbestos from Vimy Ridge, Megantic County, by R.J.C. Fabry: SiO_2 42.43, Al_2O_3 0.90, Fe_2O_3 0.90, FeO 1.56, MgO 40.69, CaO 0.13, H_2O 13.86, TiO_2 nil, MnO 0.11, total 100.58.

Chemical analysis of fine-fibre asbestos from Thetford by R.J. C. Fabry: SiO_2 39.99, Al_2O_3 1.19, Fe_2O_3 1.10, Fe 1.15, MgO 42.11, CaO trace, H_2O 14.52, TiO_2 nil, MnO 0.05, total 100.11.

Chemical analysis of an asbestos vein about 2.5 cm wide from the Bell pit, Thetford Mines, by R.J.C. Fabry: SiO_2 36.53, Al_2O_3 + Fe_2O_3 8.71, FeO 6.00, MgO 37.93, CaO 0.05, H_2O^+ 10.25, H_2O^- 0.32, CO_2 nil, total 99.79.

Chemical analysis of an asbestos vein from Lake Station, Ireland Township, by M.F. Connor: SiO_2 39.62, Al_2O_3 0.81, Fe_2O_3 4.52, FeO 1.90, MgO 39.73, CaO trace, H_2O^+ 13.32, H_2O^- 0.43, total 100.33.

Chemical analysis of serpentine from a vein about 2.5 cm wide, Lambly Mine, near Coleraine Village, by R.J.C. Fabry: SiO_2 36.61, Al_2O_3 nil, Fe_2O_3 12.63, FeO 3.29, MgO 36.69, CaO 0.07, H_2O^+ 10.33, H_2O^- 0.65, CO_2 0.10, NiO tr., total 100.37.

Chemical analysis of white serpentine from lower pit, Megantic Lambly Mine, Ireland Township, by R.J.C. Fabry: SiO_2 45.23, Al_2O_3 0.56, Fe_2O_3 0.44, FeO 0.08, MgO 40.28, CaO 1.07, H_2O^+ 12.19, H_2O^- 1.29, TiO_2 nil, MnO nil, CO_2 nil, S 0.14, total 101.28 less O for S 0.06, total 101.22 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, pp. 372-376).

21 E/12
21 E/13 Chemical analysis of serpentine from South Ham, Wolfe County, by Hunt: SiO_2 43.40, FeO 3.60, MgO 40.00, H_2O 13.00, total 100.00; S.G. 2.546 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 472).

21 L/3 Chemical analysis by E.A. Thompson, of commerical slip fibre from Quebec Asbestos Corporation at East Broughton: SiO_2 38.45, Al_2O_3 0.14, Fe_2O_3 3.15, FeO 0.86, CaO 0.00, MgO 41.18, H_2O^+ 11.86, H_2O^- 0.00, CO_2 4.45, total 100.09 (H.C. Cooke, 1937: Geol. Surv. Can., Mem. 211, p. 90).

21 L/9 Veinlets of cross-fibre asbestos in serpentinized peridotite have been found in the St. Magloire area, Talon Township, Montmagny County, range V, in the southeast half of lot 21 (J. Beland, 1952: Que. Dept. Mines, Prelim. Rept., 279, p. 11).

22 B/5 Picrolite, a fibrous, brittle variety of serpentine occurs along slip planes in the massive rock in Awantjish Township, Matapédia County, range IV, lots 10 and 11 (E. Aubert de la Rue, 1941: Que. Dept. Mines, Geol. Rept., 9, p. 30).

22 B/16 Chrysotile is present in the rocks of the Shickshock Mountain at Mont Albert, Gaspé (National Mineral Collection).

31 F/10 An analysis by Hunt, of chrysotile from Calumet Island, Pontiac County is as follows: SiO_2 41.20, MgO 43.52, Fe_2O_3 0.80, H_2O 15.40, total 100.92; S.G. 2.36-2.38 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 471).

31 G/10 An analysis by Hunt of chrysotile from Grenville Township, Argenteuil County is as follows: SiO_2 39.34, MgO 43.02, Fe_2O_3 1.80, H_2O 15.09, total 99.25; S.G. 2.47-2.52 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 471). Chemical analysis of honey-yellow grains of serpentine separated from white lamellar dolomite, Grenville Township, by T.S. Hunt, 1857: SiO_2 44.10, Fe_2O_3 1.15, MgO 40.05, H_2O 14.70, total 100.00 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 373).

31 G/12 Crystalline limestone containing abundant white to grey fibrous tremolite and greenish blue massive serpentine is exposed in roadcuts about 800 m south of Perkins Mills (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 8).

31 G/12 Massive serpentine, in a variety of colours (yellow, green, blue, red, brown, black and white), is abundant at the Cross and Maxwell brucite quarries of the Aluminum Company of Canada, Limited, along the Farm Point road near Wakefield. Veinlets of fibrous serpentine are present but rare (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 41-44).

31 G/13 Silky-white chrysotile asbestos with fibres up to 12 mm long occurs with massive yellowish green to olive-green and black serpentine at the Poltimore Asbestos property. The property is located 2.65 km south of Holland Mills, which is 5.39 km west of Notre-Dame-de-la-Salette on the road to Poltimore (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 36).

31 G/15 A somewhat mottled green to yellow serpentine which has been used for paper weights was found associated with magnesite at underground workings of Canadian Refractories Limited, at Kilmar, Argenteuil County (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 47).

31 H/1
31 H/8 Analysis of picrolite from Bolton, Brome County, by Hunt, yielded: SiO_2 43.70, MgO 40.68, FeO 3.51, NiO undet., Cr_2O_3 undet., H_2O 12.45, total 100.34; S.G. 2.607. Analyses of serpentine from Orford Township, Sherbrooke County, range XVIII, lot 10, by Hunt: (1) SiO_2 40.30, FeO 7.02, NiO 0.26, Cr_2O_3 tr., MgO 39.07, H_2O 13.35, total 100.00; S.G. 2.597; (2)

SiO_2 42.90, FeO 7.47, NiO 0.15, Cr_2O_3 0.25, MgO 36.28, H_2O 13.14, total 100.19 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 472).

31 J/4 Yellow-green to dark green and cream-white serpentine is a conspicuous constituent of crystalline limestone exposed along both banks of the du Lièvre River on the downstream side of the des Cèdres dam. Spinel and olivine are also present (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 47, 51).

31 J/7 Yellow-green, olive-green and smoky amber translucent masses and blotches of serpentine occur in white dolomite limestone at the Canada Marble and Lime quarry near l'Annonciation (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 60).

31 J/15 Translucent, yellow-green to olive-green and amber, massive serpentine is a common constituent of the marble at the Rockway Valley Marble quarry located 9.3 km west of Arundel. It occurs as masses, blotches and bands in gleaming white marble (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 68).

32 A/16 Massive yellow-green to dark green serpentine is found in pegmatite cutting calcite at the Les Calcites du Nord Quarry north of Dolbeau (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 111).

Yukon

105 C/6 Cross-fibre veins of crysotile asbestos up to 2.5 cm in width have been found on Hayes Peak, Teslin map-area (R. Mulligan, 1963: Geol. Surv. Can., Mem. 326, p. 78).

115 A/13 The Kathleen River asbestos deposit lies 10.4 km east-southeast of Haines Junction, and about 1.6 km west of Kathleen River. Asbestos veins are up to 18 cm wide, but are commonly less than 12 mm (R. Skinner, 1962: Geol. Surv. Can., Paper 62-27, p. 35).

115 G/11 Short fibre chrysotile asbestos has been found in an ultrabasic sill on the Cam Claims at 61°40'N, 139°20'W, 1.6 km east of Kluane River and 12.8 km north of km 1799 on the Alaska Highway (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 104).

116 C/7 The Clinton open-pit asbestos mine of Cassiar Asbestos Corp. Limited began production in 1967. The mine is located at an elevation of about 490 m on Porcupine Hill, immediately south of Clinton Creek. It is reached by a 42 km access road that leaves the Sixty mile-Boundary road near km 53 and crosses Fortymile River via a bridge near the mouth of Clinton Creek (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 32).

SICKLERITE

$(Li,Mn,Fe)PO_4$

Manitoba

52 L/5
52 L/6 Sicklerite has been identified in spodumene-bearing pegmatite on the Matty claims near Bird River and in the petalite-rich Coe claim pegmatite at the eastern end of Bernic Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

SIDERITE

$FeCO_3$

Siderite is widespread as a bedded deposit in sedimentary rocks, associated with clay, shale, or coal seams. It also occurs in hydrothermal veins and replacement deposits. A complete solid solution series exists between magnesite and siderite through substitution of Mg for Fe. Some substitution of Mn, Co and Ca for Fe may also take place.

British Columbia

82 F/11
82 F/14 Manganiferous siderite is the most common of the gangue minerals in the veins, lodes and replacement deposits of the Slocan silver-lead-zinc camp. A sample of siderite from the Black Prince claim contained 20.98 per cent $MnCO_3$ (A.G. Johnston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 23).

82 N/11 Siderite porphyroblasts occur in phyllites in the Esplanade Range and Northern Dogtooth Mountains at 51°31'N, 117°27'W. the porphyroblasts show striking optical and chemical zoning (J.W. Jones and E.D. Ghent, 1971: Am. Mineralogist, 56, p. 1910).

93 A/3 Siderite occurs as massive globular concretions filling amygdaloidal cavities in basalt on Mussel Creek, a branch of Moffat Creek, which flows into the Horsefly River (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, pp. 14, 15R).

93 H/4 Manganiferous siderite occurs in the gold-bearing quartz veins of the Barkerville area. (W.A. Johnston and W.L. Uglow, 1933: Geol. Surv. Can., Summ. Rept., 1932, pt. AI).

New Brunswick

21 J/7 Siderite occurs as float at Rocky Brook in York County (W.H. Poole, 1958: Geol. Surv. Can., Map 11-1958).

21 P/5 Lenses of siderite occur in sedimentary and volcanic rocks at the Drummond Iron Mine, in Gloucester County (New Brunswick Mines Branch, files).

21 P/5 Ore at the Austin Brook iron mine, south of Bathurst, consists of fine to coarsely banded magnetite with hematite, chlorite, chert and siderite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 120).

Newfoundland

1 N/10 The ore at the Wabana iron deposit consisted of closely-packed elongated spherules made up of alternating concentric layers of hematite and chamosite cemented with siderite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 62).

Northwest Territories

34 C/2 Analysis of siderite from Flint Island (56°04'N, 76°49'W) by Harrington: $FeCO_3$ 52.70, $MnCO_3$ 24.64, $CaCO_3$ tr., $MgCO_3$ 11.81, insol. 10.94, total 100.09 (B.J. Harrington, 1877-78: Geol. Surv. Can., Rept. Prog., p. 47G).

Nova Scotia

11 E/5 Siderite occurs in masses and intersecting veins with ankerite at West Mines, Londonderry,

Colchester County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 58T).

11 E/5 Specimens of brown siderite from New Mines, Acadia Mine, Londonderry, Colchester County, are in the National Mineral Collection.

11 E/5 Specimens of small dark brown rhombohedral crystals of siderite from Ferrona, Pictou County are preserved in the National Mineral Collection.

11 F/5 Specimens of brown siderite from Copper Lake, Antigonish county are present in the National Mineral Collection.

21 H/8
21 H/9 Siderite occurs at the Ankerite quarry in the Cobequid Mountains. Analysis by H. Louis: $FeCO_3$ 67.96, $MnCO_3$ 2.19, $MgCO_3$ 27.87, $CaCO_3$ 1.03, insol. 0.43, total 99.48; S.G. 3.523 (H. Louis, 1879: Nova Scotia Inst. Nat. Sci., vol. V, p. 50).

Ontario

41 I/4 Specimens of siderite, associated with talc, from lot 1, conc. I, May Township are in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 342).

41 J/6 Specimens of siderite in the mineral collection at the Royal Ontario Museum were collected at the Jury Mine in the southwest quarter of section 27, south central part of Patton Township; and at the Brady Mine in section 36, southeast corner of Patton Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 342).

41 N/15
42 C/2
42 C/8 A range of siderite lies along the crest and northern side of a broad high ridge in the Michipicoten iron ranges. The dense light grey or pink siderite contains some pyrite grains (W.H. Collins, T.T. Quirke; and E. Thomson, 1926: Geol. Surv. Can., Mem. 147, p. 83).

42 C/2 Brown, compact siderite with subconchoidal fracture, from the Magpie Mine at Michipocoten in the Algoma district, is included in the National Mineral Collection.

Quebec

21 L/9 Specimens of quartz with coarsely foliated specularite and pale yellow granular aggregates of siderite have been found on the dumps at the Eastern Metals Mine, near St-Fabien (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 66).

22 G/1 At the Candego Mine, located about 19 km south of Marsoui, the sulphide ore minerals occur in a gangue of quartz and siderite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 75).

31 H/11 Siderite is found in veins and as large crystals in vugs in nepheline syenite at the Desourdy Quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 H/12 At the Francon quarry on Montreal Island, light yellow to yellowish green and brown crystals of siderite occur, often intergrown with dolomite (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 18).

Yukon

105 M/14 Siderite is the principal gangue mineral in the lead-zinc-silver deposits of the Keno-Galena Hill area, where it cements breccia in the vein faults and fills fractures and cavities in the lodes. Most of the siderite occurs as drusy masses or coarse-grained and massive. Rhombohedral crystals with curved faces are found lining vugs. Stalactitic, globular and botryoidal masses have been observed but are rare. Siderite is often intimately intergrown with galena, pyrite, sphalerite and freibergite. Chemical analyses of two fresh and one slightly oxidized siderite samples by S. Courville are:

I - fresh, Sadie Friendship lode, SiO_2 0.10, Al_2O_3 0.01, Fe_2O_3 0.06, FeO 37.98, CaO 0.80, MgO 4.98, Na_2O 0.05, K_2O 0.01, H_2O^+ 0.02, H_2O^- 0.11, TiO_2 0.00, P_2O_5 0.05, MnO 16.12, CO_2 39.30, S 0.00, total 99.59, S.G. 3.82;

II - fresh, Onek lode, SiO_2 0.50, Al_2O_3 0.00, Fe_2O_3 0.09, FeO 44.23, CaO 0.31, MgO 1.20, Na_2O 0.03, K_2O 0.02, H_2O^+ 0.15, H_2O^- 0.03, TiO_2 trace, P_2O_5 0.77, MnO 13.71, CO_2 37.75, S 0.02, total 99.81, S.G. 3.74;

III - Bellekeno lode, SiO_2 0.00, Al_2O_3 0.00, Fe_2O_3 1.23, FeO 40.41, CaO 0.90, MgO 1.35, Na_2O 0.06, K_2O 0.02, H_2O^+ 0.03, H_2O^- 0.05, TiO_2 0.00, P_2O_5 0.06, MnO 17.12, CO_2 38.10, S 0.00, total 99.33, S.G. 3.80 (R.W. Boyle, 1965: Geol. Surv. Can., Bull. 111, p. 118, 263).

106 D/6 A vein of siderite, freibergite and pyrite, 76 cm wide, occurs on a property at 64°24'N, 135°17'W on the northwest slope of Grey Copper Hill, southeast of Carpenter Creek, a tributary of the Beaver River (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 22).

SIDERONATRITE

$$Na_2Fe(SO_4)_2(OH).3H_2O$$

Nova Scotia

11 J/4 A specimen from No. 26 Colliery, Glace Bay, was identified as sideronatrite by L.J. Cabri, CANMET and donated to the National Mineral Collection, Catalogue no. 12121. Melanterite, epsomite, rozenite, pickeringite, aluminocopiapite and halotrichite were also identified (E.L. Zodrow and K. McCandlish, 1978: Can. Mineralogist, 16, p. 17-22).

SIDEROTIL

$$FeSO_4.5H_2O$$

The pentahydrate salts of Fe, Cu, and Mg are isostructural, and the mineral names based on dominant cation present are siderotil, chalcanthite and pentahydrite, respectively.

New Brunswick

21 P/5 The secondary copper and iron sulphates, chalcanthite, siderotil and rozenite, occur as coatings, encrustations and irregular patches on sulphides and host rock at the Key Anacon Mine. The deposit is near the bridge over the Nepisiquit River, 4.8 km east of Highwat 331 at a point 18.8 km south of Bathurst (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 117).

Newfoundland

12 H/16 Ore specimens coated with rozenite, siderotil, leonhardtite and goethite are present on mine dumps at the old Terra Nova Mine at the side of

Highway 410, 3.5 km south of Baie Verte opposite the junction of the road to Seal Cove. (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 119).

Ontario

42 A/9 Siderotil occurs as a white coating on rusty weathered specimens on the dumps at the Centre Hill Mine in Munro Township. The property is about 9.6 km by road north of Highway 101 from a point 25.2 km east of the junction of Highway 101 and Highway 11 at Matheson (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 116).

Quebec

21 E/14 At the Solbec Mine, siderotil has been identified as a greyish white, soft crust on specimens consisting of fine-grained sulphides and magnetite. The mine is 1.6 km north of Highway 34 at a point 12.4 km east of Highway 1 (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 40).

32 C/4 Specimens coated with bluish white siderotil were found on the dumps at the Rainville Mine located 1.9 km south of Highway 59 from a point 16.7 km east of Val d'Or, and at the Louvem Mine located 3.2 km north of Highway 59 on a road 20.1 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 115, 120).

32 D/10 Siderotil is one of the secondary minerals found on the dumps at the Lyndhurst Mine 5.8 km east of Highway 46 along the road to Laferté (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 57).

siegenite

(see LINNAEITE)

SILLIMANITE

Al_2SiO_5

Sillimanite is one of three polymorphs of Al_2SiO_5, the others being andalusite and kyanite. It is found in high-grade thermally metamorphosed pelitic rocks.

Manitoba

53 O/13
63 K/13 The nickel ore of the Thompson-Moak Lake belt contains sillimanite. The mineral assemblage is typical of the almandine-amphibolite facies, sillimanite-almandine-orthoclase subfacies (H.D.B. Wilson and W.C. Brisbin, 1961: Can. Inst. Mining Met., Bull., vol. 54, No. 594, p. 821).

Newfoundland

11 O/10
11 O/11 Road cuts and shoreline outcrops between Channel-Port aux Basques and Rose Blanche expose biotite gneiss and biotite schist commonly containing garnet and sillimanite. The sillimanite occurs abundantly as colourless to white fibrous, flaky, foliated and columnar masses and layers (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 163-165).

Northwest Territories

26 B/15 Sillimanite-bearing gneisses, containing massive euhedral to subhedral, medium-to fine-grained, bladed or tabular crystals of sillimanite are prominent in the Chidliak Fiord area, Baffin Island (G.C. Riley, 1960: Geol. Surv. Can., Bull. 61, p. 47).

Nova Scotia

20 O/16 Small crystals of sillimanite, staurolite, chloritoid, actinolite and garnet occur in light grey schist which outcrops along the shore from Foote Cove south to Chegoggin Point (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 78).

21 A/2 Sillimanite from the seashore of Eastern Head, Liverpool Bay, Queens County, was donated to the National Mineral Collection by E.R. Faribault in 1912.

Ontario

31 C/9 Sillimanite is found as white sheaf-like aggregates about 2.5 cm long, and as bluish fibrous aggregates, in roadcuts on Highway 15, approximately 43.8 and 44.9 km north of Kingston (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 45).

31 C/11 Sillimanite-garnet schist occurs at Otter Creek in Hungerford Township. Specimens are in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 343).

31 F/4 A band of sillimanite-rich paragneiss, striking east-west and dipping steeply south, is found in Dungannon Township, Hastings County, conc. X, lot 22 (D.F. Hewitt and W. James, 1955: Ont. Dept. Mines, Ann. Rept., 64, Pt. VIII, p. 59).

31 F/5 Sillimanite in fine needle-like aggregates can be found in zones up to 3 m wide in interbanded amphibolite and sillimanite-garnet-biotite paragneiss in Carlow Township, Hastings County, on the border of concs. XI and XII, lot 21 (D.F. Hewitt, 1954: Ont. Dept. Mines, Ann. Rept., vol. 63, Pt. VI).

31 F/6 Fine-grained, fibrous, radiating aggregates of sillimanite, which make up 20 to 30 per cent of the rock, form narrow bands in amphibolite in Lyndoch Township, conc. XV, lot 34 (D.F. Hewitt, 1953: Ont. Dept. Mines, Ann Rept., vol. 62, Pt. V, p. 85).

41 H/14 Sillimanite occurs as stick-like crystals up to 6 cm long and 6 mm in diameter on an island in the centre of the northern part of Beaverstone Bay near Collins Inlet on Georgian Bay. The crystals weather into relief which can be seen from distances of 12 or 15 m. Garnet and graphite occur with the sillimanite (T.T. Quirke and W.H. Collins, 1930: Geol. Surv. Can., Mem. 160, pp. 77, 78).

41 I/7 Fibrous sillimanite can be found in Dryden Township at the first cutting east of Wanapitei and in conc. II, lot 9 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 206).

52 O/1 The mineral collection at the Royal Ontario Museum includes a specimen from the control dam, Lake St. Joseph at 51°07'N, 90°13'W (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 343).

Quebec

12 L/8 Sillimanite occurs as long, slender, glossy, colourless crystals up to 12 mm in length on an island opposite Romaine, near the confluence of the Romaine River and the St. Lawrence River. Chemical analysis by E.W. Todd: SiO_2 36.70, Al_2O_5 62.73, Fe_2O_3 0.63, total 100.06; S.G. 3.209 (T.L. Walker and A.L. Parsons, 1923: Univ. Toronto Stud., Geol. Ser., 16, p. 36).

12 M/5
12 M/12 Tabular crystals of sillimanite are found in the paragneiss of the Upper Romaine River area in Saguenay County, between the Petite Romaine and Touladis rivers (J. Claveau, 1949: Que. Dept. Mines, Geol. Rept., 38, p. 14).

22 J/9 Sillimanite is found in quartzite with feldspar, biotite and large garnet porphyroblasts, 11 km south of Irene Lake in the Nipissis River area, Saguenay County (P.E. Grenier, 1952: Que. Dept. Mines, Prelim. Rept., 272, p. 5).

31 G/15 A sillimanite paragneiss, containing about 2 to 5 per cent sillimanite can be found near the roadside, at the south end of Papineau Lake, Papineau County, in the Simon Lake area (C. Faessler, 1948: Que. Dept. Mines, Geol. Rept., 33, p. 23).

31 I/4 Roadcuts on both sides of Highway 42 opposite Lac-des-Francais about 80 km north of Montreal, contain sillimanite as sheaf-like aggregates measuring up to 10 cm long and as small colourless blades with a pearly lustre (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 74).

31 I/16 Sillimanite is rare in the ore zone at Montauban-les-Mines and Tetrault Mines, Portneuf County, but it is an essential mineral of the paragneisses and an accessory of the migmatites (J.J. O'Neill and F.F. Osborne, 1938: Que. Dept. Mines, Prelim. Rept., 138, p. 18).

31 J/2
31 J/11 Sillimanite-bearing gneiss is exposed in roadcuts on Highway 11, 6.7 km north of St-Jovite and 24.9 km east of Mont Laurier (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 60, 65).

SILVER

Ag

Native silver is found in the primary zones of hydrothermal deposits and to a lesser extent in oxidized zones of ore deposits. Silver forms a complete solid solution series with Au; it may contain large amounts of Hg and, less commonly, Cu, As, Sb, Bi and Pt. Mercurian silver is called amalgam or arquerite.

British Columbia

82 E/4 Native silver occurs in a quartz vein, 1 m wide and several hundred m long, at the Horn Silver Mine, near Richter Mountain in the west half of the Kettle River area (C.E. Cairnes, 1937: Geol. Surv. Can., Paper 37-21).

82 E/5 Free gold and native silver occur with minor disseminated pyrite and chalcopyrite in silicified volcanic and sedimentary rocks at a deposit about 1.6 km east of the village of Okanagan Falls at 49°21'N, 119°33'W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 294).

82 F/10 Native silver occurs as plates in fractures at the Silver Hoard Mine in the Ainsworth mining division (S.T. Schofield, 1920: Geol. Surv. Can., Mem. 117, p. 32).

82 F/14 Native silver has been reported in several deposits of the Slocan camp, notably: Anna at 49°48'N, 117°23'W, on the south slope of Ottawa Hill extending west from Little Tim Creek at about 1600 m elevation; and Republic at 49°48'N, 117°27'W, 3.2 km north-northeast of Slocan City at the headwaters of Climax and Scorpion Creeks between 1000 m and 1400 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 74).

82 G/12 Specimens of native silver were collected in 1935 by H.M.A. Rice from a placer deposit on Wildhorse Creek in the west half of the Fernie map-area (X-ray Laboratory, Geol. Surv. Can.).

82 M/4 A minor amount of native silver is reported in veins and stringers with barite, tetrahedrite, galena, sphalerite, pyrite, chalcopyrite and argentite at claims on Homestake Creek (51°06.7'N, 119°49.5'W) at an elevation of about 900 m, 4.8 km west of Skwaam Bay (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 87).

93 N/11 Arquerite has been found with gold as scales and nuggets at Vital and Silver creeks in the Omineca mining division (G.M. Dawson, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 42R). Chemical analysis of arquerite from Vital Creek by Riotte and Leckhardt: Ag 83.30, Hg 11.00, Pb 0.40, Cu 0.20, Au, Pt, Fe trace, total 94.90 (G.M. Dawson, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 26R).

93 N/15 A nugget of mercurian silver, about 8 millimetres in greatest dimension was found in a placer deposit near Germansen Landing in the Omineca mining district (L.G. Berry and R.M. Thompson, 1962: Geol. Soc. Am., Mem. 85, p. 11).

94 E/6 Fine-grained native gold, silver and electrum are reported in silicified breccia on the Lawyers claims at 57°18'N, 127°12'W, 9.6 km southwest of Toodoggone Lake at about 1700 m elevation (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1974, p. 312).

103 H/14 Native gold and silver were found in the upper workings of a bornite-chalcocite deposit about 1.6 km from the shore of Drumlummon Bay, a small cove on the northwest shore of Douglas Channel beside the outlet of Foch Lagoon (J.A. Roddick, 1970: Geol. Surv. Can., Paper 70-41, p. 53).

103 P/12 Vein material containing some pyrargyrite and native silver was encountered in drill core at the Musketeer property at 55°42'N, 129°30"W, at about 360 m elevation on the east side of the Kitsault River between Tiger and Silverwolf Creeks (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 508).

103 P/12 The Kitsol vein located at 55°41'N, 129°31'W, immediately north of the confluence of Evindsen Creek and the Kitsault River at 360 m elevation contains pyrargyrite, native silver and marcasite in a quartz-calcite-barite gangue (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 489).

104 P/5 Native silver and pyrargyrite occur with bismuthinite, marcasite, native antimony, tetrahedrite, chalcopyrite, arsenopyrite, pyrrhotite and molybdenite in quartz veins at the Contact claims 4.8 km by road northwest of Cassiar (H. Gabrielse, 1963: Geol. Surv. Can., Memoir 319, p. 119).

Newfoundland

2 E/13 At the West Mine on a hillslope immediately west of Tilt Cove the copper orebody consisted of veinlets and disseminations of chalcopyrite and pyrite with minor amounts of other minerals including native silver and native copper (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

12 A/15 Native silver, bornite and acanthite are reported to occur in fractures in the ore at the Buchans Mine (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 106).

Northwest Territories

86 E/9 Native silver occurs in a vein in fractured diabase, 14 km from the mouth of the Camsell River in the Mackenzie district (D.F. Kidd, 1936: Geol. Surv. Can., Mem. 187, p. 30).

86 E/9 Native silver occurs with native bismuth, matildite, safflorite, skutterudite, rammelsbergite, pararammelsbergite, gersdorffite, cobaltite and niccolite, at a deposit on the Camsell River, 6.4 km south of its mouth at Conjuror Bay on Great Bear Lake, at 65°36'14"N, 118°06'45"W (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 F/13 The ore zone at the Contact Lake Mine near Port Radium in the Great Bear Lake region consists of veins of quartz and carbonate minerals, containing shoots of native silver, hematite, pyrite, chalcopyrite, magnetite, bornite, pitchblende, arsenopyrite, chalcocite, tetrahedrite, cobaltite, niccolite, sphalerite, galena, native bismuth, argentite, malachite, azurite and erythrite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 18).

86 K/4 Native silver, argentiferous galena and acanthite are the principal ore minerals mined at Echo Bay Mines Limited located 1.6 km northeast of Port Radium. Copper, nickel, zinc and cobalt sulphides are also found in the carbonate and quartz-filled veins. (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 42). The same three minerals occur in the uranium-silver deposit at the Eldorado Mine (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 36).

86 O/5 Native silver has been found with native copper and chalcocite in the Coppermine River area at the following occurrences: TOM claims of Agassiz Mines and Fundy Explorations Limited at 67°19'15"N, 115°52'W; JIM claim N92502 explored by D'Aragon Mines and Willow Lake Mines Limited at 67°21'10"N, 115°55'30"W; CU claim T5086 of Janus Explorations Limited at 67°22'N, 115°48'W (R.I. Thorpe, 1970: Geol. Surv. Can., Paper 70-47).

Ontario

31 C/5 The mineral collection at the Royal Ontario Museum includes native silver from Le Vesconte Mound near Campbellford, Seymour Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 344).

31 M
41 P Native silver was discovered at Cobalt in 1903 and the findings soon spread to the surrounding districts of Gowganda and South Lorrain and the townships of Casey, James, Maple Mountain, Speight and Whitson. The silver occurred in films, flakes, wires and flattened masses, and was usually accompanied by argentite and native bismuth. The famous 'silver sidewalk' of the La Rose Mine was reported to have been almost solid native silver for a length of 30 m and to have yielded 23 400 kg of silver. The high-grade veins contained a great variety of minerals, of which the chief were calcite, smaltite, niccolite and native silver. Pyrargyrite, proustite, argentite, millerite, chalcopyrite, sphalerite and galena were also abundant (C.H. Stockwell et al., 1957: Geol. Surv. Can., Econ. Geol. Ser., No. 1, p. 67).

31 M/5 Antimonial silver, which is harder and tougher than pure silver and has a yellowish bronze colour, has been found at the Timiskaming Mine at Cobalt. Chemical analysis by E.W. Todd: Ag 92.19, Sb 6.78, As 0.45, total 99.42; S.G. 10.01 (M.A. Peacock, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 42) (M.A. Peacock and L.G. Berry, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 52).

41 I/6 Native silver has been found in galena-parkerite-rich ore and also in bornite-bearing ore from the lower levels of the Frood Mine, Sudbury (J.E. Hawley and R.J. Stanton, 1962: Can. Mineralogist, 7, p. 41).

41 I/11 Native silver, smaltite, niccolite and chalcopyrite occur in a gangue of calcite and quartz at Gowganda in the Onaping area, Sudbury district (W.H. Collins, 1917: Geol. Surv. Can., Mem. 95, p. 119).

41 P/9 Filiform native silver from Downey Lake, James Township, Timiskaming district has been donated to the National Mineral Collection by A.E. Barlow.

41 P/9 Specimens of native silver found at the Tucky Godbrey Mine, James Township, and the Elk Lake Albanie Mine at Elk Lake are part of the National Mineral Collection.

41 P/10 Dendritic silver occurs in a greenish black diabase at the O'Brien Mine on Miller Lake in the Gowganda area. The central skeletal cores of pale yellow native silver are surrounded by relatively thick crusts of a succession of cobalt-nickel arsenides (A. Montgomery, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 23).

42 A/11 Specimens of native silver from the Kidd Creek Mine, lots 3 and 4, conc. V, Kidd Township are included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 344).

52 A/7 Native silver was found in the form of wires, leaves, nuggets and veinlets, with acanthite and a suite of cobalt-nickel minerals, at the Silver Islet Mine at the southwest end of Silver Islet (T.L. Tanton, 1931: Geol. Surv. Can., Memoir 167).

52 E/10 At the Mikado Mine on the south shore of Bag Bay, Shoal Lake, Glass Township, native silver occurs in a quartz vein with gold, chalcopyrite, galena, tetradymite, bismuthinite and molybdenite. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 344).

52 L/16 Antimonial silver is associated with allargentum in a base-metal sulphide deposit in Mulcahy Township about 32 km west of Red Lake and 1200 m south-southwest of the south end of Trout Bay. Electron microprobe analysis: Ag 97.3, Sb 2.6, Hg 0.1 (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 234).

Quebec

31 F/10 The National Mineral Collection includes native silver from range IV, lot 10, Calumet Township, Pontiac County.

32 C/4 Vugs containing native silver in wire and dendritic forms have been found at the Manitou-Barvue (Golden Manitou) Mine. The mine is 1.6 km south of Highway 59 via roads which leave the highway 13.0 and 15.7 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 114).

32 D/6 Native silver is reported to be present in the copper-zinc ore at the Millenbach Mine on Highway 46, 8.3 km from Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 52).

32 D/7 Minor amounts of native silver, native gold and electrum are present in the copper-zinc ore at the D'Eldona (Delbridge) Mine. The mine may be reached via rue Perrault 5.8 km from its intersection with Highway 59 in Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 60).

Saskatchewan

74 N/10 Native silver and copper have been identified with several rare selenide minerals in pitchblende ore from the Martin Lake Mine located at the northeast corner of Martin Lake in the neck of land between Beaverlodge Lake and Martin Lake (D.C. Harris, L.J. Cabri and S. Kaiman, 1970: Can. Mineralogist, 10, p. 207).

Yukon

105 D/2 Gold-silver ores have been mined from the Arctic Caribou (Big Thing) and Montana Mine properties at Montana Mountain near the village of Carcross. Galena, native silver, pyrargyrite and acanthite have been found in quartz veins with pyrite, tetrahedrite, arsenopyrite and sphalerite (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 59).

105 M/14 Native silver occurs as thin films on galena and wiry forms in vugs and small openings in vein faults at Keno, Sourdough and Galena Hill areas, Mayo mining district. It has also been observed in ice lenses (R.W. Boyle, 1956, 1957: Geol. Surv. Can., Paper 55-30 and 57-1).

115 G/6 Small amounts of mercurian silver have been recovered from Burwash Creek, Kluane River district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 30).

115 I/3 Native silver occurs with freieslebenite, acanthite, andorite and argentian tetrahedrite at the Webber property of Mount Nansen Mines Limited at 62°03.5'N, 137°10'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 36).

115 J/10 Native silver has been found at the Bomber showing of Casino Silver Mines Limited on a tributary of Casino Creek at 62°43'N, 138°49'W, at an elevation of about 1200 m. It occurs in quartz-barite veins with galena, sphalerite, chalcopyrite and pyrite (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 39).

SINHALITE

$MgAlBO_4$

Ontario

31 E/1 The rare borate minerals sinhalite, szaibelyite and warwickite have been found in crystalline limestone in a road cut on the north side of the South Baptiste Lake road at a point 12 km west of its junction with Highway 62, 6.7 km north of Bancroft. The sinhalite occurs as colourless, transparent, sugary crusts on dark green, transparent, massive spinel (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

SJOGRENITE

$Mg_6Fe_2(OH)_{16}CO_3.4H_2O$

Sjogrenite is a hexagonal mineral isostructural with barbertonite (Cr for Fe) and manasseite (Al for Fe). Pyroaurite is a rhombohedral polymorph.

Quebec

21 E/14 Colourless to pale green, tiny flakes of sjogrenite and bottle green shiny flakes of pyroaurite have been identified on fracture planes in massive serpentine from the Belmina Mine near St-Jacques (Stenson) (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 45).

32 D/9 Sjogrenite occurs as fracture coatings in an ultramafic body explored by Dumont Nickel Corporation near Amos (J.L. Jambor, 1975: Geol. Surv. Can., Paper 75-1A, p. 261).

SKLODOWSKITE

$Mg(UO_2)_2(SiO_3)_2(OH)_2.5H_2O$

Manitoba

52 L/6 Uranophane and sklodowskite were identified as a coating on quartz and magnetite on a specimen from the Huron claim pegmatite about 0.8 km inland from a point on the southeast shore of the Winnipeg River about 15 km above Pointe du Bois (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 562).

Saskatchewan

64 L/4 Sklodowskite is associated with uranophane at the Rabbit Lake uranium deposit at 58°11'00"N, 103°42'36"W, west of Wollaston Lake (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1B, p. 235).

SKUTTERUDITE

$(Co,Ni)As_3$

The name skutterudite has been used as a general name for the cobalt-nickel arsenide solid solution series comprising the minerals skutterudite, smaltite and chloanthite. It has also been used for the Co-rich and As-high member of the series to distinguish from Co-rich As-deficient smaltite and the Ni-rich As-deficient chloanthite. Iron is commonly present in substitution for Co and Ni in amounts up to about 12 per cent.

British Columbia

93 M/4 Skutterudite shows cubic outlines on massive areas and appears to replace both arsenopyrite and löllingite in polished specimens from the Hazelton View Mine. The mine is located between 1550 and 1840 m on the north slope of Rocher Déboulé Mountain, 6.4 km south of South Hazelton in the Omineca mining district (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 453).

Northwest Territories

86 E/9 Skutterudite occurs with native silver and bismuth, matildite, safflorite, rammeslbergite, pararammelsbergite, gersdorffite, cobaltite and niccolite at a deposit on the Camsell River, 64 km south of its mouth at Conjuror Bay at 65°36'14"N, 118°06'45"W. (D.C. Harris and R.I. Thorpe, 1969: Can. Mineralogist, 9, p. 655-662).

86 K/4 Skutterudite is present as a minor contituent in the form of long skeleton crystals sparsely scattered through quartz gangue, in claims on the north shore of Contact Lake, on the property

of Bear Exploration and Radium Company, Limited (E. Thomson, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 27).

86 L/1 Skutterudite occurs at the Eldorado Mine at Great Bear Lake as isolated remnants of crystals of cubic habit associated chiefly with the common metallic minerals, and as zoned crystals of variable composition. In the latter form of occurrence the mineral may appear in a fairly massive aggregate of crystals or as individual crystals associated with native bismuth (E. Thomson, 1923: Univ. Toronto Stud., Geol. Ser., 32, p. 43).

Ontario

31 M/4 Skutterudite is found in association with chloanthite and lollingite at the Keeley Mine in the South Lorrain section of the Cobalt district (J.M. Bell and E. Thomson, 1924: Univ, Toronto Stud., Geol. Ser., 17, p. 27).

31 M/5 Small brilliant crystals of skutterudite imbedded in fragments of soft chloritic or micaceous rock can be found at the Timiskaming Mine, Cobalt (T.L. Walker, 1921: Am. Mineralogist, 6, p. 54).

31 M/5 Skutterudite occurs with lollingite and in places is the major constituent of the ore veins at the La Rose Mine, Cobalt (T.L. Walker and A.L. Parsons, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 9).

31 M/5 Skutterudite occurs 3.2 km southeast of Cobalt on the shore of Cross Lake on the property of M.J. O'Brien Limited. It is associated with a variety of other sulphides (E. Thomson, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 41).

31 M/5 Skutterudite is associated with silver and lollingite in veins at the O'Brien Mine on Miller Lake, Gowganda. Calcite is the common gangue mineral (E. Thomson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 61).

31 M/5 The mineral collection at the Royal Ontario Museum includes specimens from the Agaunico Mine, lot 15, conc. I, Bucke Township; and from the following mines in Coleman Township: Temiskaming Mine, north half of lot 1, conc. III; Bailey (Glen Lake) Mine, southwest quarter of north half of lot 4, conc. IV; Foster Mine, southeast quarter of north half of lot 4, conc. IV; Penn-Canadian Mine north half of north half of lot 4, conc. IV; Cobalt Lake Mine under Cobalt Lake, lots 5 and 6, concs. V and VI; La Rose Mine, lot 4, conc. VI; O'Brien Mine, south half of lot 4, conc. VI. (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 356-357).

41 P/10 Skutterudite forms rims around radiating intergrowths of lollingite and safflorite and is also present as cubic grains in specimens from No. 4 crosscut, Castle Trethewey Mine, in the Gowganda area (E.W. Todd, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. III, p. 67).

41 P/10 Specimens in the mineral collection at the Royal Ontario Museum are from: Bonsall Mine, Haultain Township; and Miller Lake O'Brien Mine, Nicol Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 357).

31 M/4
31 M/5
31 M/12 Electron probe microanalyses of skutterudites from the Cobalt-Gowganda ores:

	Co	Ni	Fe	As	Total
41 P/9	17.7	3.0	2.6	79.0	102.3
41 P/10	18.3	1.5	1.0	78.5	99.3
41 P/15	19.1	2.0	1.5	79.0	101.6
41 P/16	18.6	2.3	1.6	79.0	101.5
	17.3	2.2	2.9	79.3	101.7
	17.6	3.1	1.7	79.2	101.6
	17.3	2.1	1.8	77.6	98.8
	17.7	2.0	2.0	81.0	102.7
	18.2	1.5	1.0	78.5	99.2
	17.9	1.5	1.3	77.4	98.1

(W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 168)

SMALTITE

$(Co,Ni)As_{3-x}$

Smaltite is the Co-rich As-deficient member of the skutterudite series.

Ontario

31 C/5 Smaltite has been noted in the iron ore at the Dominion Mine, Madoc Township, Hastings County, conc. II, lot 2 (G.M. Dawson, 1895: Geol. Surv. Can., Ann. Rept., VIII, pp. 129, 129A).

31 M/5 Smaltite crystals embedded in dolomite gangue occur at the Foster Mine in the Cobalt area. The crystals are slightly distorted cubes with small octahedral and still smaller rhombic dodecahedral faces. Some of the cubes reach a size of 5 millimetres (H.V. Ellsworth, 1916: Ont. Bur. Mines, Ann. Rept., vol 25, Pt. I, p. 209).

41 P/10 Massive smaltite is reported from an open cut in a calcite vein at No. 1 shaft, Hudson Bay Mine, Leith Township, Gowganda area (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol 30, Pt. III, p. 42).

41 P/10 Isolated, well-formed, isometric crystals of smaltite occur in niccolite and timiskamite, at the Coleroy Mine, Gowganda area (E.W. Todd, 1926: Ont. Dept. Mines, Ann. Rept., vol. 35, Pt. III, p. 76).

41 P/10 Calcite veins varying in width from 2 to 10 cm containing smaltite and sulphides, occur at the O'Brien Mine, Miller Lake, Gowganda area (E. Thomson, 1933: Univ. Toronto Stud., Geol. Ser., 35, p. 61).

41 P/10 Aggregations of smaltite were encountered in calcite veins at the 9 m level of the Silver Bullion Mine, Nicol Township, Gowganda area (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. III, p. 34).

41 P/15 Smaltite, associated with massive bornite and native silver can be found in veins of calcite varying in width up to 15 cm at claim L.O. 305, Morel Township, in the Gowganda area (A.G. Burrows, 1921: Ont. Dept. Mines, Ann. Rept., vol 30, Pt. III, p. 44).

52 A/7 Smaltite is reported to be a constituent of the rich silver ore mined at the Silver Islet Mine located on the southwest end of Silver Islet. (T.L. Tanton, 1931: Geol Surv. Can., Memoir 167).

Quebec

31 M/3 Small veins of smaltite have been reported at Fabre, near Lake Timiskaming, Timiskaming County (J. Obalski, 1907: Mining Operations in Quebec, p. 57).

SMITHSONITE

$ZnCO_3$

Smithsonite is a secondary mineral found chiefly in the oxidized zone of ore deposits, or as a replacement of calcareous rocks adjacent thereto, and derived by the alteration of primary zinc minerals.

British Columbia

82 K/2 Masses of crystalline smithsonite are reported from the Moonshine claims near Lardeau, which were worked for silver, lead and zinc by Willett Mines Limited. Woodruffite, aurichalcite, gunningite and hydrozincite are associated (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 251).

82 K/10 Smithsonite was found accompanying sphalerite galena, siderite, tetrahedrite, pyrite, and pyrargyrite in a gangue composed of crushed and brecciated slate, calcite and quartz in the Alamo Mine, at the head of Hauser Creek, Slocan mining division (G.C. Hoffmann, 1895: Geol. Surv. Can., Ann. Rept., VIII, p. 14R).

82 N/5 Minor smithsonite is found with anglesite, cerussite, malachite and azurite in oxidized lead-zinc-silver-gold ore on the Waverley property located just north of Tangier Pass and accessible from Albert Canyon (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

Northwest Territories

68 H/8
68 H/9 Smithsonite, sphalerite and galena are the minerals and ore associated with pyrite and barite at the Main and East (Eclipse) showing of Bankeno Mines Limited on Little Cornwallis Island. The Main showing is on the southwest corner of the Island and the East showing lies 26 km to the northeast (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 58).

Ontario

30 M/5 Smithsonite is present as an alteration product of sphalerite associated with calcite and dolomite at the Dundas South quarry on lots 10 and 11, conc II, West Flamborough Township.. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 363).

Quebec

22 B/16 Smithsonite is found as aggregates of tiny grey crystals and as fine-grained massive white patches on quartz at the Federal Mine; it fluoresces orange-pink in ultraviolet light. Hydrozincite and hemimorphite are associated. The mine is located about 1.6 km west of the Trans Gaspésien Highway from a junction 6.4 km south of the south gate to Parc de la Gaspésie (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 71).

Yukon

105 M/14 Small amounts of smithsonite are present in most of the oxidized lodes and in some zones of reduction in the Keno Hill - Galena Hill area. It occurs as encrustations, earthy and porous masses and as small botroyidal masses. Gypsum, limonite, calcite and anglesite are common associates (R.W. Boyle, 1965: Geol. Surv. Can., Bull. 111, p. 149).

105 P/14 Abundant smithsonite occurs with barite, cerussite and hydrozincite in a fault zone at the ART-EKWI property at 63°51'N, 129°12'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 C/7 Massive smithsonite is common and cerussite and hydrozincite also occur in the oxidized zone of zinc-lead deposits at Goz Creek at 64°26'N, 132°31'W. Similar deposits occur at 64°26'N, 132°55'W, about 24 km west of Goz Creek on the Bonnet Plume River (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 C/10 Smithsonite occurs with yellow sphalerite on claims located along an upper tributary of the Snake River at 64°34'N, 132°32'W (W.O. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 33-35).

SMYTHITE

$(Fe,Ni)_9S_{11}$

Manitoba

52 L/6 Disseminated to massive sulphides, including pyrrhotite, chalcopyrite, pyrite, sphalerite, pentlandite, smythite, marcasite and violarite, occur in samples from the Ore Fault Group of Bird River Mines, Township 17, Range 15E, in the Lac du Bonnet area. Electron microprobe analysis of the smythite: Fe 56.3, Ni 1.9, S 41.1, total 99.3 (E.H. Nickel, 1972: Can. Mineralogist, 11, p. 514).

Ontario

31 M/5 Smythite was discovered with calcite and sulphides in a vein at the Silverfields Mine, Coleman Township. Electron probe analyses gave: Fe 58.5, Ni 0.4, S 40.9, total 99.8, for smythite associated with pyrrhotite; Fe 58.1, Ni 0.5, S 41.5, total 100.1, for smythite associated with pyrite (L.A. Taylor, 1970: Carnegie Inst. Year Book 68 for 1968-69).

42 D/14 The principal ore minerals at the Nicopor Mine are pyrrhotite, pyrite and magnetite. Chalcopyrite, smythite and violarite are present in small amounts. Electron microprobe analysis of smythite: Fe 56.8, Ni 1.7, S 41.1, total 99.6. The mine is along the Canadian Pacific railway line 12.8 km north of Schreiber (E.H. Nickel, 1972: Can. Mineralogist, 11, p. 514).

52 B/14 Irregular masses of sulphides and magnetite occur in highly altered gabbro at the Atikokan Iron Mine in Hutchinson Township on the Atikokan River between Sapawa Lake and Whiskey Jack Lake. The sulphide minerals include pyrrhotite, pyrite, chalcopyrite, pentlandite, smythite and sphalerite. Electron microprobe analysis of smythite: Fe 56.9, Ni 2.8, S 41.2, total 100.9 (E.H. Nickel, 1972: Can. Mineralogist, 11, p. 514).

Quebec

31 M/6 Ore samples from the Lorraine Mine on lot 51, range III, Gaboury Township consist chiefly of pyrrhotite and chalcopyrite with lesser amount of smythite, pyrite, pentlandite, violarite, marcasite and magnetite. Electron microprobe analysis of smythite: (1) Fe 56.4, Ni 2.2, S 40.5, total 99.1 (average of 17 analyses); (2) Fe 50.9, Ni 7.5, S 40.7, total 99.1 (highest Ni value) (E.H. Nickel, 1972: Can. Mineralogist, 11, p. 514).

soapstone

(see TALC)

SODALITE

$Na_4Al_3Si_3O_{12}Cl$

Sodalite is a member of the feldspathoid group of alkali aluminosilicates that form in place of feldspars in alkali-rich, silica-deficient rocks. It commonly has an attractive blue colour and may be cut and polished as an ornamental stone or gemstone.

British Columbia

82 N/1 A light corn-flower blue sodalite of great beauty is found in some abundance in the vicinity of Ice River, a tributary of the Beaver-foot River in the Golden mining division (D.S.M. Field, 1951: Can. Mining J., vol. 72, Pt. 2, Sept., pp. 82-83). Chemical analysis of sodalite from Ice River: SiO_2 37.50, Al_2O_3 31.82, Fe_2O_3 0.01, Na_2O 19.34, K_2O 0.27, Na 4.61, Cl 7.12, total 100.67; S.G. 2.293 (B.J. Harrington, 1886: Trans. Roy, Soc. Can., Ser. 1, vol. IV, Sec. III, p. 81).

Ontario

31 D/16 Sodalite occurs in nepheline pegmatite at the Fraser quarries on lot 30, conc. IV, Glamorgan Township. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 364).

31 F/4 Sodalite occurs in Dungannon Township, Hastings County, conc. XIII, lot 29, and conc. XIV, lot 25 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 208).

31 F/4 Sodalite occurs in Dungannon Township, Hastings County, conc. XIII, lot 29, and conc. XIV, lot 25 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 208).

31 F/4 Chemical analysis of sodalite from Dungannon, Hastings County, by Harrington: SiO_2 36.58, Al_2O_3 31.05, FeO 0.20, Na_2O 24.81, K_2O 0.79, Cl 6.88, SO_3 0.12, H_2O 0.27, insol. 0.80, total 101.50, less O for Cl 1.55, total 99.95 (B.J. Harrington, 1894: Am. J. Sci., Ser. 3, vol. 48, p. 17).

31 F/4 Sodalite-bearing nepheline rock occurs in tongues which are in immediate contact with impure crystalline limestone, Dungannon Township, Hastings County, near Bancroft. Chemical analysis by H.C. Rickaby yielded: SiO_2 37.08, Al_2O_3 32.58, CaO 0.50, MgO 0.03, MnO tr., Na_2O 22.26, K_2O 0.53, H_2O 0.67, CO_2 0.32, Cl 6.82, total 100.79 (A.L. Parsons, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 18) (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 6).

31 F/4 Nuggets of blue translucent flawless sodalite occur northeast of Bancroft on the York River, Dungannon Township, Hastings County (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 79).

31 F/4 Hackmanite, a variety of sodalite which undergoes a remarkable colour intensification following brief exposure to ultraviolet light, occurs near Bancroft, Dungannon Township, Hastings County (D.L. Lee, 1936: Am. Mineralogist, 21, p. 714) (R.D. Kirk, 1955: Am. Mineralogist, 40, p. 22).

31 F/4 A specimen of sodalite from south half lot 1, conc. XII, Faraday Township, is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70 p. 364).

31 F/6 Slender crystals of corundum occur with small patches of sodalite and cancrinite in nepheline syenite on the Gutz farm about 0.8 km from Rosenthal (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 40).

31 L/3 The mineral collection at the Royal Ontario Museum includes sodalite from the southeast corner of Callander Bay, conc. XXV, North Himsworth Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 365).

42 D/15 A specimen of the hackmanite variety of sodalite collected along Highway 17 northeast of Coldwell in Coldwell Township is included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 365).

Quebec

31 H/2 Sodalite occurs in the nepheline syenite at Brome, Brome County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 58T).

31 H/5
31 H/12 Chemical analysis of sodalite from Montreal, Hochelaga County: SiO_2 37.52, Al_2O_3 31.38, Fe_2O_3 tr., CaO 0.35, MgO tr., Na_2O 19.12, K_2O 0.78, Na 4.48, Cl 6.91, total 100.54; S.G. 2.220 (B.J. Harrington, 1886: Trans. Roy, Soc. Can., Ser. 1, vol. IV, sec. III, p. 81).

31 H/11 Sodalite occurs at Beloeil, Rouville County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 58T).

31 H/11 Nepheline syenite grading into nepheline-sodalite syenite forms the eastern half of Mont St-Hilaire. At the Desourdy quarry on the northeast slope of Mont St-Hilaire, sodalite occurs as a constituent of veins and vugs in nepheline syenite (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

SODDYITE

$5UO_3.2SiO_2.6H_2O$

Saskatchewan

74 N/9 The secondary uranium mineral soddyite has been identified with uraninite at the HU-HP claims on the Oldman River about 9.6 km from its mouth on Lake Athabasca (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 304).

soluble anhydrite

(see BASSANITE)

SORBYITE

$17PbS.11(Sb,As)_2S_3$

Ontario

31 C/6 The new mineral, sorbyite, was discovered in specimens collected from a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed. Taylor of Madoc. Electron probe microanalysis (average of two grains) by G.R. Lachance: Pb 46.5, Sb 25.25, As 5.5, S 21.25, total 98.50 (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 191-213).

souesite

(see NICKEL-IRON)

SPENCERITE

$Zn_4(PO_4)_2(OH)_2 \cdot 3H_2O$

British Columbia

82 F/6 This rare mineral was found at the Hudson Bay Mine about 8 km east of Salmo, near Nelson, in the West Kootenay district. The mineral forms the central portions of stalactitic growths, being surrounded by a shell of hemimorphite. Chemical analyses by Walker: ZnO 60.18, 60.18; P_2O_5 26.14, 26.23; H_2O (at 160°) 9.79, 9.83; H_2O (at 200°) 3.53, 3.47; total 99.64, 99.71. Chemical analysis by Widdowson: ZnO 60.05, P_2O_5 26.74, H_2O 13.70, MnO 0.41, SiO_2 0.40, total 101.30; S.G. 3.14 (T.L. Walker, 1916: Mineral. Mag., 18 pp. 76-81).

SPENCITE

$(Ca,Fe)_2(Y,La)_3(Si,B,Al)_8(O,OH,F,Cl)_{20}$

Ontario

31 E/1 This new borate-silicate of calcium and yttrium was named after the Canadian mineralogist Hugh S. Spence, who collected the mineral in 1934 from a prospect pit in Cardiff Township, lot 7, conc. XX, Haliburton County. It occurred as dark reddish brown masses in a narrow pegmatite stringer in a vuggy pyroxenite, associated with calcite, apatite, diopside, fluorite and wernerite. X-ray diffraction data could not be obtained because the mineral is metamict and decomposes on heating before it recrystallizes. Chemical analysis by C.O. Ingamells: Na_2O 0.11, K_2O 0.01, MgO 0.50, CaO 7.81, SrO 0.05, Fe_2O_3 3.22, FeO 0.00, MnO 0.60, Y_2O_3 17.77, La_2O_3 0.73, CeO_2 2.49, Pr_6O_{11} 0.54, Nd_2O_3 1.84, Sm_2O_3 1.07, Eu_2O_3 0.14, Gd_2O_3 1.61, Tb_4O_7 0.34, Dy_2O_3 1.92, Ho_2O_3 0.50, Er_2O_3 1.99, TM_2O_3 0.31, Yb_2O_3 2.88, Lu_2O_3 0.27, ThO_2 1.84, Al_2O_3 3.87, TiO_2 0.27, B_2O_3 10.04, SiO_2 24.89, P_2O_5 0.02, Cl 0.45, F 0.44, H_2O^+ 9.82, H_2O^- 1.93, total 100.27, less O for F, Cl 0.28, total 99.99 C. Frondel, 1961: Can. Mineralogist, 6, pp. 576-581) (O.I. Joensuu and C.O. Ingamells, 1966: Can. Mineralogist, 8, pp. 647, 648).

31 E/1 Chemical analyses of spencites from lot 7, conc. XX Cardiff Township: (1) P_2O_5 2.40, TiO_2 0.45, SiO_2 26.40, ThO_2 1.90, RE_2O_3 36.84, Al_2O_3 2.82, B_2O_3 2.37, Fe_2O_3 7.15, CaO 5.48, MgO 1.08, MnO 0.35, H_2O 12.28, F 0.89, U_3O_8 0.09, less O for F 0.37, total 100.13; (2) P_2O_5 1.84, TiO_2 0.65, SiO_2 23.44, ThO_2 1.35, RE_2O_3 33.72, Al_2O_3 6.97, B_2O_3 10.46, Fe_2O_3 2.22, CaO 13.90, MgO 0.77, MnO 0.46, H_2O 3.84, F 0.30, less O for F 0.12, total 99.80; and from calcite-fluorite-uraninite vein dykes on the Cardiff property, South Zone, lot 1, conc. XVIII, Cardiff Township: (1) amber colour, SiO_2 17.62, ThO_2 2.32, RE_2O_3 50.68, Al_2O_3 1.20, B_2O_3 10.53, Fe_2O_3 1.80, CaO 9.66, MgO 0.15, H_2O 4.98, F 1.05, U_3O_8 0.46, less O for F 0.44, total 100.01; (2) partial analysis of associated black-cloured spencite: TiO_2 0.06, SiO_2 16.82, ThO_2 9.50, RE_2O_3 44.13, Al_2O_3 3.19, Fe_2O_3 1.15, CaO 5.45, MnO 0.56 H_2O 12.72 (D.D. Hogarth, H.R. Steacy, E.I. Semenov, E.G. Proshchenko, M.E. Kazakova and Z.T. Kataeva, 1973: Can. Mineralogist, 12, p. 66).

31 F/4 Chemical analysis of blackish brown spencite from the Faraday Mine: Nb_2O_5 1.44, TiO_2 0.47, SiO_2 24.40, ThO_2 2.30, RE_2O_3 35.11, Al_2O_3 1.46, B_2O_3 7.00, Fe_2O_3 3.57, CaO 12.90, SrO 0.10, MgO 0.40, MnO 0.54, Na_2O 0.68, H_2O 8.96, F 0.40, less O for F 0.17, total 99.56 (D.D. Hogarth, H.R. Steacy, E.I. Semenov, E.G. Proshchenko, M.E. Kazakova and Z.T. Kataeva, 1973: Can. Mineralogist, 12, p. 66).

SPERRYLITE

$PtAs_2$

This rare precious metal mineral was first described in 1889 and named after F.L. Sperry, a chemist of Sudbury, Ontario, who found the mineral in the gossan of the Vermilion Mine.

British Columbia

92 H/10 An occurrence of sperrylite with chromite, magnetite, chalcopyrite, millerite and asbestos in a breccia pipe in peridotite is reported on the D and R claims at 49°32'N, 120°54'W, at the junction of the Tulameen River and Britton Creek at about 850 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1973, p. 148).

92 I/4 Sperrylite has been found in the black sand of the Fraser River, near Lytton. One highly modified cubic crystal and several hard tin-white rounded grains were identified by X-ray powder pattern (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 526).

Ontario

31 M/4 A specimen of sperrylite from the Kanichee (Cuniptau) Mine 6.4 km northwest of Timagami in Strathy Township is in the mineral collection at the Royal Ontario Museum. It is associated with chalcopyrite and michenerite (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 366).

41 I/6 Chemical analysis of sperrylite, by Wells, from the Vermilion Mine, conc. IV, lot 6, Denison Township, Sudbury district yielded: As 40.98, Sb 0.50, Pt 52.57, Rh 0.72, Pd tr., Fe 0.07, SnO_2 4.62, total 99.46; S.G. 10.602 (H.L. Wells 1889: Am J. Sci., 3, vol. XXXVIII, pp. 67-73).

41 I/6
41 I/11 The mineral collection at the Royal Ontario Museum includes sperrylite specimens from the Copper Cliff Mine, lot 12, conc. II, McKim Township; and the Frood Mine, lots 6 and 7, conc. VI, McKim Township (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 366).

41 I/16 Sperrylite has been identified as a rare constituent of the ore at the Temagami (Copperfields) Mine, a former producer of copper, gold and silver ore. The mine is located on the south shore of the isthmus joining the northern and southern halves of Timagami Island in Timagami Lake. A road to the mine about 17.6 km long leads east from Highway 11 at a point 1.8 km south of Timagami village (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 12).

Quebec

32 D/8 Sperrylite has been found in a zone of metasediments on the property of Marbridge Mines Limited about 22.5 km north of Malartic on lots 9 to 13, range V, LaMotte Township (R. Buchan and J.H. Blowes, 1968: C.I.M. Bull., 61, p. 534).

Saskatchewan

74 A/7 Masses of pyrrhotite, violarite and chalcopyrite that constitute the orebody at the Rottenstone Mine also contain pentlandite, sperrylite, sphalerite and cubanite. The deposit is on the southeast shore of Rottenstone Lake (Ann P. Sabina 1972: Geol. Surv. Can., Paper 71-27, p. 8).

SPESSARTINE

$Mn_3Al_2(SiO_4)_3$

The name spessartine (or spessartite) is applied to the dominantly manganese-aluminium compositional variety of the garnet group. Lesser amounts of ferrous iron, magnesium and calcium are commonly present in the mineral. Spessartine is dark red to black in colour and less common than most of the other garnet species. It has been found in skarn deposits, metamorphosed sedimentary rocks and granitic pegmatites.

Nova Scotia

11 E/1 A spessartite-bearing rock occurs at Rocky Lake, 4.8 km northwest of Liscomb. The principal minerals are spessartite, rhodonite and quartz. Other minerals include rhodochrosite, pyrophanite, mica, hornblende, magnetite and pyrrhotite (A.G. Jonhston and W.D. McCartney, 1965: Geol. Surv. Can., Paper 64-37, p. 51).

20 O/16 Lenses and nodules composed chiefly of spessartine and quartz occur in the Halifax formation and are exposed near Sandford in Yarmouth County. The spessartine is pale yellowish pink to colourless; it has an index of refraction of 1.805 ± 0.005 and a unit cell edge of 11.613Å. Chemical analysis by J.A. Maxwell: SiO_2 39.74, TiO_2 0.34, Al_2O_3 18.79, Fe_2O_3 1.52, FeO 8.79, MnO 26.60, MgO 1.09, CaO 2.66, Na_2O 0.02, P_2O_5 0.07, H_2O^+ 0.26, H_2O^- 0.08, total 99.96 (E.A. Schiller and F.C. Taylor, 1965: Am. Mineralogist, 50, p. 1477).

Quebec

31 G/13 Chemical analysis of spessartine from the Villeneuve Mica Mine, Villeneuve Township, range I, lot 31, yielded: SiO_2 36.30, Al_2O_3 19.20, FeO 10.66, MnO 30.06, CaO 3.07, MgO 0.43, loss on ign. 0.31, total 100.03 (B.J. Harrington, 1890-91: Can. Rec. Sci., IV, p. 226).

31 G/13 Yttrian spessartine (containing 5 Y by X-ray fluorescence analysis) occurs at the Evans-Lou Mine near Wakefield Lake about 40 km north of Ottawa (N.M. Miles, D.D. Hogarth and D.S. Russell, 1971: Am. Mineralogist, 56, p. 395).

32 C/5 Spessartine occurs as bright yellow to orange-yellow grains, uniformly ditributed throughout a spodumene pegmatite, south of Lake Lortie, Lacorne Township, Abibiti County. Chemical analysis by H.V. Ellsworth: SiO_2 38.2, Al_2O_3 20.8, Fe_2O_3 + FeO 2.2, MgO 0.4, CaO 0.4, MnO 38.0, total 100.0; S.G. 4.279 (L.P. Tremblay, 1950: Geol. Surv. Can., Mem. 253, p. 47).

32 D/8
32 D/9 Spessartite is associated with spodumene in an essentially quartz-muscovite-albite-microcline assemblage in Figuery Township, Abitibi-East County, range II, lot 36 (W.W. Weber, 1959: Que. Dept. Mines, Prelim, Rept., 257, p. 15).

SPHAEROCOBALTITE

$CoCO_3$

Ontario

31 M/5 The mineral collection at the Royal Ontario Museum includes sphaerocobaltite from the O'Brien Mine, claim RL403, south half, lot 4, conc. VI, Coleman Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 367).

SPHALERITE

ZnS

Sphalerite is the most common zinc mineral and principal economic source of zinc. It occurs in an unusual variety of colours for a sulphide mineral, ranging from white, almost colourless (cleiophane), to black (black jack). Sphalerite often contains considerable iron (marmatite) and lesser amounts of cadmium (pribramite) and manganese. Because of the very large number of reported occurrences of sphalerite in Canada (the New Brunswick Research and Productivity Council lists more than 100 localities in that province alone) only a few representative occurrences are noted here. The alternative name, blende, is widely used, especially in Europe.

British Columbia

82 E/6 Sphalerite, varying in colour from light amber to black, occurs at the Highland Bell Mine on Wallace Mountain, near Beaverdell, 37 km east of Penticton, in the Greenwood mining division. Chemical analysis by R.N. Williams: Zn 58.30, Cd 0.55, Fe 7.15, Mn 0.09, Cu 1.20, S 32.27, As tr., Sb tr., Pb tr., insol. 0.24, total 99.50 (A.B. Staples and H.V. Warren, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 28).

82 F/4 A lead-zinc-silver ore has been mined from the Bluebird vein at 49°04'N, 117°48'W, 800 m south of the Rossland municipal boundary astride Trail Creek at 880 m elevation. Galena, sphalerite, pyrite, arsenopyrite, stibnite and pyrrhotite occur in a quartz gangue (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1974, p. 70).

82 F/9
82 F/10 The Sullivan orebody, near Kimberley, is a sulphide replacement of argillaceous sediments, and the Bluebell orebody, near Riondel, is a sulphide replacement of limestone. Sphalerite and galena are the main minerals and they are associated with pyrrhotite and pyrite (N. Campbell and W.T. Irvine, 1960: Can. Inst. Mining Met., Bull. 53, No. 575, p. 155).

82 K/3 The National Mineral Collection includes tetrahedral crystals of translucent sphalerite from the Lucky Jim Mine at Slocan in the west Kootenay district.

82 M/1
82 M/7
82 M/8
82 M/15
82 M/16 Lead-zinc deposits, generally low in silver, are the predominant type in the Big Bend map area, and are commonly associated with limestones of the Badshot Formation and lower part of the Lardeau Group, and with impure marbles surrounding the core of the gneiss dome that features the Shuswap Complex. The following deposits are known:

82 M/1 - River Jordon property, 19.3 km northwest of Revelstoke between elevations of

1770 m and 2410 m, on the northern slopes of Mount Copeland. Mastodon Mine at an elevation of 1500 m on the ridge between La Forme and Carnes Creeks. Lead King showing about 3.2 km east of the Mastodon mill. Little Slide showings, northeast of the east fork of La Forme Creek about 4.8 km east of the Mastodon mill.

82 M/7 - The Cottonbelt property lies between elevations of 1500 and 1800 m on the hills south of Blais Creek. It is accessible by road and trail, 29 km from the head of Seymour Arm.

82 M/8 - J and L group on the shoulder between the east and south forks of Carnes Creek about 13 km by trail from the Big Bend highway. A and E showing on the northeastern slopes of the hill south of Burke Creek between 1800 and 2160 m elevation. The Keystone claim at the head of Keystone Creek is accessible by logging road and trail from the Big Bend highway.

82 M/15 - The Ruddock Creek property extends from the head of Ruddock Creek at an elevation of 2290 m northwesterly around the summit mass of the peak, 10 km west of Gordon Horne peak, and westerly into Oliver Creek valley.

82 M/16 - The Kinbasket property lies 90 to 120 m above the southwestern shore of Kinbasket Lake between Trident and Windy Creeks (J.O. Wheeler, 1965: Geol. Surv. Can., Paper 64-32, p. 27-32).

82 M/3
82 M/4 Sphalerite, galena and pyrrhotite ore has been mined from a property at 51°03.6'N, 119°32.3'W, at 1500 m, to 1800 m elevations on Adams plateau east of Adams Lake and north of Scotch Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 85).

82 N/8 Resin yellow sphalerite occurs at the Monarch Mine, 4.8 km east of Field in the Golden mining division (J.D. Galloway, 1915: Rept. of Minister of Mines, British Columbia, pp. K80-82).

92 F/12 The Lynx deposit of Western Mines Limited west of the south end of Buttle Lake is a zinc-copper-lead massive sulphide deposit. The main ore consists of alternating bands of chalcopyrite and sphalerite with less abundant galena, tetrahedrite and bornite (J.E. Muller and D.J.T. Carson, 1969: Geol. Surv. Can., Paper 68-50, p. 37).

92 L/12 Veins of sphalerite, 15 to 60 cm wide, occur on the Dorlon showings 360 m south of the junction of Nahwitte River and Kains Creek (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1972, p. 306).

93 L/10 Pyrite, sphalerite, chalcopyrite, galena and tetrahedrite occur in several deposits on Grouse Mountain at the south end of the Babine Range 19.3 km due north of Houston (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1971, p. 397).

93 L/15 Galena and sphalerite have been mined at the Cronin Mine at 54°55.3'N, 126°48.5'W, on the east slope of Mount Cronin (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1972, p. 420).

104 B/9 Sulphide mineralization consisting mainly of massive sphalerite and disseminated tetrahedrite has been found at 1060 m to 1130 m elevation along Eskay Creek on the east slope of Prout Plateau 2.4 km east of Tom Mackay Lake (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1972, p. 516).

104 I/1 Chalcopyrite, sphalerite and bornite, both dispersed and massive, are present on claims centred at 58°12'N, 128°22'W, about 21 km southeast of the south end of Rainbow Lake at about 1500 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 343).

104 K/11 Massive sulphide replacement of limestone has been explored on the Eriksen-Ashby property at 58°39'N, 133°28'W, The minerals are pyrite, sphalerite, galena and freibergite (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 55).

104 K/12 The Tulsequah Chief Mine at 58°44'N, 133°35'W, and the Big Bull (Manville) Mine at 58°40'N, 133°33'W, produced copper, lead, zinc, gold, silver and cadmium in the period 1951 to 1957. The ore consists of massive fine-grained pyrite and chalcopyrite in lenses, and sphalerite, pyrite and galena in quartz-carbonate-barite gangue (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 54-55).

104 N/12 Galena, sphalerite and arsenopyrite occur with minor chalcopyrite and pyrite in quartz, ankerite and calcite at the Atlin-Ruffner Mine. The mine site is at the 1190 m level on the northwestern slope of Leonard Mountain overlooking Fourth of July creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 39).

104 P/3 Sphalerite, galena, chalcopyrite, scheelite and hydrozincite occur in a shear zone in limestone at the McDame Belle property on McDame Creek about 1.6 km east of Centerville (H. Gabrielse, 1963: Geol. Surv. Can., Mem. 319, p. 114).

114 P/10 Sulphide deposits containing bornite, chalcocite, chalcopyrite, sphalerite and galena occur in skarn zones on Mineral Mountain and Copper Butte which are located northwest and north respectively of the hairpin turn at Mile 52 (83.5 km) Haines Road (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 59).

Manitoba

63 I/6
63 I/7 A lenticular replacement body containing sphalerite, galena, chalcopyrite, jamesonite and freibergite occurs in the Echimamish area, 72 km northeast of Norway House (T.L. Tanton, 1937: Geol Surv. Can., Paper 38-18, p. 16).

63 J/13 Seven massive sulphide deposits of the type pyrite-pyrrhotite-sphalerite-chalcopyrite-galena have been investigated in the Snow Lake-Herb Lake area (J.F Davies, 1960: Can. Inst. Mining Met., Bull. 53, No. 575, p. 142).

63 K/12 Pyrite-chalcopyrite-sphalerite orebodies occur at the Mandy and Schist Lake mines on the shore of the Northwest Arm of Schist Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 38, 39).

63 K/13
63 K/14 Massive copper-zinc sulphide orebodies consisting mainly of pyrite but with minor sphalerite and chalcopyrite are located in the Flin-Flon and Sherridon area (C.H. Stockwell, 1946: Geol. Surv. Can., Paper 46-14, p. 4).

63 K/16 Two base-metal orebodies occur in the Chisel Lake area. The Chisel Lake orebody is directly below the southern end of Chisel Lake. The Ghost Lake orebody is 1200 m east of the Chisel Lake orebody and 600 m northeast of Lost Lake. The principal sulphides in order of decreasing

abundance are: sphalerite, pyrite, pyrrhotite, chalcopyrite, galena and arsenopyrite. Also reported are: gudmundite, marcasite, meneghinite, tetrahedrite, native gold and bournonite-seligmannite (H. Williams, 1966: Geol. Surv. Can., Memoir 342 p. 30).

New Brunswick

For an extensive listing of occurrences of sphalerite and other metallic minerals see: The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick, Part B. Metallic, by the New Brunswick Research and Productivity Council, edited by D. Abbott, 1965.

21 G/7 Sphalerite occurs in rhyolite at Mount Pleasant, Charlotte County, along with cassiterite, stannite, chalcopyrite, bornite, chalcocite, tennantite, covellite, galena, molybdenite, wolframite and scheelite (A.A. Ruitenburg, 1963: M.Sc. thesis, Univ. of New Brunswick).

21 G/7 Electron probe microanalysis of sphalerite from the Mount Pleasant tin deposit, by J. Rucklidge: Cu 5.7, Sn 0.0, Fe 5.5, Zn 56.4, S 32.8, In 1.1, Ag 0.0, total 101.5. Sphalerite and stannite are the main carriers of indium in the ores (R.S. Boorman and D. Abbott, 1967: Can. Mineralogist, 9, p. 166-179).

21 O
21 P A large number of occurrences are known in the Bathurst-Newcastle area in Restigouche, Gloucester and Northumberland counties. These include several important massive sulphide base metal orebodies, notably Brunswick, Heath Steele, and Wedge, in which the main associates of sphalerite are: pyrite, pyrrhotite, arsenopyrite, chalcopyrite and galena (Supriya Roy, 1961: Geol. Surv. Can., Bull. 72) (A.L. McAllister, 1960: Can. Inst. Mining Met., Bull. 53, No. 574, pp. 88-98).

21 P/5 Sphalerite is closely associated with chalcopyrite at the Captain deposit on the headwaters of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland counties about 1.4 km east of Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can., Paper 66-18, p. 11).

Newfoundland

12 A/15 Sphalerite is an important constituent of the massive sulphide orebodies at Buchans. It is associated with chalcopyrite, galena, pyrite and barite (D.M. Barid, 1960: Can. Inst. Mining Met., Bull. 53, No. 574, pp. 77-80).

12 G/1 Massive sulphides (pyrite, chalcopyrite and sphalerite) occur in sheared fragmental chloritized andesite at York Harbour (D.M. Baird, 1960: Can. Inst. Mining. Met., Bull, 53, No. 574, pp. 77-80).

12 I/5 Sphalerite forms coarsely crystalline aggregates and, less commonly, colloform masses at the Newfoundland Zinc Mine. Minor amounts of galena, pyrite and marcasite are associated with the sphalerite. The deposit is 11.2 km by road inland from Daniel's Harbour (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 138).

Northwest Territories

48 C/1 A flat-lying orebody 90 m wide, 9 to 15 m thick and 3.2 km long has been found on the south shore of Strathcona Sound. The body is near massive pyrite with varying amounts of sphalerite, galena and minor marcasite (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970; Volume 2, p. 152; Dept. Indian and Northern Affairs).

68 H/8
68 H/9 Galena, sphalerite and smithsonite are the principal minerals on the properties of Bankeno Mines Limited on Little Cornwallis Island. The Main showing is in the southwest corner of the Island at about 75°22'N, 96°55'W. The East (or Eclipse) showing is 26 km northeast of the Main showing. Some barite and pyrite are also present (E.A. Schiller, 1965: Geol. Surv. Can., Paper 65-11, p. 58).

75 M/2 A large number of claims have been staked in the Indian Mountain Lake - Benjamin Lake area in the search for zinc-lead-silver ore. A deposit of about one million tonnes has been outlined just south of BB Lake on the property of Indian Mountain Metal Mines Ltd. (R.I. Thorpe, 1966: Geol. Surv. Can., Paper 66-52, p. 21).

85 B/16 Sphalerite, galena and marcasite occur as disseminated grains, masses and veinlets replacing dolomite or calcite in the Pine Point area, south of Great Slave Lake. Colloform and stalactitic masses of sulphide are not uncommon (Western Miner and Oil Review, 1963: vol. 36, No. 8, p. 26).

106 A/12 Coarsely crystalline galena and sphalerite occur in vugs and veins scattered throughout Ordovician to Devonian dolomites at 64°32'N, 129°53'W, 5 km north of the Mountain River (M.P. Cecile and D.W. Morrow, 1978: Geol. Surv. Can., Paper 78-1A, p. 472).

Nova Scotia

The following occurrences have been noted by B.J. Keating, 1960, in Can. Inst. Mining Met., Bull, 53, No. 574, pp. 81-87.

11 E/3 With pyrite and argentiferous galena in limestone at Gays River settlement in Halifax County.

11 E/6 With galena in pyritized limestone at Smithfield, Colchester County.

11 F/9 With pyrite, chalcopyrite and galena at Stirling, 48 km northeast of St. Peter's, Richmond County.

11 K/10 With pyrite, chalcopyrite and galena in altered lavas and tuffs at Rocky Brook in Inverness County.

11 N/2 With pyrite and pyrrhotite in crystalline limestone at Meat Cove, Inverness County.

21 H/1 With pyrite, chalcopyrite, galena and barite at Magnet Cove, Walton, Hants County.

Ontario

31 C/7 Dark brown sphalerite has been found in close association with galena at the Frontenac (Frontenac Draper Lake) lead mine. The sulphide-bearing veins occur within marble and gneiss about 27 km north of Kingston along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 24).

31 C/10 Dark brown sphalerite occurs as granular masses and disseminated grains in crystalline limestone at the Long Lake Zinc Mine, about 800 m from Long Lake village and 9 km northwest of Parham (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 19).

31 F/7 Dark brown sphalerite occurs in crystalline limestone at the Renprior zinc mine located about 6.4 km south of Renfrew on lots 1 and 2, conc. IV, Admaston Township (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 14).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16
Sphalerite is common in the Cobalt-Gowganda ores. It occurs in the ore veins, in late calcite veins, in fault veins and in the wall and country rock. Electron microprobe analyses are as follows: massive, end of ore vein, Zn 65.54, Fe 1.61, Cd 0.08, S 33.53, total 100.76; massive, in ore vein, Zn 58.42-67.46, Fe 7.18-0.32, Cd 0.03-0.19, S 35.08-35.03, totals 100.71-103.00; fault vein, Zn 65.61, Fe 1.45, Cd 0.41, S 32.56, total 100.03; interflow, Zn 60.06, Fe 6.25, Mn 0.04, Cd 0.13, S 33.53, total 100.01; interflow, Zn 61.87, Fe 5.52, Mn 0.07, Cd 0.14, S 33.40, total 101.00; interflow, Zn 62.99, Fe 5.64, Mn 0.04, Cd 0.14, S 33.11, total 101.92; parallel veinlet, Zn 58.18-66.48, Fe 7.79-1.38, Cd 0.18, S 33.74-32.62, total 99.89-100.66; in carbonate vein, Zn 61.59-63.44, Fe 3.04-0.67, Cd 0.17, S 31.07-32.09, total 96.87 (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 219).

41 A/11 Honey yellow sphalerite of variable degree of transparency has been collected in the Wiarton area in Bruce County (D.S.M. Field, 1952: Can. Mining J., 73, Pt. 3, pp. 86-88).

41 A/14 Disc-shaped sphalerite concretions occur in thin-bedded Silurian dolomite on Bruce peninsula, and spherical concretions are found in massive beds within the same rocks. The conretions are well-developed 11.6 km south of Ferndale on the east side of No. 6 highway (D.F. Sangster and B.A. Liberty, 1971: Econ. Geol., 66, p. 1145).

41 I/11 The massive sulphide orebodies of Consolidated Sudbury Basin Mines, in Fairbanks and Creighton townships, contain sphalerite as the most abundant ore mineral. It is associated with major pyrite and minor chalcopyrite and galena (J.E. Thomson, 1960: Can. Inst. Mining Met., Bull. 53, No. 575, pp. 136-140).

42 A/5 Sphalerite occurs with pyrite, pyrrhotite and chalcopyrite at the Kam-Kotia Porcupine Mine in Robb Township, west of Timmins (W. Hogg, 1962: Western Miner and Oil Review, 35, No. 8, p. 18).

42 A/11 Sphalerite is the principal ore mineral at the Kidd Creek Mine which is probably the world's leading producer of silver and zinc. The mine is 25.7 km north of Timmins via Highway 655 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 139).

42 D/14 Sphalerite is the main ore mineral, and is associated with pyrite, chalcopyrite, and minor pyrrhotite at the Zenmac (Zenith) Metal Mine, located about 24 km northeast of Rossport in the Thunder Bay district (J.E. Thomson, 1960: Can. Inst. Mining Met., Bull. 53, No. 575, pp. 136-140).

42 F/4 The massive sulphide orebodies of Geco and Willroy mines in Gemmell Township contain major amounts of pyrite, pyrrhotite and sphalerite, in that order of abundance, and lesser amounts of chalcopyrite and galena (J.E. Thomson, 1960: Can. Inst. Mining Met., Bull. 53, No. 575, pp. 136-140).

52 G/15 The massive orebody at the Mattabi Mine consists of sphalerite, chalcopyrite, pyrite, galena, tetrahedrite-tennantite, arsenopyrite, minor pyrrhotite, and rare boulangerite and bournonite. The mine is between Sturgeon Lake and Bell Lake about 80 km north of Ignace (J.M. Franklin, J. Kasarda and K.H. Paulsen, 1975: Econ. Geol., 70, p. 63).

52 L/16 A small high grade base-metal deposit has been found in Mulcahy Township about 32 km west of Red Lake and 1200, south-southwest of the south end of Trout Bay. The principal minerals consist of coarse grains of pyrrhotite, sphalerite and chalcopyrite. There are lesser amounts of galena, marcasite, arsenopyrite, cobaltite, pyrargyrite, paracostibite, gudmundite, stannite, argentian tetrahedrite, antimonial silver, allargentum, ilmenite, breithauptite, cassiterite and nisbite (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10 p. 232).

Quebec

31 F/10 Sphalerite is the most important base metal sulphide, accompanying pyrrhotite, galena, chalcopyrite and pyrite at New Calumet Island, 4.4 km west of Bryson bridge, Grand Calumet Township, Pontiac County (J.E. Gilbert, 1960: Can. Inst. Mining Met. Bull 53, no. 575, pp. 128-135).

32 C/4 Sphalerite occurs with pyrite, tetrahedrite, galena, chalcopyrite and ruby silvers in the massive sulphide orebody at the Golden Manitou Mine, and with pyrite, pyrrhotite and chalcopyrite in the east Sullivan orebody, Bourlamaque Township (J.E. Gilbert, 1960: Can. Inst. Mining Met., Bull, 53, No. 575, pp. 128-135).

32 C/4 Pyrite, chalcopyrite and sphalerite are the principal ore minerals at the Louvem Mine 3.2 km by road north from Highway 59, 20.1 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv.Can., Paper 73-30, p. 120).

32 C/5 At the Vendome Mine the ore consists mainly of massive and disseminated pyrite, pyrrhotite and dark brown sphalerite. The mine is about 2.4 km southwest of Barraute (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, P. 108).

32 C/12 Sphalerite and pyrite were the chief ore minerals at the Barvue Mine at Barville, 11.2 km north of Barraute (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, P. 110).

32 D/6 Massive sulphide lenses of pyrite, pyrrhotite, chalcopyrite and sphalerite constitue the copper-zinc ore at the Millenbach Mine on Highway 46, 8.3 km from Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 52).

32 D/6
32 D/14
32 F/13
Massive sulphide deposits in which pyrite is the main sulphide and sphalerite the most abundant of the base metal sulphides include: Normetal Mining Corporation, Desmeloizes Township (32 D/14); West McDonald Mine, Mobrun Copper, Lake Dufault Mines and Waite Amulet Mines, Dufresnoy Township (32 D/6); Quemont Mining Corporation, Rouyn Township (32 D/6); and Mattagami Lake Mines, Galinee Township (32 F/13) (J.E. Gilbert, 1960: Can. Inst., Mining Met., Bull, 53, No. 575, pp. 128-135).

32 D/7 Massive and disseminated pyrite and sphalerite occur with chalcopyrite and galena at the D'Eldona Mine (Delbridge Mine). The mine is along rue Perrault, 5.8 km from its intersection with Highway 59 in Rouyn (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 60).

Saskatchewan

The following occurrences of sphalerite have been noted by A.R. Byers, 1960 in Can. Inst. Mining Met., Bull. 53, No. 575, pp. 145-152.

63 K/13 The orebodies of the Flin-Flon deposit are mostly massive sulphides, chiefly pyrite, including economic amounts of sphalerite and chalcopyrite.

63 L/10 Massive sphalerite-galena bodies occur at the Parrex deposit in the Hanson Lake area. Associated minerals are: arsenopyrite, pyrite, pyrrhotite, chalcopyrite, boulangerite, tetrahedrite, and argentite.

64 D/4 The base metal sulphides, sphalerite and chalcopyrite, are associated with pyrrhotite, pyrite and galena in pegmatite at the McKenzie deposit, Brabant Lake. Gahnite is a characteristic accessory mineral.

Yukon

95 D/5 Considerable exploration work has been carried out on a lead-zinc showing at 60°30'N, 127°57'W, about 3.2 km southwest of Quartz Lake in the valley of a creek locally known as Mine Creek and tributary to Hyland River, at an elevation of 976 m. The deposit, at the base of a limestone conglomerate, contains sphalerite, galena and pyrite in an ankerite matrix (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 73).

105 A/2 A large deposit of sphalerite and galena is located about 56 km north of Watson Lake (Western Miner and Oil Review, 35, No. 11, 1962, p. 32).

105 F/6 Large massive pyrite-pyrrhotite-galena-sphalerite deposits occur on the Faro property of Anvil Mining Coporation Limited at 61°21.5'N, 133°02'W, in the Rose Creek area of Anvil Range, about 4.8 km northwest of Ross River (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 43).

105 H/6 Sphalerite occurs with argentian galena and pyrite on the Matt Berry Property at 61°27'N, 129°25'W, near the mouth of Thompson Creek on the east side of East Arm, Frances Lake (D.C. Findlay, 1967: Geol. Surv. Can., Paper 67-40, p. 63).

105 H/8
105 H/9 Sphalerite-galena mineralization is widespread in the mountainous area between Tyers and Hyland Rivers. Showings that have been explored include: Fir Tree and Black Jack at 61°22'N, 128°23'W; Ron Group at 61°26.5'N, 128°31'W; Lake Group at 61°16.5'N, 128°19'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 68).

105 K/6 Two base metal deposits were discovered by drilling on the Faro property at 62°21.5'N, 133°22'W. The No. 1 zone contains much pyrrhotite with pyrite, sphalerite, galena, and minor chalcopyrite. The No. 2 zone lacks pyrrhotite (L.H. Green, 1966: Geol Surv. Can., Paper 66-31, p. 50).

105 K/6 A large base metal deposit containing sphalerite, pyrite, pyrrhotite, galena and chalcopyrite has been outlined by drilling on the Vangorda Creek property at 62°15'N, 133°12'W, extending southward from the southwestern base of Mt. Mye to Shrimp Lake (L.H. Green and C.I. Godwin, 1964: Geol. Surv. Can., Paper 64-36, p. 31).

105 M/14 Chemical analyses of sphalerite from Keno Hill-Galena Hill area by Mines Branch, Ottawa.

	A-472	A-473	A-535	A-568	A-708
Zn	57.83	59.03	61.85	57.83	53.81
Cd	0.94	0.71	0.95	1.16	0.82
Fe	7.08	6.58	2.53	7.39	11.54
Mn	0.09	0.05	0.03	0.08	0.20
S	32.87	32.76	32.43	32.65	33.33
Total	98.81	99.13	97.79	99.11	99.70
S.G.	4.068	4.030	4.077	4.039	4.004

	A-710	A-709	A-711	A-718	A-719
Zn	61.44	59.44	58.83	64.06	63.65
Cd	0.83	0.88	0.79	0.73	0.73
Fe	4.45	6.58	5.67	0.63	2.63
Mn	0.14	0.07	0.82	0.01	0.01
S	32.78	33.22	31.60	32.54	33.06
Total	99.64	100.19	97.71	97.97	100.08
S.G.	4.072	4.054	4.047	4.134	4.080

A-472 Massive black sphalerite, Sadie-Friendship Mine.
A-473 Massive black sphalerite, Onek Mine.
A-535 Massive dark brown sphalerite, Lucky Queen Mine
A-568 Massive black sphalerite, Klondike-Keno vein.
A-708 Massive black sphalerite, Galkeno Mine.
A-710 Black sphalerite crystals, Hector-Calumet Mine, 200 m level.
A-709 Massive black sphalerite, Hector-Calumet, 240 m level.
A-711 Massive dark brown sphalerite, Hector-Calumet Mine, 355 m level.
A-718 Crystalline reddish brown resinous sphalerite, Gambler vein.
A-719 Massive dark brown sphalerite, Gambler vein.

(R.W. Boyle, 1965: Geol. Surv. Can., Bull, 111, p. 268)

105 O/8 Fine-grained sphalerite and galena are present in barite rich limestone on the Tom property (63°10'N, 130°09'W) 10 km southwest of the Northwest Territory and Yukon boundary at an elevation of about 1500 m in a cirque valley southeast of the South MacMillan River (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol 1, Dept. Indian Affairs and Northern Development, p. 129).

105 P/11 Yellow sphalerite, coarse-grained galena and white dolomite fill open spaces in an array of stratiform deposits that extends for about 24 km from the ICE and EMILY claims of Geomont at 63°40'N, 129°05'W, to the ARN and TEE claims of Bethlehem at 63°44'N, 129°15'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 239).

105 P/14 Yellow sphalerite occurs with galena and pyrite as disseminations and fracture fillings in dolomite at the KEG and TAP claims at 63°58'N, 129°13'W, northwest of Godlin Lakes; and at the RAIN-SNOW property at 63°58'N, 129°16'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 A/3 Galena and sphalerite occur with lesser amounts of barite and tetrahedrite in brecciated dolomite at the BEAR-TWIT property of Cominco on the Twitya River at 64°02'N, 129°25'W (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 C/7 Breccias at Gaz Creek (64°26'N, 132°31'W) contain sphalerite that varies in colour from white, through pale yellow, to honey brown and

red. Pyrite and galena are less abundant and boulangerite is present in one zone. Massive smithsonite is common, and cerussite and hydrozincite also occur in the oxidized zone. Similar deposits occur at 64°26'N, 132°55'W, about 24 km west of Goz Creek on the Bonnet Plume River (K.M. Dawson, 1975: Geol. Surv. Can., Paper 75-1A, p. 240).

106 C/10 Light brown to yellow sphalerite and smithsonite occur in dolomite on several properties at about 64°34'N, 132°32'W, on an upper tributary of the Snake River (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs).

106 C/11 Occurrences of light-coloured sphalerite in dolomitic rocks are widespread in the Corn Creek area, notably: along Corn Creek at 64°36'N, 133°17'W, about 14.4 km above its confluence with the Bonnet Plume River; at 64°33'N, 133°17'W, about 14.4 km above its confluence with the Bonnet Plume River; at 64°33'N, 133°17'W, on a ridge between Corn Creek and the Bonnet Plume River; and at 64°38'N, 133°15'W on the south side of Black Canyon Creek (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs).

106 D/3 Siderite veins containing argentian galena, sphalerite, chalcopyrite and quartz crystals are exposed on the Paul group on a plateau to the northeast of Mount Cameron at 64°05'N, 135°00'W (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 16).

115 A/3 Massive sulphides consisting of argentian galena, sphalerite, and minor chalcopyrite with stibnite and jamesonite are reported on the MOHAWK, SKY and STE claims at 60°07'N, 137°08'W, roughly 4.8 km due west of Dalton Post at 950 m to 1060 m elevations (W.D. Sinclair, J.M. Maloney and D.B. Craig, 1975: Mineral Industry Report, 1974, Yukon Territory; Dept. Indian and Northern Affairs, p. 140).

115 I/3 Sphalerite is a constituent of silver-gold ores at the Webber and Heustis showing of Mount Nansen Mines Limited and the property of Brown - McDade Mines Limited, in the Nansen Creek - Webber Creek area at 62°03'N, 137°07' to 137°10'W (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 34).

115 J/10 Lenses of massive sphalerite and galena occur in quartz-barite veins at the Bomber showing of Casino Silver Mines Limited, located on a tributary of Casino Creek at an elevation of about 1200 m (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 39).

SPHENE

$CaTiSiO_5$

Sphene is widely distributed as an accessory mineral in intermediate and acid igneous rocks and in metamorphic rocks. The alternative name, titanite, is widely used.

Manitoba

63 J/13 Crystals of brown sphene 1 cm in diameter occur in white quartz at the Osborne Lake Mine, which may be reached via Highway 393, 19.3 km from Highway 392.

63 K/16 Sphene is reported to be present at the Chisel Lake Mine at the southern end of Chisel Lake.

63 P/12 Sphene, apatite and zircon are found in quartzite at the Thompson Mine south of the city of Thompson (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 63, 65, 74).

Ontario

31 B/12 Reddish brown sphene up to 6 mm long, and grains of pyrrhotite, are scattered throughout arkosic sandstone that outcrops in roadcuts on both sides of Highway 2 about 14 km west of Brockville (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 48).

31 C/7 Sphene is reported to occur as large crystals in veins which crosscut pyroxenite at the Lacey mica mine. Other minerals present in the mine are mica, pyroxene, apatite and zircon. The mine is located about 17 km north of Kingston and 8 km west of the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 25).

31 C/9 Brownish yellow sphene has been found in association with graphite in silicated crystalline limestone at the Timmins Mine. The mine is located about 270 m west of the Kingston-Westport-Perth Road and about 67 km north of Kingston (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 C/9 Dark brown crystals of sphene, up to 12 mm thick and 2.5 cm long, occur in crystalline limestone exposed in roadcuts on Highway 15 at 43.4 and 43.6 km north of Kingston. Smaller crystals may be found in roadcuts at 45.2 and 45.5 km (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 45).

31 C/10 Crystals of sphene up to 2.5 cm long are present in crystalline limestone exposed in roadcuts on the Westport road about 11 km east of Godfrey (Ann P. Sabina, 1968: Geol Surv. Can., Paper 67-51, p. 16).

31 C/16 The following occurrences of sphene have been reported in the area south of Perth: (a) crystals averaging 12 mm long, with tourmaline and pyroxene in a quartz-calcite matrix, at the Rogers Mine, north of Noble Bay; (b) brown crystals up to 12 mm across, with apatite, in feldspar, at the Byrnes Mine, west of Long Lake; (c) dark brown crystals averaging 2.5 cm long, in a feldspar-quartz matrix, at the Globe Graphite Mine on the property of Mr. James Coutts, about 8 km from Perth along the road to Rideau Ferry (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 31, 32, 38).

31 C/16 Sphene is present in a vein of mica, green apatite and pink calcite at the McLaren Mine on lot 6, conc. VIII, North Burgess Township. A specimen is included in the mineral collection at the Royal Ontario Musuem (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 405).

31 D/13 A specimen of sphene in the mineral collection at the Royal Ontario Museum was obtained from Highway 102, 8.8 km north of Highway 501, lot 24, conc. X, Baxter Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 405).

31 D/16 The mineral collection at the Royal Ontario Museum includes specimens from the following occurrences: Dyno Mine, lot 2, conc. VIII, Cardiff Township; lot 28, conc. XV, Glamorgan Township; lot 9, conc X, Monmouth Township;

Millar's Mine, lot 15, conc. XI, Monmouth Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 404, 405).

31 E/1 Specimens of sphene in the mineral collection at the Royal Ontario Museum were collected from the following localities: Cardiff Uranium Mine shaft and south adits, lot A, conc. XVII, Cardiff Township; lot 5, conc. XXII, Cardiff Township; road cut at Diamond Lake, lots 31 or 32, conc. III or IV, Herschel Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 404-405).

31 E/4 A specimen in the mineral collection at the Royal Ontario Museum was obtained from Highway 660, 8 km west of Torrance, about lot 41, conc. VII, Wood Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 406).

31 E/9 Sphene crystals occur in pegmatite at the Cameron and Aleck, and Cameron quarries, 4.8. and 6.4 km northwest of Madawaska (Ann P. Sabina, 1971, Geol. Surv. Can., Paper 70-50, p. 55, 56).

31 F/2 Sphene is reported at the Old Caldwell pyrite mine in Blithfield Township, lot 2, conc. I, about 2 km east of Clyde Lake Railway siding (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 9).

31 F/3 Small grains of sphene are associated with abundant garnet in gneiss at the Ruby deposit in Ashby Township, lot 9, conc. XV (Ann P. Sabina, 1971: Geol Surv. Can., Paper 70-50, p. 23).

31 F/3
31 F/6 Euhedral dark brown sphene in association with allanite, quartz, microcline, plagioclase and pyroxene can be found in Griffith Township, Renfrew County (E.W. Heinrich, 1959: Can. Mineralogist, 6, p. 344).

31 F/4 Sphene, associated with ilmenite and zircon, occurs at the MacDonald Mine, in Monteagle Township, Hastings County, conc. VII, lots 18 and 19 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 209).

31 F/4 Specimens of sphene from near Bronson, Dungannon Township, and from the Faraday Mine, lots 16 and 17, conc. XI, Faraday Township are included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 406).

31 F/5 Crystals of brown sphene occur with corundum at the Craigmont deposit, lots 2, 3 and 4, conc. XVIII, Raglan Township, and at the Burgess Mine, lot 14, conc. XIV, Carlow Township (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 43, 46).

31 F/6 Dark chocolate brown crystals of sphene with an adamantine to resinous lustre, occur in abundance at Turner's Island, Lake Clear, Sebastopol Township, Renfrew County, Chemical analysis: SiO_2 28.76, TiO_2 32.76, Al_2O_3 6.32, Fe_2O_3 2.73, FeO 1.07, MnO 0.03, CaO 27.97, Total 99.64 (A.T. Prince 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 59).

31 F/6 Sphene has been reported at the following localities: Sunset molybdenite deposit on lot 36, conc. XIV, Brougham Township; Spain Mine, lot 31, conc. IV, Griffith Township; Jamieson molybdenite mine, lot 5, conc. VIII, Lyndoch Township; Keyfortmore feldspar deposit on the St. Louis farm, off Highway 41, 13.8 km from its junction with Highway 60 in Eganville; Radnor iron mine, lot 16, conc. IX, Grattan Township; road cuts on Highway 512, 14.3 to 14.8 km from its junction with Highway 41 just south of Eganville; Meany and Smart apatite deposits along the Lake Clear cottage road which leaves Highway 512, 9,6 km from its junction with Highway 41; road cuts on Highway 60, 2.2 and 3.7 km west of Golden Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 18-26, 32-35, 49).

31 F/7 The following occurrences of sphene have been noted: Jamieson lime quarry 3.2 km southeast of Renfrew along Raglan Street; Zenith molybdenite mine on lot 28, conc. IV, Bagot Township; Hunt molybdenite mine on lot 9, conc. XI, Brougham Township; Jamieson lime quarry off Highway 17, 4.8 km west of Renfrew (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 13-17, 27-28).

31 F/10 Sphene occurs with apatite in pegmatite on the Fred Ross farm about 3.2 km southwest of Foresters Falls, and at Elliot's Mine about 0.8 km north of Foresters Falls on lot 6, conc. IX, Ross township (Ann P. Sabina, 1971; Geol Surv. Can., Paper 70-50, p. 61-62).

31 F/12 The mineral collection at the Royal Ontario Museum includes sphene from the Five Mile Mine on lot 17, conc. VII, Dickens Township (J. Satterly, 1977: Ont. Geol. Surv., MP70 p. 406).

52 C/11 A specimen of sphene from Pitchers Point Burial Mound, Pitchers Point, near Fort Frances in McIrvine Township is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 406).

52 G/9 Sphene from the east side of Alley Lake at 49°36'N, 90°20'W, in the Thunder Bay district is in the Royal Ontario Museum mineral collection (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 406).

Quebec

21 E/10 Transparent reddish brown sphene is a constituent of the granite mined as a building stone at the Silver Granite quarry, 3.2 km from Ste-Cécile Station (Ann P. Sabina, 1967: Geol. Surv. Can. Paper 66-51, p. 42).

31 F/9 Sphene is associated with molybdenite at the Moss deposit on the Robert Steel farm about 4.8 km north of Quyon via Egan Street, and at the Kirkham deposit on Clarendon Road 13 about 12.8 km north of Shawville (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 89, 93).

31 F/10 Dark brown sphene is a constituent of biotite gneiss at the New Calumet Mine on the west shore of the south half of Calumet Island (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 102).

31 F/15 Brown, wedge-shaped crystals of sphene occur at Lithfield, Pontiac County, range XI, lot 21 (National Mineral Collection).

31 F/15 Sphene occurs with allanite in a road cut on the south side of the Campbells Bay-Otter Lake road at a point 6.4 km east of Highway 8 opposite Lawless Lake. Crystal aggregates of pyroxene and sphene are common at the Waltham quarry on the north side of Highway 8, 2.9 km west of Waltham (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 104-106).

31 F/16 Crystals of sphene have been found at the Zimmerling deposit 9.6 km east of Otter Lake village, and at the Richard cordierite deposit

on the property of Albert Richard 5.6 km northwest of Otter Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 94, 95).

31 G/5 Roadcuts along the Gatineau Parkway expose crystalline limestone, pyroxenite and pegmatite containing aggregates of sphene and crystals up to 2.5 cm long. Similar dark brown crystals of sphene occur at the Pinks Lake Mine, and the Wallingford and Payne deposits north of Aylmer (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 7-9).

31 G/10 Chemical analysis of sphene from Grenville, Argenteuil County, by Hunt: SiO_2 31.83, TiO_2 40.00, Fe_2O_3 tr., CaO 28.31, ign. 0.40, total 100.54; S.G. 3.495 (W.E. Logan, 1863: Geol Surv. Can., Geology of Canada, p. 503).

31 G/10 Chemical analysis of sphene from Grenville, Argenteuil County, by Harrington: SiO_2 32.09, TiO_2 37.06, FeO 1.16, CaO 28.50, ign. 0.66, total 99.47 (B.J. Harrington, 1877-78: Geol. Surv. Can., Rept. Prog., p. 28G).

31 G/11 In the Buckingham area, crystals and masses of sphene have been found in pegmatite and crystalline limestone at the Walker Mine, in crystalline limestone at the Bell Graphite Mine and in feldspar gneiss at the Peerless (Diamond) Mine. Sphene crystals have also been reported near Glen Almond at the Emerald and Davis Mines (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 5,15,17,20,27).

31 G/12 Black, wedge-shaped crystals of sphene occur in Hull Township, Gatineau County, range XIV, lot 8 (National Mineral Collection).

31 G/12 Sphene occurs at Little Rapids Mine, Portland East, Papineau County, range I, lot 7 (Donated to the National Mineral Collection by B. Winning, 1912).

31 G/12 Sphene occurs in Templeton Township, Gatineau County, range V, lot 9 (Donated to the National Mineral Collection by J. Choquette, 1910).

31 G/12 Sphene is present as nut brown masses about 2.5 cm in diameter at the Blackburn Mine north of Hull. It occurs with smoky blue apatite and salmon-pink calcite at the Seybold (Moore) Mine and forms crystals up to 2.5 cm diameter at the Deziel and McGlashan Mines near St-Pierre-de-Wakefield (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 18, 24, 30, 31).

31 G/12 Brown sphene crystals up to 12 mm long occur in grey feldspar at the Sabourin, Rainville (Dugas) and Jackson Rae deposits, near Perkins Mills; also at the Little Rapids (Watts) Mine 19.8 km north of Buckingham, and at roadcuts 20.0 and 26.4 km north of Buckingham along Highway 35 (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 10, 11, 13, 30, 31).

31 G/13 Pink feldspar at the Hart Mine near Notre-Dame-de-la-Salette contains massive chocolate brown sphene associated with black hornblende. Sphene has also been identified in roadcuts on Highway 35 north of Notre-Dame-de-la-Salette at distances 5.1, 11.4 to 11.9, 13.0, 14.0 and 14.6 km (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 32, 38, 40, 42).

31 G/13 Brown crystals of yttrian sphene up to 30 cm in longest dimension occur at the Evans-Lou deposit near Wakefield Lake about 40 km north of Ottawa. A content of 5.5 per cent of yttrium was determined by X-ray fluoresence analysis (N.M. Miles, D.D. Hogarth and D.S. Russell, 1971: Am. Mineralogist, 56, p. 395.

31 G/14 Dark brown wedge-shaped crystals and crystal aggregates of sphene are present at the Cole Lake Mine near Glen Almond (Ann P. Sabina 1969: Geol. Surv. Can., Paper 68-51, p. 28).

31 G/15 Sphene occurs at the Miller (Keystone) Mine (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 75).

31 G/16 Brown sphene occurs with lilac-coloured diopside and pale yellow vesuvianite at a deposit on the property of Albert Morrow about 6.4 km from Lost River (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 71).

31 H/11 Sphene is one of the many minerals found in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 H/13 In a roadcut about 26 km north of Montreal on Highway 65, past St-Calixte, small crystals of pink titanite occur in crystalline limestone (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 71).

31 I/15 Dark brown titanite grains occur at the Ste-Thècle Marble Quarry (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 85).

31 J/4 Dark brown crystals of sphene, about 2 cm across, occur at the Canastata Mine near Notre-Dame-du-Laus (Ann P. Sabina, 1969: Geol. Surv. Can., Papaer 68-51, P. 50).

31 J/11 Dark brown sphene crystals about 12 mm long occur at the Val-Barrette Quarries (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 57).

31 K/1 Sphene occurs with scapolite in Dorion Township, Pontiac County, lots 31, 32 (Donated to the National Mineral Collection, by H.A. Cameron, 1907).

31 K/2 Dark brown sphene occurs at the Squaw Lake molybdenite deposit at the eastern end of Squaw Lake in Huddersfield Township about 7.2 km north-northwest of the village of Otter Lake (Ann P. Sabina, 1971: Geol Surv. Can., Paper 70-50, p. 98).

32 A/16 At the Les Calcites du Nord Quarry, north of Dolbeau, crystals of sphene occur in calcite where it is intruded by pegmatite dykes (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 111).

Saskatchewan

73 P/6 Sphene is present at the Anglo-Rouyn Mine on the east side of a peninsula east of Waden Bay at the north end of Lac La Ronge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 5).

SPINEL

$MgAl_2O_4$

The term spinel is used generally for a large group of oxides having a common structure type. The compounds are usually oxides of the type AB_2O_4 where A is one or more of the divalent metals Mg, Fe, Zn, Mn, Ni, and B is one or more of the trivalent metals Al, Fe, Cr, Mn, or

tetravalent Ti. Natural spinels fall into three series, spinel, magnetite and chromite. In the spinel series, Al is the dominant B metal ion, and end-member varieties within the series include: spinel ($MgAl_2O_4$), hercynite ($FeAl_2O_4$), galaxite ($MnAl_2O_4$), and gahnite ($ZnAl_2O_4$).

Newfoundland

1 M/6 Honey coloured spinel forms 1 per cent of the granitic rocks of the Ackley batholith exposed 11 km northeast of Pin Hill (D.A. Bradley, 1962: Geol. Surv. Can., Mem. 321, p. 36).

Northwest Territories

26 G/6 Grains of dark green spinel, anhedral and irregular outlined, are found in skarn at the north end of Brown Inlet, Baffin Island (G.C. Riley 1960: Geol. Surv. Can., Bull. 61, p. 40).

Ontario

31 C/9 Crystals of black spinel, up to 5 cm in diameter, have been found in flesh red limestone in South Burgess Township, Leeds County, conc. I, lot 10 (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 210).

31 C/10
31 C/16
31 F/4 The mineral collection at the Royal Ontario Museum includes specimens of spinel from the following localities: north of Enterprise, lot 6, conc. XV, Sheffield Township (31C/10); lot 10, conc. I, and lot 11, conc. I, Bathurst Township (31C/16); skarn zone on the east side of York River, lot 11, conc. XI, Dungannon Township (31F/4) (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 373).

31 F/10 Spinel occurs with fluorite, apatite and white orthoclase in a vein of flesh red calcite in Ross Township, Renfrew County (G.C. Hoffmann. 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 59T).

31 F/10 Tiny crystals of pink spinel occur in crystalline limestone exposed in road cuts on Highway 653, 10.3 km from Haley Station. Similar crystals have been noted in dolomitic rocks along the east side of the Ottawa River below the Chenaux Dam (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 57).

Quebec

22 D/11 Dark green spinel is associated with the ore at the St-Charles titanium deposit on the north shore of the Saguenay River near St-Nazaire (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 109).

31 F/10 Tiny spinel crystals, commonly mauve and occasionally green in colour, occur in crystalline limestone exposed by roadcuts in the vicinity of Bryson (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 101-103).

31 G/13 Minor amounts of bluish-green to mauve spinels in crystalline limestone are exposed in roadcuts along Highway 35 between Val-des-Bois and Notre-Dame-du-Laus (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 44-5).

31 G/13 Spinel occurs in Portland Township, Papineau County, range X, lot 16 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, pp. 25, 26R).

31 I/4
31 I/5 Small, translucent octahedrons of blue spinel are found in a bed of crystalline limestone in the Seignory of Daillebout, Joliette County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 59T).

31 J/4 Smoky mauve to purplish blue spinel is found in crystalline limestone in the Notre-Dame-du-Laus area: (1) with abundant clinohumite, exposed on a hill on the west side of the du Lièvre River about 11 km south of Notre-Dame-du-Laus; (2) on both banks of the du Lièvre River on the downstream side of the des Cèdres Dam. Black spinel crystals up to 2 cm across occur at the Parker Mine, 4.8 km west of Notre-Dame-du-Laus (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 45, 47, 48, 51).

31 J/4 Spinel occurs in Bigelow Township, Labelle County, range V, lot 52 (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., p. 266).

31 K/1 Spinel occurs in Bouchette Township, Gatineau County, range VI, lots 3 and 4 (R.A.A. Johnston, 1910: Geol. Surv. Can., Sum. Rept., p. 266).

31 K/1 Spinel crystals have been found in Aylwin Township, Gatineau County, range VI, lot 48 (W.F. Ferrier, 1890-91: Can. Rec. Sci., IV, p. 475).

32 D/6 Spinel occurs as a common and abundant mineral in the dalmatianite at Amulet anticlinorium in the Noranda district. The spinel has a moderately deep green colour, well-developed cleavage, and occurs in well-formed crystals, chiefly octahedral (M.E. Wilson, 1941: Geol. Surv. Can., Mem. 229, p. 76).

SPODUMENE

$LiAlSi_2O_6$

Spodumene is a member of the pyroxene group found in complex granite pegmatites associated with other lithian aluminosilicates. Kunzite is a transparent pink to violet variety and hiddenite is a green spodumene used as a gemstone. The geology of Canadian lithium deposits, in which spodumene is by far the most important lithium minerals, has been treated in detail by R.W. Mulligan in Geol. Surv. Can., Econ. Geol. Rept., 21, (1965).

Manitoba

52 E/11 Several spodumene-bearing pegmatites have been found in an east-west band of metavolcanic rocks that extends about 32 km from East Braintree to West Hawk Lake. The Lucy and Ardon claims lie about 800 m north of the Trans-Canada Highway at a point 10.6 km east of the East Braintree turnoff. In the vicinity of West Hawk Lake, the Deer claim is in the centre of sec. 16, township 19, range 17, 300 m from the southwest shore of the lake. Two other dykes occur: 1,340 m N, 25°W; and 360 m S, 30°E of the Deer claim (R.W. Mulligan, 1965).

52 L/6 Large tonnages of potential lithium ore have been blocked out in the Bernic Lake-Winnipeg River district. Spodumene is the major lithium mineral and is often associated with amblygonite and lepidolite (R. Brinsmead, 1960: Precambrian, 33, No. 8, p. 19). The most important deposits are: Chemalloy Minerals Limited on the western part of Bernic Lake; Lithium Corporation of Canada property at the east end of Bernic Lake including the Buck, Coe and Pegli claims; and the Bob or Silverleaf Group, formerly known as the Bear claim, on the Winnipeg River about 6.4 km above Lamprey Falls

(R.W. Mulligan, 1965). Chemical analysis of spodumene from the Bear claim by R.J.C. Fabry: SiO_2 66.50, Al_2O_3 26.04, Li_2O 6.47, Na_2O 0.92, CaO 0.25, K_2O 0.12, FeO 0.11, MgO 0.07, MnO 0.01, total 100.49 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 155).

52 L/6 Chemical analyses of coarse columnar spodumene from the Tanco pegmatite Bernic Lake by K. Ramlal and R.M. Hill: SiO_2 63.45, Al_2O_3 27.40, Fe_2O_3 0.053, MgO 0.012, CaO 0.16, Li_2O 7.87, Na_2O 0.114, K_2O 0.038, Rb_2O 0.002, Cs_2O 0.001, H_2O^+ 0.30, H_2O^- 0.11, P_2O_5 0.02, total 99.53; SiO_2 63.20, Al_2O_3 27.68, Fe_2O_3 0.087, MgO 0.013, CaO 0.00, Li_2O 7.80, Na_2O 0.125, K_2O 0.019, Rb_2O 0.001, Cs_2O 0.001, H_2O^+ 0.36, H_2O^- 0.08, P_2O_5 0.03, total 99.40. (P. Černý and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 665).

52 L/11 White and green spodumene is a constituent of pegmatite dykes cutting greenstones and granites in the vicinity of Cat Lake. Properties include: the Spot Group of Lithia Mines and Chemicals Limited, 8 km west of Cat Lake; the Eagle Group held by Lithium Corporation of America at the northwest end of Cat Lake; the Irgon claim of Lithium Corporation of Canada, 520 m north of Cat Lake, Township 19, Range 15; and the Central claim about 300 m south of the middle part of Cat Lake (G.D. Springer, 1950: Manitoba Mines Br., Publ. 79-7) (R.W. Mulligan, 1965).

63 I/12 Pegmatite dykes, some of which contain spodumene and lepidolite are abundant to the west of Cross Island in the Cross Lake area (C.K. Bell, 1961: Geol. Surv. Can., Paper 61-22, p. 17).

63 J/13 Spodumene-bearing dykes have been reported in three areas near Crowduck Bay north of the settlement of Herb Lake, on the east shore of Wekusko Lake. The Green Bay property is at lat. 54°51'30"N, long. 99°38'30"W in township 68, range 15; the Violet Group is at lat 54°51'05"N, long 99°42'45"W in township 68, range 15; and the Sherritt-Gordon property is at lat. 54°50'30"N, long. 99°44'00"W in township 67, range 15 (R.W. Mulligan, 1965).

Northwest Territories

85 I
85 J A belt of lithium-bearing pegmatites extends northwesterly for 104 km from Hearne Channel to a point about 59 km northeast of Yellowknife, and a branch extends west of the area south of Prosperous Lake, about 13 km northeast of Yellowknife. Spodumene is the chief lithium mineral of the district. Amblygonite occurs in substantial amounts in the Buckham Lake-Hearne Channel area and has also been reported at Hidden Lake, Reid Lake and Sproule Lake. Petalite, triphylite, lithiophilite and lepidolite are rare. Other minerals of economic interest are beryl, columbite-tentalite, tapiolite and cassiterite. The main occurrences are listed below (R. Mulligan, 1965).

85 I/1 Best Bet property, immediately northwest of the north-central part of Drever Lake or 5.6 km northeast of the tip of Blatchford Lake. Tan Group, 2.3 km east of the southeast corner of Blatchford Lake.

85 I/6 Ann Group, on the south shore of Reid Lake.
85 I/7 Lit 1 and 2 claims (Campbell pegmatites), on the northwest shore of Buckham Lake near its northernmost tip. Lit 3 claim (McDonald dyke). 8 km southwest of the north end of Buckham Lake. Chemical analysis of spodumene "from a dyke 5.6 km due west from a point on the west shore of Buckham Lake, 4.8 km from its north end" by R.J.C. Fabry: SiO_2 64.09, Al_2O_3 27.06, FeO 1.25, MgO 0.27, CaO 0.51, Na_2O 1.59, K_2O 0.15, MnO 0.02, Li_2O 5.70, total 100.64 (J.A. Maxwell et al. 1965: Geol. Surv. Can., Bull. 115, p. 353).

85 I/8 Echo Group, east of Tanco Lake. Jo Group, south of the east arm of Tanco Lake.

85 I/11 J.M. Group, east of Hidden Lake and south of Thompson Lake, adjoining the Lit Group on the west.

Lit Group, 1.4 to 4.8 km east of Hidden Lake and 1.6 to 4.8 km south of the Thompson-Lundmark Godl Mine.

Jim-Lit Group, 4 km east of Hidden Lake and 3.2 km west of Tibbitt Lake.

Taco claim, just south of the central part of Sproule Lake.

Fly Group, southwest part of Sproule Lake.

C.D. Group, along the northeast shore of Upper Ross Lake.

85 I/13 Cota Group, 4.8 km north of Blaisdell Lake.
85 J/9 Murphy-UM Group, southeast shore of Bighill Lake.

Limo Group, on and near the north shore of Bighill Lake.

Li Group, southeast end of Prosperous Lake.

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85 I/11 A pegmatite dyke exposed on the peninsula north of the narrowest part of Thompson Lake at 62°37'N, 113°29'W, contains abundant spodumene erratically distributed in ragged pods. Beryl is fairly abundant and has some columbite-tantalite associated with it (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept. 23, p. 66).

Nova Scotia

20 O/16 Spodumene and beryl have been identified in a pegmatite dyke 750 m southeast of Brazil Lake crossroads (F.C. Taylor, 1961: Geol. Surv. Can., Map 44-1960).

Ontario

31 C/16 Spodumene has been reported by Hunt in a small rolled mass of granite near Perth, Lanark County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 59T).

32 D/13 Spodumene is reported to occur with pollucite on property held by the Johns Manville Company in Steele Township, north of Abitibi Lake (S.C. Robinson: private communication).

32 E/4 Spodumene, pollucite, beryl and columbite-tantalite occur in a pegmatite dyke in the Case batholith near its contact with meta-sedimentary rocks in lot 5, conc. V, Steele Township (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept., 23, p. 79).

42 E
52 H Spodumene occurs in a belt of pegmatite dykes in the Nipigon district in the general vicinity of Orient Bay. Quartz, albite, minor potash feldspar and muscovite are the common minerals of the dykes. Tourmaline, beryl and a little

amblygonite are found in the M.N.W. dyke (R.W. Mulligan, 1965). The following properties have been explored.

42 E/4 The M.N.W. property situated near the south end of a ridge east of Jackfish River, about 2.4 km west of Cosgrave Lake.

42 E/5 Several showings within about 2.4 km of the north shore of Jean Lake have been investigated by Jean Lake Lithium Mines Limited and Towagmac Exploration Limited. The Conwest property of Ontario Lithium Company Limited consists of several showings in the area near the southwest end of Georgia Lake. The Dunvegan-Newkirk property of Georgia Lake Lithium Mines is located about 2 km west of Georgia Lake. Aumacho River Mines Limited is located about 6.4 km southwest of Georgia Lake at the north end of Blay Lake.

52 H/8 Nama Creek Mines Limited have drilled a number of dykes located just north of Little Postagoni River near its junction with Postagoni River. Several dykes outcrop on a property of Noranda Mines Limited about 800 m east of the northern part of Postagoni Lake. A property held by Lun Echo Gold Mines Limited is situated within 1.6 km east of Forgan Lake.

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42 L/2 Specimens submitted to the Royal Ontario Museum for identification, by Mr. McDermott of Port Credit, were found to contain spodumene and the rare mineral eucryptite. The locality is said to be a pegmatite "near Nakina" (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 377).

52 C/8 Spodumene-bearing dykes have been drilled by International Lithium Coporation on the south shore of Lac La Croix near its east end; and by Lexindin Gold Mines south of Wisa Lake, about 6 km north of Lac La Croix (R.W. Mulligan, 1965).

52 F/15 Green and white spodumene occurrences have been evaluated by Lun Echo Gold Mines Limited on a property south of Ghost Lake about 16 km northeast of Dryden (R.W. Mulligan, 1965).

52 F/16 Large crystals of spodumene are reported to occur with pollucite about 4.8 km northeast of Gullwing Lake in Webb Township. Identification was made at the Royal Ontario Museum (J.A. Mandarino and D.C. Harris, 1965: Can. Mineralogist, 8, p. 377-8).

52 I/8 Several occurrences of spodumene are known in the Falcon Lake-Zigzag Lake area about 32 km northeast of Lake Nipigon. The Motsen claims at about lat. 50°28'N, long. 88°08'W, extend from about 1.6 to 4.8 km west of Falcon Lake. Another occurrence has been reported about 6.4 km south of Falcon Lake (R.W. Mulligan, 1965).

52 J/13 Spodumene-bearing pegmatite outcrops on the McCombe property of Capital Lithium Mines Limited and on the Consolidated Morrison deposit located about 4.8 km northwest of Root Lake (R.W. Mulligan, 1965).

52 P/9 Three pegmatite dykes containing appreciable quantities of spodumene and lepidolite, much coarse pink tourmaline and some fluorite outcrop just north of Lily Pad Lakes in the Fort Hope area (V.K. Prest, 1942: Ont. Dept. Mines, Ann. Rept., 51, Pt. III, p. 27).

Quebec

31 M/10 Spodumene-bearing dykes occur in Delbreuil Township, near Temiscamingue County near the north shore of Lac Simard (R.W. Mulligan, 1965).

32 C/5
32 D/8 Swarms of pegmatites in the Preissac-Lacorne district of Abitibi County are important sources of the rare-element minerals: spodumene, lepidolite, beryl, molybdenite and pollucite. The main properties are as follows:

(1) Quebec Lithium Corporation property covers the eastern and central lots of ranges VIII and IX and part of range X, Lacorne Township. A mine and mill are on lot 54, range IX, about 400 m south of Lac Lortie.

(2) The property of Canadian Lithium Mining Company Limited includes much of the western part of range X and a few of the western lots of range IX, Lacorne Township, also some adjoining parts of range I, Landrienne Township. Spodumene has been noted on lots 25 and 26, Landrienne Township, and on lots 35 and 38, range X, Lacorne Township.

(3) Lacorne Lithium Mines Limited have conducted exploratory diamond-drilling of spodumene-bearing dykes on lots 59 to 63, range X, Lamotte Township.

(4) Lithium Corporation of America has explored properties on lot 36, range II, Figuery Township, about 800 m west of Harricanaw river, and in the central part of lot 11, range II, Lacorne Township.

(5) Pegmatite is exposed on the property of International Lithium Corporation on lot 39, range II, Figuery Township, on the tip of a peninsula on Harricanaw River.

(6) The property of Valor Lithium Mines Limited includes parts of ranges VII, VIII, and IX, in the northwest quarter of Lacorne Township. The main showing is on the southern part of lot 22, range VIII.

(7) A pegmatite dyke has been drilled by Ascot Metals Corporation in range VII, Lamotte Township, about 1.6 km west of the narrows of Lake Lamotte.

(8) Spodumene deposits are held by Iso Uranium Mines Limited on lot 5, range V, Lacorne Township, and on lot 60, range VII, Lamotte Township.

(9) Three main spodumene-bearing pegmatites are exposed on the property of Amos Lithium Corporation in the southern part of lots 7 and 8 range III, Lacorne Township, near the southeast shore of Lake Baillarge (R.W. Mulligan, 1965).

Chemical analysis of unaltered spodumene from a dyke in the Preissac-Lacorne district by R.J.C. Fabry: SiO_2 63.72, Al_2O_3 26.24, Fe_2O_3 0.90, FeO tr., MgO 0.16, CaO 0.22, Na_2O 2.25, K_2O 0.03, H_2O 0.52, TiO_2 0.06, MnO 0.06, Li_2O 5.77, total 99.93 (G.W.H. Norman, 1944: Geol. Surv. Can., Paper 44-9, p. 13).

32 D/1 A pegmatite dyke containing some spodumene (Wells-Lacourcière showing) occurs in Montanier Township, about 24 km south of the Village of Cadillac. It is a few hundred metres northwest of the Rapide II road at a point 15.6 km south of a guarded gate (R.W. Mulligan, 1965).

32 J/11 Spodumene and beryl are reported to have been found on the property of Sirmac Mines Limited, 14.4 km northwest of Assinica Lake (R.W. Mulligan, 1965).

33 E/11 Spodumene occurs in "orthoclastic granitic veinstone cutting syenite" on Walrus Island off the east coast of James Bay (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, pp. 15, 16R).

SPURRITE

$Ca_5Si_2O_8CO_3$

Quebec

34 B/1
34 B/2 The rare metamorphic mineral, spurrite, occurs as white to pinkish nodules that stand out in relief in crystalline limestone near the east end of the largest island in West Clearwater Lake. The mineral was identified optically by H.W. Bostock and confirmed by X-ray diffraction pattern (X-ray Laboratory, Geol. Surv. Can.).

STANNITE

Cu_2FeSnS_4

Stannite is an ore mineral of tin. It is rarely discovered in sufficient quantity to be mined directly and is more commonly won as a by-product of base metal operations.

British Columbia

82 F/15 Stannite occurs in quartz veins in closely folded black slates near the summit of Rose Pass, 8 km northeast of the end of Crawford Bay on Kootenay Lake, in the Ainsworth mining district (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 454).

82 F/15 Stannite has been identified as a minor constituent of the following lead-zinc-silver deposits in the Ainsworth area: Early Bird. Lakeshore, Highland, Little Donald, Silver Glance, Ida C, Tardiff . It has also been found in a quartz vein on the Humbolt claim on the Crawford Bay-Rose Pass trail about 16 km northeast of Crawford Bay, Kootenay Lake (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept., 28, p. 86-7).

82 L/14 Patches of stannite up to 1 cm in size were seen in a groundmass of galena, sphalerite, pyrite, minor chalcopyrite and white quartz in samples from the Crowfoot property Magna Bay, Shuswap Lake, Kamloops mining district (R.M. Thompson 1953: Am. Mineralogist, 38, p. 548).

82 N/4 Stannite from the Snowflake Mine on Woolsey Creek, near Revelstoke in the Big Bend area, was analyzed by R.J.C. Fabry in 1929: Sn 26.65, Cu 31.56, Zn 7.72, Fe 3.65, Mn 0.00, Ni 0.00, S 29.76, total 99.34 (National Mineral Collection).

82 N/4 Stannite is found with galena, sphalerite and pyrite at the Snowflake Mine. located north of Clabon Creek and 6.4 km north of Albert Canyon; and at the Columbia Lead and Zinc Mine southeast of the Snowflake Mine (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

82 N/4 An ex-solution intergrowth of stannite in kesterite forms an appreciable part of the ore from a prospect in the vincinity of the Snowflake Mine 30.5 km northeast of Revelstoke. Sphalerite, pyrite and galena are the main minerals of the ore. Small amounts of cassiterite, pyrrhotite, rutile, scheelite, tetrahedrite, chalcopyrite, covellite, cerussite and canfieldite are also present. Electron microprobe analysis of the stannite: Cu 29.88, Zn 5.85, Fe 7.35, Sn 27.54, S 28.99, total 99.61 (D.C. Harris and D.R. Owens, 1972: Can. Mineralogist 11, p. 531).

104 O/16 Stannite has been identified in polished section of lead-zinc-silver ore from the Silvertip property at about 59°55'N, 130°20'W (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 79).

Manitoba

52 L/6 Stannite has been found in a specimen from the Tanco pegmatite, Bernic Lake, associated with aikinite-bismuthinite intergrowths, gustavite, cosalite, native bismuth, chalcopyrite and arsenopyrite (D.C. Harris and T.T. Chen, 1975: Can. Mineralogist, 13, p. 411).

New Brunswick

21 G/7 Stannite occurs with cassiterite, base metal sulphides, wolframite, scheelite, molybdenite, bismuthinite and bismuth at Mount Pleasant in Charlotte County (A.A. Ruitenberg, 1963: Univ. New Brunswick, M.Sc. thesis).

21 G/7 Electron probe microanalysis of zincian stannite from the Mount Pleasant tin deposit, by J. Rucklidge: Cu 27.5, Sn 26.1, Fe 11.0, Zn 5.1, S 27.9, In 1.95, Ag 0.19, total 99.74. Analyses of other minerals show that stannite and sphalerite are the main carriers of indium in the ores (R.S. Boorman and D. Abbott, 1967: Can. Mineralogist, 9, p. 166-179).

21 G/7 Electron microprobe analyses of stannite from Brunswick Tin Mines Limited, formerly Mount Pleasant:

Cu	29.8	29.7	29.9	29.2	29.1	29.0
Sn	27.6	29.0	26.9	26.5	27.2	27.2
In	0.1	0.1	0.1	0.1	0.1	0.2
Fe	10.0	11.7	9.6	8.8	9.9	9.1
Zn	3.9	1.4	4.5	6.2	4.3	6.6
S	29.5	29.5	29.8	29.1	29.6	30.1
Total	100.9	101.4	100.8	99.9	100.2	102.2

Electron microprobe analyses of zincian stannite with zinc content more than Cu_4 $(Fe_{1.2}Zn_{0.8})Sn_2S_8$

Cu	28.0	27.9	27.4	27.4	27.4	27.4
Sn	25.6	25.6	26.1	26.1	26.1	26.0
In	0.3	0.3	0.2	0.2	0.3	0.2
Fe	9.0	8.7	8.3	8.0	9.0	7.3
Zn	8.5	9.7	10.4	11.4	8.3	9.1
S	29.9	30.0	29.9	30.0	30.2	29.3
Total	101.3	102.2	102.3	103.1	101.3	99.3

(W. Petruk, 1973: Can. Mineralogist, 12, p. 46)

21 G/7 Stannite occurs with sphalerite, pyrite, galena, pyrrhotite, chalcopyrite and quartz in siltstone at Kedron Brook. Directions to reach the deposit from the junction of highways 1 and 41 are as follows: proceed north along highway 41; 11.2 km - turn right at junction Rollingdam road; 14.8 km - Rollingdam crossroads, continue straight ahead; 21.2 km - turn right at junction Pleasant Ridge road; 26.5 km - fork, bear right; 29.4 km - turn right at junction Pomeroy Ridge road; 34.4 km - turn off left to Kedron Brook; the deposit occurs along Kedron Brook 180 m above the road crossing (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 9).

21 P/5 Stannite and cassiterite are constituents of the Brunswick No. 6 orebody in Gloucester County (E.R. Lea and C. Rancourt, 1958: Can. Inst. Mining Met., Bull, 51, pp. 167-177).

21 P/5 Stannite is closely associated with chalcopyrite and sphalerite, forming rims or inclusions in both of the minerals, at the Captain deposit located on the headwaters of Tozer Brook and the west branch of Portage River in Gloucester and Northumberland Counties about 14 km east of Heath Steele (W.M. Tupper, D.J. Bachinski and R.W. Boyle, 1968: Geol. Surv. Can., Paper 66-18, p. 11).

Northwest Territories

85 J/8 Zincian stannite was found in one specimen of gold ores from the Yellowknife Bay area (L.C. Coleman, 1953: Am. Mineralogist, 38, p. 515).

Ontario

41 I/6 Stannite has been detected in the nickel ores of Sudbury. It occurs always as small irregular patches of characteristic brownish grey colour. Grain size is irregular, 0.03 millimetre to 0.1 millimetre, the former size being prevalent. Most is anisotropic in shades of blue, grey-blue, to yellow-grey. Very occasionally, fine lamellar twinning has developed. It is most frequently found as minute blebs within sphalerite and pyrrhotite in chalcopyrite rich patches of ore (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7, p. 41).

52 L/16 A massive base-metal sulphide ore deposit located about 1200 m south-southwest of the south end of Trout Bay in Mulcahy Tonwship, about 32 km west of Red Lake, contains lesser amounts of stannite, galena, marcasite, arsenopyrite, cobaltite, pyrargyrite, paracostibite, gudmundite, tetrahedrite, silver, allargentum, ilmenite, breithauptite, cassiterite and nisbite (L.J. Cabri, D.C. Harris and J.M. Stewart, 1970: Can. Mineralogist, 10, p. 232).

Quebec

32 D/6 At the Lac Dufault Mine in the southwestern part of Dufresnoy Township about 12.8 km north-northwest of Noranda, stannite has been identified at the upper contact of the massive sulphide body (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept., 28, p. 108).

Yukon

95 E/8 Stannite is associated with franckeite and geocronite in calcite veins along a low-angle fault in slates at the headwaters of the east branch of the Coal River at approximately lat. 61°25'N, long. 127°21'W (A.M. Evans, 1957: Can. Mineralogist, 6, pp. 119-127).

105 B/3 Drill core specimens from the BOM property near the head of Swift River were found to contain stannite and stanniferous ludwigite (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept., 28, p. 80).

STANNOIDITE

$Cu_8(Fe,Zn)_3Sn_2S_{12}$

New Brunswick

21 G/7 The rare mineral stannoidite, previously known as hexastannite has been identified with kesterite in samples from Brunswick Tin Mines Limited, formerly Mount Pleasant. Electron microprobe analysis: Cu 38.5, Sn 19.5, Fe 9.1, Zn 5.1, S 29.6, total 101.8 (W. Petruk, 1973: Can. Mineralogist, 12, p. 46).

Ontario

42 A/11 A small amount of stannoidite is widely distributed in a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine, north of Timmins. The mine may be reached via Highway 655, 25.7 km north of Highway 101. Electron microprobe analysis: Cu 38.0, Fe 8.6, Zn 4.3, Sn 18.7, As 0.5, Se 1.55, S 27.9, total 99.55 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

STAUROLITE

$(Fe,Mg)_2Al_9Si_4O_{23}(OH)$

Staurolite is typically a mineral of medium grade regionally metamorphosed argillaceous sediments and is particularly characteristic of mica schists where it may be associated with almandine garnet and kyanite. Cruciform twins are common.

British Columbia

82 F/14
82 K/13 Staurolite is found on the west side of Slocan Lake in the Slocan mining division, in the rocks of the Shuswap Formation (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 213).

103 J/8 Staurolite crystals showing cruciform twins occur in mica schists on the beach and on a high bluff at the site of an old fish fertilizer plant on the mainland, about 8 km north of Prince Rupert, at Prince Rupert Harbour (F.A. McLean, private communication).

Manitoba

63 J/13 Staurolite is found at Snow Lake (D.S.M. Field, 1951: Can. Mining J., 72, Pt. 2, pp. 76-78). Large, untwinned crystals of long prismatic habit, up to 2.5 cm wide and 18 cm long occur on the north bank of Snow Creek, approximately 30 m below the outlet of Snow Lake. The dark, reddish brown crystals, some of gem quality, occur in random orientation in a banded metamorphosed arkosic greywacke (M.H. Frohberg, 1960: private communication).

63 J/13 Staurolite-bearing schists are exposed in road cuts along Highway 392 between the bridges over Anderson Creek and Snow Creek, and staurolite schist is the host rock for the orebody at the Stall Lake Mine at Stall (Miller) Lake.

Staurolite crystals and cruciform twins are abundant in schist along the shores of islands at the south end of Crowduck Bay, along the adjacent west shore, on islands and along the shore at the northeast end of Crowduck Bay, along the west shore of the narrow connecting Crowduck Bay and Wekusko Lake, and on Ballard and Campbell Islands.

Dark brown staurolite crystals about 2 cm in diameter and several cm long are abundant in schist exposed at the bridge over Snow Creek on Highway 392, along the north side of the narrows on the east side of Snow Lake about 1.6 km west of the bridge, and along Snow Creek east of the bridge (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 52,60,61,65,66).

63 K/16 Crystals of staurolite up to 10 cm long were collected from the dumps at the Nor Acme Mine (Ann P. Sabina, 1972: Geol. Surv. can., Paper 71-27, p. 67).

New Brunswick

21 G/6 Staurolite occurs in mica schists at Moores Mills, Moore Lake, Charlotte County (L.W. Bailey and G.F. Matthew, 1870-71: Geol. Surv. Can., Rep. Prog., p. 240).

21 G/6 Dark brown prisms of staurolite about 12 mm long and small pink garnets are found in mica schist in roadcuts along the Oak Bay Road about 13 km from its junction with Highway 1 (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 8).

Nova Scotia

11 E/1 Dark brown, partly transparent staurolite prisms about 2.5 cm long are associated with transparent pink garnet crystals in mica schist at the Cochrane Hill gold mine. The mine may be reached by a 400 m single lane road leading east from Highway 7 from a point 2.2 km south of the Glenelg - Cross Roads County Harbour road intersection. (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 15).

11 F/5 Staurolite occurs at the Salmon River Mine in Guysborough County (H. Fletcher, 1886: Geol. Surv. Can., Ann. Rept., II, p. 156P).

20 O/16 Staurolite is a constituent of light grey schist which outcrops along the shore from Foote Cove south to Chegoggin Point. (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 78).

20 P/6 Staurolite-garnet schists containing crystals up to 3 cm long are exposed along the Port La Tour shoreline in the vicinity of the wharf at Crow Neck Point (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 79).

20 P/11 Staurolite-garnet schist is exposed along the shoreline of Negro Harbour. Brown staurolite, pink to mauve andalusite and pink garnet crystals are scattered throughout schist that is exposed along the west shore of Shelburne Harbour from Roseway to East Point, and south of Sandy Point (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 80-82).

20 P/11
20 P/12
20 P/14 Staurolite occurs at Carleton Village, the Jordan River, Red Head and Pubnico Harbour, in Shelburne County (L.W. Bailey, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 58M).

20 P/14 Schist containing staurolite, andalusite and garnet is exposed in several roadcuts between Shelburne and Jordan Falls, and along the Jordan River (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 82).

Ontario

31 C/14
31 C/15 Staurolite crystals are prominent in muscovite schist in Barrie Township, Frontenac County in the Clarendon-Dalhousie area. Crystals up to 7 cm long are found in the hanging-wall and footwall of a muscovite schist hear Fernleigh (B.L. Smith, 1956: Ont. Dept. Mines, Ann Rept., vol. 65, Pt VII, pp. 35, 36).

41 I/5 Staurolite associated with garnet occurs in a schist in Baldwin Township, Sudbury district, conc. III, lot 2. The staurolite crystals are most extensively developed where narrow bands of greywacke are confined between sills (J.E. Thomson, 1952: Ont. Dept. Mines, Ann. Rept., vol 61, Pt. IV, p. 12).

41 I/11 Argillaceous rock, north of the Copper Cliff Mine, McKim Township, is composed of 75 per cent staurolite, which is found as stumpy crystals up to 2 cm in length. Some large knots are up to 20 cm in diameter (T.C. Phemister, 1956: Ont. Dept. Mines, Ann. Rept., vol. 65, Pt. III, p. 106).

42 L/5 Beautiful, large, twinned staurolite crystals occur in dark coloured medium-grained rock on the northwest shore of Albert Lake, Gzowski Township, in the Kowkash gold area (P.E. Hopkins, 1917: Ont. Dept. Mines, Ann. Rept., vol. 26, p. 186).

42 L/6
42 L/7 Staurolite is present in sedimentary schists in the O'Sullivan Lake area (W.W. Moorhouse, 1955: Ont. Dept. Mines, Ann. Rept., 64, Pt. IV, p. 10).

STEENSTRUPINE

$(Ce,La,Na,Mn)_6(Si,P)_6O_{18}(OH)$

Quebec

31 H/11 Steenstrupine has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

STEPHANITE

Ag_5SbS_4

British Columbia

82 E/15 Stephanite occurs at the Waterloo claim, Thunder Hill camp, in the Grand Forks mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem, 74, p. 215).

82 F/14 Stephanite is a conspicuous constituent of ore at the Anna Mine at the Slocan Mining camp, Slocan City. It is associated with galena in vein matter carrying pyrite, chalcopyrite, sphalerite and native silver in a gangue of quartz and carbonate (C.E. Cairnes, 1934: Geol. Surv. Can., Mem. 173, p. 129).

Stephanite occurs at the Arlington Mine at Spring Creek in the Slocan mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 215).

Ontario

31 M/4 A few brilliant crystals of stephanite, associated with proustite and xanthoconite, occur at the Keeley Mine in South Lorrain. The crystals of stephanite are well formed and are cyclically or pseudohexagonally twinned. Chemical analysis by M.C. Haller: Ag 67.78, Sb 14.89, S 16.57, insol. 0.72, total 99.96; S.G. 6.233 (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 69) (T.L. Walker, 1930: Univ Toronto Stud., Geol. Ser., 29, p. 13).

31 M/4 The mineral collection at the Royal Ontario Museum includes specimens of stephanite from the Frontier Mine in the northeast part of South Lorrain Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 376).

31 M/5 Stephanite from the Silver Miller and O'Brien mines in the Cobalt camp have been identified by X-ray powder pattern (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 M/5 Black, tabular crystals of stephanite with a metallic lustre occur at the Penn Canadian Mine, Cobalt district. Chemical analysis by E.W. Todd: Ag 67.81, S 16.21, As 2.34, Sb 13.53, total 99.89; S.G. 5.92-5.94. The analysis corresponds to 81 per cent stephanite, 16 per cent proustite and 3 per cent dyscrasite (Univ. Toronto Stud., Geol. Ser., 12, 1921, p. 69).

31 M/5 Stephanite is found at the Drummond Mine, at the east end of Kerr Lake, Coleman Township (National Mineral Collection).

31 M/5 Well-formed crystals of stephanite occur at the Kerr Lake Mine at Cobalt in the Timiskaming district (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 215).

31 M/5 The ores at the Silverfields and Nipissing mines in the Cobalt area are reported to contain stephanite (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 26, 32).

31 M/5 Specimens of stephanite from the Brady Lake Mine and Cobalt Lode Mine, lot 2, conc. III, Coleman Township, are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 376).

41 P/10 Vugs containing stephanite have been reported in ore veins at the Miller Lake O'Brien Mine in the Gowganda area (Ann P. Sabina, 1974: Geol. Surv., Paper 73-13, p. 77).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16
Stephanite is the most common silver sulphantimonide in the Cobalt-Gowganda ores, where it appears late in the paragenesis. Electron probe microanalyses by D.C. Harris: (1) Ag 68.2, Sb 14.6, S 16.0, total 98.8; (2) Ag 69.4, Sb 15.1, S 15.9, total 100.4; (3) Ag 68.1, Sb 13.8, As 1.5, S 15.4, total 98.8; (4) Ag 68.3, Sb 15.4, S 16.3, total 100.0 (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 211).

42 A/11 Stephanite is an accessory mineral in the ores of the Kidd Creek Mine, lots 3 and 4, conc. V, Kidd Township, about 27 km north of Timmins (R.R. Walker, A. Matulich, A.C. Amos, J.J. Watkins and G.W. Mannard, 1975: Econ. Geol., 70, p.80).

52 A/5 Stephanite occurs at the Badger Mine in the Thunder Bay District (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 210)

Yukon

105 M/14 Massive black stephanite covers one side of a narrow limonite-stained quartz vein at the Elsa mine, 43 km north of Mayo on the north-facing slope of Galena Hill (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 507).

STERRYITE

$12PbS.5(Sb,As)_2S_3$

Ontario

31 C/6 Sterryite, named in honour of T. Sterry Hunt first mineralogist with the Geological Survey of Canada, was found in specimens collected from a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed Taylor of Madoc. In polished sections it was observed as needle-like laths and anhedral grains in veenite. Electron probe microanalysis by G.R. Lachance: Pb 45.74, Sb 22, As 5.75, S 21, total 94.50 (J.L. Jambor, 1967; Can. Mineralogist, 9, p. 191-213).

STIBICONITE

$(Sb,Ca)Sb_{1-2}(O,OH,H_2O)_{6-7}$

The higher oxides of antimony occur in nature as a single phase with a structure of the pyrochlore type. The name stibiconite has priority. Synonyms which should be dropped are: cervanite, volgerite, stibianite and hydroromeite; arsenostibite is arsenian stibiconite.

Newfoundland

2 E/10 Stibiconite has been identified as yellow powdery coatings on stibnite and quartz at the Moreton's Harbour Antimony Mine. The mine is on the steep side of a hill at the south shore of Frost Cove on the west side of Moreton's Harbour, New World Island, Notre Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 97).

Quebec

21 E/13 Stibiconite occurs as pale to canary yellow, vitreous granular masses and earthy radiating, fibrous aggregates, associated with other secondary minerals, kermesite, senarmontite, valentinite and jarosite on antimony, stibnite and gudmundite, at the Lac Nicolet (South Ham) antimony mine. The mine dumps are located about 13.6 km west of Highway 1 along Highway 34 (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 44).

STIBIOTANTALITE

$Sb(Ta,Nb,Sb)O_4$

Manitoba

52 L/6 Stibiotantalite forms subhedral to euhedral grains up to 2 cm long in the Odd West pegmatite about 1 km north of the western end of Rush Lake. Electron microprobe analysis: CaO 0.1, Ta_2O_5 54.5, Nb_2O_5 4.0, Sb_2O_3 41.8, total 100.4 (P. Černý and D.C. Harris, 1973: Can. Mineralogist, 12, p. 76).

STIBNITE

Sb_2S_3

Stibnite is found typically in hydrothermal veins and replacement deposits of low temperature origin or in hot-spring deposits. It is the most important ore mineral of antimony, but although it is widely distributed, large deposits are of rare occurrence.

British Columbia

82 K/3 Stibnite has been found at the Alps-Alturas Group on the north fork of Carpenter Creek in the Slocan mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem 74, p. 215).

92 F/6 W.J. Sutton has reported an occurrence of stibnite near Great Central Lake, Vancouver Island, in the Alberni mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem, 74, p. 215).

92 F/7 A stibnite-quartz vein has been explored at the Silver Bell Deposit near Horne Lake, Vancouver Island (J.E. Muller and D.J.T. Carson, 1969: Geol. Surv. Can., Paper 68-50, p. 42).

92 H/3 A quartz vein containing stibnite occurs on the Mammoth group claims on the north bank of

Sumallo River about 1.6 km above the junction of the Sumallo with the Skagit (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 78).

92 H/6 Stibnite, enargite and chalcopyrite are found at the Emancipation Mine in Coquihalla valley opposite the mouth of Dewdney Creek (S. Leaming 1973: Geol Surv. Can., Paper 72-53, p. 78).

92 I/4 The presence of stibnite has been reported at Jamieson's claims near Lytton in the Ashcroft mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 215).

92 I/12 Specimens of stibnite have been found near Foster Bar, 37 km from Lytton, on the Fraser River (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 60T).

92 I/14 An occurrence of stibnite has been reported at Ferguson Creek in the Bridge River area (A.S. Dawson, 1947: Can. Mining J., 68, pp. 20, 21).

92 I/15 Stibnite occurs in a gangue of dolomite and barite near the mouth of Copper Creek, Kamloops Lake, in the Kamloops mining division (G.M. Dawson, 1894: Geol. Surv. Can., Ann, Rept., VIII, p. 99A).

92 J/10 Fine-granular, and radiating-columnar masses of stibnite occur in quartz near Cadwallader Creek, in the Lillooet mining division (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 16R).

92 J/15 Massive, coarsely-columnar stibnite has been found on the east side of Tyaughton Lake, near Gun Creek, in the Bridge River area. Specimens donated by W.F. Ferrier are in the National Mineral Collection (W.S. McCann, 1922: Geol. Surv. Can., Mem. 130, p. 73).

92 J/15 In the Bralorne area, stibnite showings occur in a 0.6 m wide shear zone in greenstone at 50°46.5'N, 122°52.7'W, 1200 m south-southwest of Gwyneth Lake at 900 m elevation; and at 50°49'N, 122°42'W, associated with auriferous arsenopyrite in a shear zone in metasediments at 1800 m elevation near the headwaters of Truax Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 224-5).

92 J/15 Pyrite, stibnite and cinnabar occur in veins and as replacement bodies in greenstone at 50°53.8'N, 122°47.9'W, at an elevation of 900 m on the north shore of Carpenter Lake, 4.8 km northeast of Gold Bridge (B.C. Dept. Mines and Pet. Res., Geol., Exp. and mining in B.C., 1972, p. 283).

92 N/8 Quartz veins carrying stibnite and associated arsenopyrite are found at the Morris Mine at Tatlayoko Lake (H.V. Warren and R.M. Thompson, 1949: Am. Mineralogist, 34, p. 458).

92 O/1 A deposit of stibnite occurs on Watson Bar Creek in the Bridge River district (J.S. Stevenson, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 104).

92 O/2 Stibnite, associated with scheelite occurs in a small vein from 2.5 to 7.5 cm wide, in a large irregular area of carbonatized serpentine in the Tyaughton Creek valley, 22.5 km north of Minto Mine in the Bridge River district (J.S. Stevenson, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 96).

92 O/2 Stibnite is associated with cinnabar in fractures in conglomerate at 51°04'N, 122°48'W, at an elevation of about 1500 m on Relay Creek, 2.4 km above Tyaughton Creek (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C. 1970, p. 224).

92 P/8 A specimen of stibnite found on Chinook Mountain west of Kanaka in the Kamloops district is in the National Mineral Collection.

93 K/8 Stibnite occurs in quartz veins and as small kidney-shaped masses in sheared wall-rock, 16 km west of Fort St. James, 800 m inland from the bay behind Beaver Island on the south shore of Stuart Lake (J.C. Gray, 1937: Geol. Surv. Can., Paper 38-14, p. 7) (A.S. Dawson, 1947: Can. Mining J., 68, pp. 20,21).

93 L/14 A series of veins ranging in width from 7.6 to 25.4 cm contain varying amounts of stibnite with subordinate sphalerite, galena and chalcopyrite. The stibnite occurs in fine-grained massive form as coarse tabular crystals. The veins are on the Reiseter claims at 54°55'N, 127°10'W, on the south side of Reiseter Creek 3.2 km east of Buckley River (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 162).

93 M/5 Silver-lead ores at the Silver Bell claim, Hazelton, contain stibnite (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 215).

93 N/11 Stibnite is associated with jamesonite, arsenopyrite, sphalerite, pyrite, andorite, freibergite, native silver, quartz and calcite in a vein located 32 km east of Takla Landing on Takla Lake, on a hillside on the west side of the pass from Kwanika Creek to Silver Creek (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 71).

103 G/4 Finely disseminated gold and stibnite occur in a quartz vein stockwork at 53°02'N, 131°44'W, on the north side of Cumshewa Inlet on the east side of Moresby Island at elevations between 150 and 300 m (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C. 1974, p. 322).

104 K/10 A stockwork of quartz veins containing chalcopyrite, tetrahedrite, stibnite and enargite occurs on the Thorn claims in the bottom of a deep valley occupied by a northwesterly flowing tributary of Sutlahine River at 58°33'N, 132°48'W. (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 56).

104 K/11 Veins and disseminations of stibnite are present in altered volcanic rocks at 58°35'N, 133°20'W, on the Baker property near Stukini Creek (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 57).

104 K/12 Veinlets of massive and disseminated stibnite occur in quartz-carbonate gangue at the Surveyor and Council properties at 58°37'N, 133°32'W, and 58°36'N, 133°34'W, about 2.4 and 4.8 km south of Tulsequah (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 57).

104 M/15 An occurrence of stibnite has been reported near Lake Bennett (R.A.A. Johnston, 1915; Geol. Surv. Can., Mem. 74, p. 215).

104 N/4 Stibnite has been found at No. 1 Union camp in the Union Group situated near the glacier at the foot of Atlin Lake in the Atlin Lake mining division (National Mineral Collection).

Manitoba

52 L/6 Arsenian stibnite is an alteration product of allemontite at the Odd West pegmatite about 1 km

north of the western end of Rush Lake in the Bird River area. Electron microprobe analysis: Sb 70.93, As 4.33, S 25.62, total 100.88 (P. Černý and D.C. Harris, 1973: Can. Mineralogist, 11, p. 978).

53 L/13 Stibnite occurs in quartz and schists, associated with gold and sulphides of iron, copper, zinc and lead, at the New Falu claim on the east end of Hyers Island in Oxford Lake (A.S. Dawson, 1947: Can. Mining J., 68, pp. 20, 21).

New Brunswick

The following occurrences of stibnite have been listed in The Occurrence of Economic Minerals, Rocks and Fuels in New Brunswick record 2, Part B, 1965, by the New Brunswick Research and Productivity Council.

21 G/7 Piskahegan, Charlotte County.

21 G/9 Coates Hill, Queen's County.

21 G/14 Lake George, York County. The stibnite here occurs with native antimony in well-defined quartz veins in highly tilted slates and quartzites (G.C. Hoffmann 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 60T).

21 H/12 Stewarton, King's County.

21 H/13 Scotch Settlement, King's County.

21 J/3 Southampton, York County.

21 J/5 Hartland, Carleton Coutny.

21 J/6 Coldstream, Carleton County.

21 P/12 Lincour, Gloucester County.

Newfoundland

2 E/10 Dark grey metallic bladed aggregates of stibnite occur in quartz-calcite veins at a deposit worked for antimony at Moreton's Harbour. The mine is on the steep side of a hill at the south shore of Frost (Cross) Cove on the west side of Moreton's Harbour, New World Island, Notre Dame Bay. A small amont of stibnite is associated with arsenopyrite at the Stewart Mine on the east side of the opening of Little Harbour, a small inlet on the east side of Moreton's Harbour (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 97, 100).

Northwest Territories

85 J/8 Stibnite occurs with native antimony in the gold ores of the Yellowknife Bay area (L.C. Coleman, 1953: Am. Mineralogist, 38, p. 515).

Nova Scotia

11 E/4 Stibnite has been found in considerable abundance in quartzite and calcite veins cutting talcose slates at Rawdon and West Gore in Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 60T).

Ontario

31 C/11 An occurrence of stibnite has been reported in lot 28, conc. I, Sheffield Township, Lennox and Addington counties.

31 C/14 Stibnite has also been reported on lots 21 to 23, conc. VIII, Barrie Township, Frontenac County (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 210).

31 F/2 The National Mineral Collection includes a specimen of stibnite with barite from lot 20, conc. VIII, Lavant Township, Lanark County.

41 J/12
41 K/9 Stibnite is said to occur near Echo Lake and Garden River in the Algoma district (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 210).

41 N/2 Specimens of stibnite associated with chalcopyrite and pyrite were collected at the Tribag Mine in the east-central part of Nicolet Township, and donated to the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 378).

42 B/1 Stibnite is reported to occur with berthierite, native antimony and other antimony and arsenic minerals at a deposit explored by Card Lake Copper Mines Limited in Sewell Township at about 48°12'N, 82°00.5'W. The occurrence is 6.7 km by road south of Highway 101 from a junction 19.3 km west of the Little Star Lake road (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 154).

42 E/10 Crystals of stibnite and berthierite are associated at the Talmora Mine, Errington Township, Thunder Bay district (E.C. Pye, 1951: Ont. Dept. Mines, Ann. Rept., Vol, 60, Pt. VI, p. 60).

42 E/11 At the Jellico Mine, Lindsley and Errington townships, in the Little Long Lac area, stibnite is associated with chalcopyrite and arsenopyrite (H.S. Armstrong, 1944: Am. Mineralogist, 29, p. 313).

52 F/3 A stibnite occurrence is reported at Gates Lake, 96 km south of Wabigoon (A.S. Dawson 1947: Canadian Mining J., 68, p. 20).

52 N/4 The massive sulphide ore at the Cochenour-Willans Mine, Red Lake, contains stibnite (M.H. Frohberg, private communication).

52 N/4 A specimen of stibnite from the Campbell Red Lake Mine in the west part of Balmer Township is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 378).

Quebec

21 E/13 Stibnite is found with native antimony in argillite on lot 56, range I South Ham Township, Wolfe County (R.W. Ellis, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 80K).

21 E/15 The National Mineral Collection includes a specimen of stibnite from Marlow Township, Beauce County, lot 1, range VI.

Yukon

105 D/3 Stibnite occurs with silver, quartz, calcite, barite, sphalerite, jamesonite, galena, and grey copper on the eastern face of the southern portion of Carbon Hill, extending west across the Wheaton River and the central portion of the eastern face of Chieftan Hill (A.W.G. Wilson, 1917: Can. Mining J., 37, pp. 132-135) (W.E. Cockfield and A.H. Bell, 1944: Geol. Surv. Can., Paper 44-14, p. 16) (J.O. Wheeler, 1952: Geol. Sruv. Can., Paper 52-30, p. 13).

105 D/11 Small amounts of stibnite occur with grossular at the Copper King and Anaconda claims in the Whitehorse mining division (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 25R).

105 M/11
105 M/12 Stibnite occurs with quartz at Stewart River, about 8 km from Gordon Landing, in the Duncan Creek mining division (R.Bell, 1904: Geol. Surv. Can., Ann. Rept. XVI, p. 38A).

115 I/3 Visible stibnite occurs with arsenopyrite, pyrite, galena and sphalerite in quartz veins at the Heustis property of Mount Nansen Mines Limited at 62°03'N, 137°09'W, in the Nansen Creek-Webber Creek area (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 37).

115 I/6 The American Yukon prospect at 62°17'N, 137°02.5'W, 330 m north of Emmons Hill on the southeast flank of Freegold Mountain between Stoddart Creek and Seymour Creek, consists of a coarse stibnite, barite, quartz and carbonate vein in banded gneisses. (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970. Vol. 1, Dept. Indian Affairs and Northern Development, p. 78).

115 P/16 The main Hawthorne showing at 63°46'N, 136°15'W, straddles the ridge south of Scheelite Dome, just west of the head of Swede Gulch at an elevation of about 1,550 m. It consists of a quartz vein with stibnite that has been traced for 120 m. Stibnite has also been found at another showing about 1.2 km south-southeast of the main showing on a small tributary of Harvey Gulch (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 20).

116 D/6 A 5.4 m wide outcrop of stibnite occurs at Forty Mile River, 225 km up river from Forty Mile Post (--, 1916: Can. Mining J., 37, p. 565).

STICHTITE

$Mg_6Cr_2CO_3(OH)_{16}.4H_2O$

This rhombohedral, lilac to rose pink mineral occurs as blebs or veinlets in serpentine rocks. It is isostructural with hydrotalcite (Al for Cr) and pyroaurite (Fe for Cr), and has a hexagonal polymorphic form, barbetonite, with which it is often admixed.

Ontario

42 A/6 Stichtite is reported to have been found at the property of Canadian Magnesite Mines in Deloro Township about 11.2 km south of Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 144).

42 A/6 Small bright purple grains of stichtite occur in the ultramafic rocks in southwestern Carman Township (E.J. Leahy, 1971: Ont. Dept. Mines, GR 96, p. 64).

42 B/1 Stichtite occurs as small purple eyes in serpentinite on lots 7 and 8 in the southern part of the Keith-Muskego area (V.K. Prest, 1950: Ont. Dept. Mines, Ann. Rept., vol 59, Pt. VII, p. 17).

Quebec

21 L/3 An occurrence of stichtite at the Megantic Mine, Black Lake, has been described (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Museum Bull., No. 27, p. 29) (C. Frondel, 1941: Am. Mineralogist, 26, p. 307).

STILBITE

$NaCa_2Al_5S_{13}O_{36}.14H_2O$

Stilbite is a mineral of the zeolite group of hydrated aluminosilicates which have the characteristic properties of: (1) losing water without change of crystal structure, and absorbing other compounds in place of water; and (2) undergoing cation exchange. Stilbite, also known by the name desmine has a distinctive sheaf-like form.

British Columbia

82 L/5 Road-cuts on logging roads south of Monte Lake expose basalts containing the zeolite minerals stilbite, thomsonite, analcime, levyne, cowlesite, ferrierite, heulandite and chabazite (W.S. Wise and R.W. Tschernich, 1975: Am. Mineralogist, 60 p. 951).

92 B/5 Veins and amygdules in the Metchosin basalt east of the Sooke River contain stilbite, epidote, pumpellyite, prehnite, laumontite, chabazite, analcime, quartz and calcite (W.G. Libby and Jerry Kopel, 1971: Can. Mineralogist, 10 p. 915).

92 I/3 Specimens of stilbite have been collected from Zakwaski Mountain, east of Lytton (G.M. Dawson: National Mineral Collection).

New Brunswick

21 B/10
21 B/15 Zeolites occur as crystal aggregates and as radiating fibres in cavities and seams in basalt exposed along the shoreline of Grand Manan Island. They are most abundant along the coastline known as Seven Days Work. Stilbite, scolecite, heulandite, laumontite, analcime, natrolite, epistilbite and thomsonite have been reported (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 10).

22 B/1 Cavities up to 10 cm in diameter and fractures up to 5 cm wide in volcanic flows along the shoreline between Inch Arran and Bon Ami Point are filled with one or more of stilbite, laumontite, thomsonite, heulandite and prehnite (Ann P. Sabina, 1967: Geol. Surv Can., Paper 66-51, p. 103).

Northwest Territories

48 B/15 Amygdules of stilbite are found in volcanic rocks northeast of Peter Richards Islands (R.R.H. Lemon and R.G. Blackadar, 1963: Geol. Surv. Can., Mem. 328, p. 11).

Nova Scotia

21 A/NW
21 H/SE The occurrence of abundant zeolites in the trap rocks that outcrop along the shores of the Bay of Fundy and Minas Basin was first described by F. Alger and C.T. Jackson in 1827, 1828, and 1829 (Am. J. Sci., Ser. 1, vo. XII, p. 227, vol. XIV, pp. 305-330, and vol. XV, pp. 132-160). Stilbite is by far the most abundant and universally distributed of all zeolites, and has been found at the following localities:

N.T.S.	County	Locality
21 A/12	Annapolis	Digby Gut(northeast)
21 A/12	Digby	Deep Cove
21 A/14	Annapolis	Port Lorne
21 A/14	Annapolis	St. Croix Cove
21 B/8	Digby	Boar's Head
21 B/8	Digby	Digby Neck(west end)
21 B/8	Digby	Petite Passage (east side)
21 H/2	Kings	Black Rock
21 H/2	Kings	Harbourville
21 H/2	Kings	Mordern
21 H/3	Annapolis	Margaretsville
21 H/3	Annapolis	Port George
21 H/3	Cumberland	Isle Haute
21 H/7	Cumberland	Cape D'Or
21 H/8	Cumberland	Cape Sharp
21 H/8	Cumberland	Clarke's Head
21 H/8	Cumberland	Five Islands
21 H/8	Cumberland	Partridge Island
21 H/8	Cumberland	Wasson Bluff
21 H/8	Kings	Amethyst Cove
21 H/8	Kings	Cape Split

21 H/2
21 H/3
21 H/8

Chemical analyses by E.W. Todd: I. creamy yellow with faint reddish tint, mainly sheaf-like aggregates, from Partridge Island: SiO_2 55.52, Al_2O_3 16.85, Fe_2O_3 0.11, CaO 7.70, Na_2O 1.42, K_2O 0.48, H_2O 18.05, total 100.13; S.G. 2.162; II. white to colourless, approximately parallel growth, from Long Point: SiO_2 55.68, Al_2O_3 17.08, Fe_2O_3 0.06, CaO 7.60, MgO 0.10, Na_2O 1.28, K_2O 0.48, H_2O 18.08, total 100.36; S.G. 2.172; III. Radiated white aggregate lacking pearly lustre, from Morden: SiO_2 55.30, Al_2O_3 17.13, Fe_2O 0.05, CaO 7.85, Na_2O 1.28, K_2O 0.62, H_2O 18.10, total 100.33; S.G. 2.162 (T.L. Walker and A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, pp. 68-71).

Chemical analysis of stilbite from Port George by How: SiO_2 57.32, Al_2O_3 17.28, CaO 7.57, Na_2O 2.10, H_2O 16.52, total 100.79 (H. How: Phil. Mag., Ser. 5, vol. 1, p. 134).

Stilbite is probably the most abundant member of the zeolite group of minerals which are found in basalts of the Minas Basin-Bay of Fundy area. The following list of localities and associated minerals has been compiled from Geol. Surv. Can., Paper 64-10, Rocks and Minerals for the Collector, Bay of Fundy Area, by Ann P. Sabina, (1964).

	Locality	Associated Minerals
21 A/12	Deep Cove	jasper, chalcedony, heulandite, epistilbite
	Gulliver Cove	heulandite, chalcedony, jasper, quartz
21 B/8	Little River Cove	chalcedony, jasper
	Petite Passage at East Ferry	chalcedony, jasper
	East Sandy Cove (St. Mary's Bay)	analcime, scolecite, chalcedony, jasper
21 B/9	Trout Cove	heulandite, jasper, chalcedony
21 H/1	Woodworth Bay (Bennett Bay)	chalcedony, jasper, thomsonite, heulandite, analcime, mordenite
21 H/2	Baxter Harbour, Long Beach	chalcedony, jasper, heulandite, analcime, laumontite
	Halls Harbour	heulandite, amethyst, laumontite, thomsonite, apophyllite
	Chipman Brook	heulandite, mordenite, laumontite
	Canada Creek, Black Rock	mordenite, heulandite, mesolite, apophyllite, laumontite, prehnite, gyrolite
	Harbourville, Ogilvie	heulandite, laumontite mesolite, chalcedony
	Morden	laumontite, mordenite, analcime, apophyllite, heulandite, mesolite
21 H/3	Margaretsville	heulandite, laumontite, analcime, apophyllite, gyrolite, mesolite, scolecite, natrolite
	Port George	chalcedony, heulandite, analcime, mesolite, apophyllite, gyrolite, thomsonite, laumontite
21 H/7	Horseshoe Cove-Cape D'Or	analcime, laumontite, apophyllite, chabazite, thomsonite, mesolite, natrolite, heulandite, jasper, obsidian, copper, calcite
21 H/8	Partridge Island	laumontite, natrolite, heulandite, chabazite, analcime, apophyllite, quartz crystals, calcite, chalcedony
	West Bay	chalcedony, quartz crystals
	Swan's Creek	gmelinite, chabazite, analcime, apophyllite, natrolite, heulandite
	Cape Blomidon-Cape Split	apophyllite, natrolite, heulandite, chabazite, analcime, gmelinite, mesolite, thomsonite laumontite, amethyst, jasper, agate, calcite, celadonite
	Pinnacle Island	analcime, chabazite, natrolite, heulandite, thomsonite, gmelinite, calcite
	Scots Bay, Small Cove, Big Cove	chalcedony, jasper, amethyst, rutilated quartz, mesolite, natrolite, heulandite

21 H/8

Chemical analysis by F. Aumeuto of stilbite from Cape Blomidon: SiO_2 55.08, Al_2O_3 16.54, FeO 0.10, CaO 7.63, MgO 0.20, K_2O 0.53, Na_2O 0.93, H_2O^+ 14.65, H_2O^- 4.22, total 99.88 (F. Aumento and C. Friedlaender, 1966: Min. Soc. India, I.M.A. Volume, p. 149-154).

Ontario

31 F/7

Stilbite occurs in molybdenite-bearing pyroxenite at the Hunt Mine, lot 8 and 9, conc. XI, Brougham Township. A specimen is included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 380).

42 F/4 The mineral collection at the Royal Ontario Museum includes a specimen of stilbite with associated gypsum from the Willroy Mine in the southwest part of Gemmell Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 380).

Quebec

22 B/2 Reddish white to orange-red stilbite occurs with mordenite in fractures and as patches in volcanic rock in a quarry on the south side of a low ridge facing Highway 6 about 800 m west of the junction with the road to Cross Point and the bridge to New Brunswick (Ann. P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 100).

31 F/15 Sheaf-like aggregates of stilbite and blocky crystals of heulandite line vugs in calcite at the Yates uranium deposit in Huddersfield Township about 16.5 km northwest of Otter Lake and 4.8 km west of Sandy Creek (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 95).

31 G/12 Stilbite, associated with garnet and epidote, has been found in lot 18, range II, Wakefield Township, Gatineau County (C.W. Willimott, 1882-84: Geol. Surv. Can., Rept., Prog., p. 18L).

STILLWELLITE

$(Ce,La,Ca)BSiO_5$

Ontario

31 E/1 An occurrence of the rare borate mineral stillwellite has been found near Wilberforce on the property of Desmont Mining Corporation Limited. It occurs as maroon-red, opaque, waxy, tabular crystals up to 5 mm by 4 mm in size, and as grey, maroon-red and reddish brown to resinous patches in cream-white to salmon-pink massive calcite. Monazite, bastnaesite, thorianite, thorite and uranothorite are associated (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

Quebec

31 H/11 Stillwellite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

STILPNOMELANE

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

Stilpnomelane is a metamorphic mineral which in small flakes resembles biotite or chlorite. Its main compositional variation is in the ferrous iron to ferric iron ratio, and it has been proposed that the name stilpnomelane be restricted to brown and black varieties rich in ferric iron, and ferrostilpnomelane used for the dark green ferrous-rich mineral.

Nova Scotia

21 H/8 Stilpnomelane has been observed in dark yellowish green plumose groupings on chalcedony on the west side of Partridge Island, Cumberland County (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 15R).

Ontario

31 C/12 Stilpnomelane occurs at the Wallbridge Mine, lot 12, conc. V, Madoc Township, Hastings County (G.M. Dawson, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 107A).

31 M/4 Stilpnomelane has been found in the iron formation of the Timagami area at the Sherman Mine. Open pits are located south of Tetapaga Lake, south of Iron Lake and at the southeast end of Vermilion Lake (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 9).

41 J/2 Brown pleochroic stilpnomelane, in plates up to 1.2 millimetres across, has been found near dykes in conglomerate of the Elliot Group, Blind River. The plates are commonly replaced by chlorite along the edges (P.J. Pienaar, 1963: Geol. Surv. Can., Bull, 83, p. 74).

Quebec

31 L/6 Dark green and dark brown, radiating, foliated and randomly oriented plates of stilpnomelane have been found in specimens collected from an inactive soapstone quarry, 1.6 km northwest of St-Pierre-de-Broughton (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 257).

32 I/14 Tufts of stilpnomelane fibres up to 5 millimetres long are present in the cherty parts of the iron carbonate rock found northeast of Trout Point in Mistassini territory, Albanel area (J.N. Neilson, 1953: Que. Dept. Mines, Geol. Rept., 53, p. 21).

STOLZITE

$PbWO_4$

Stolzite occurs as a secondary mineral associated with limonite, wad, vanadinite, mimetite, wulfenite and cerussite in the oxidized zone of ore deposits containing primary tungsten minerals. It is isostructural and probably forms a complete series with wulfenite (Mo for W).

British Columbia

82 F/9 Stolzite occurs in a quartz vein with galena, pyrite, chalcopyrite, sphalerite, hematite and scheelite at the Leader claims. The claims are east of Angus Creek which flows north into St. Mary River, at 1740 to 1800 m elevation (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser., 17, p. 120).

93 A/14 Stolzite occurs as crusts of minute crystals that line the vugs in the scheelite-tungstite aggregates at Taylor Scheelite prospect, 48 km southwest of Wells, on the southwest rim of Snowshoe Plateau. The crystal faces are coated by a thin brittle film of earthy yellow tungstic oxide, but are themselves white and transparent (J.S. Stevenson, 1941: Univ. Toronto, Stud., Geol. Ser., 46, p. 137).

STROMEYERITE

CuAgS

British Columbia

82 F/6 Chemical analysis of stromeyerite by Johnston: S 15.74, Ag 52.27, Cu 31.60, Fe 0.17, total 99.78; S.G. 6.277. The sample was taken from Toad Mountain in the Nelson Mining division (G.C. Hoffmann, 1845: Geol. Surv. Can., Ann. Rept., VIII, pp. 12, 13R).

82 F/6 Stromeyerite occurs with bornite, chalcopyrite, pyrite, tetrahedrite, galena, sphalerite and argentite in a feldspathic veinstone traversing schistose eruptives at the Silver King Mine, south of Nelson, on Toad Mountain (G.M. Dawson, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 27A).

Northwest Territories

86 F/13 Stromeyerite, closely associated with chalcocite and native silver, is reported to be widespread at the B.E.A.R. silver-uranium deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol. 34, p. 761).

86 K/4 Stromeyerite has been reported as a constituent of the complex uranium-silver and silver deposits of Eldorado Mining and Refining Limited at Labine Point, and Echo Bay Mines 1.6 km northeast of Port Radium (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 35-37).

Ontario

31 M/4
31 M/5 Stromeyerite has been identified in specimens from the Frontier and Keeley mines at Silver Centre and at the O'Brien, Green-Meehan and Red Rock mines in the Cobalt area (Ann P. Sabina, 1974; Geol. Surv. Can., Paper 73-13, p. 40, 59, 63).

31 M/5 Stromeyerite occurs at the Foster Mine in the Cobalt district. Analysis by H.C. Rickaby: Cu 31.00, Ag 53.51, Fe tr., S 16.02, total 100.33 (T.L. Walker and A.L. Parsons, 1927: Univ. Toronto Stud., Geol. Ser., 24, p. 19).

31 M/5
41 P/10 Electron probe microanalyses of stromeyerite: Morrison Mine, Cu 31.2, Ag 52.3, S 15.8, total 99.3; Foster Mine, Cu 31.5, Ag 52.5, S 15.4, total 99,4; Bi, Sb, Pb, Fe, Co, Ni were looked for, but not detected (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 207).

41 P/10 Stromeyerite occurs at the Morrison Mine and Miller Lake-O'Brien Mine in the Gowganda district. Analysis by H.C. Rickaby: Cu 31.46, Ag 51.80, Fe 0.30, S 16.08, insol. 0.32, total 99.96; S.G. 6.26 (T.L. Walker and A.L. Parson, 1927: Univ Toronto Stud., Geol. Ser., 24, p. 19).

42 A/11 Stromeyerite is an accessory mineral in the ores of the Kidd Creek Mine, lots 3 and 4, conc. V, Kidd Township, about 17 km north of Timmins (R.R. Walker, A. Matulich, A.C. Amos, J.J. Watkins and G.W. Mannard, 1975: Econ. Geol. 70, p. 80).

STRONTIANITE

$SrCO_3$

British Columbia

93 A/6 Strontianite has been found at the Horsefly Mine in the Quesnel mining division (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 30R).

Ontario

30 M/5 A specimen of strontianite from the Dundas North quarry lots 10 and 11, conc. III, West Flamborough Township is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 382).

31 B/14 Grey fibrous strontianite is found as small masses on crystalline calcite that line cavities in limestone at the McFarland Construction Company quarry located about 2.4 km east of Williamsburg (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 51).

31 G/5 Strontianite occurs as clusters of acicular crystals and as fibrous aggregates in calcite at the Frazer Duntile quarry on Clyde Avenue in Ottawa (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 85).

Electron microprobe analysis of strontianite from the Frazer Duntile quarry on Clyde Avenue, Ottawa: SrO 56.39, CaO 9.08, PbO 0.03, BaO 0.36, CO_2 31.17, total 97.03 (J.A. Speer and M.K. Hensley-Dunn, 1976: Am. Mineralogist, 61, p. 1001).

31 G/5 Chemical analysis of strontianite from Nepean Township, Carleton County, by Johnston yielded: CO_2 30.54, SrO 65.43, CaO 3.38, insol. 0.17, total 99.52; S.G. 3.704 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, pp. 22, 23R).

31 G/5 Radiating, crystalline strontianite occurs in veins up to 15 cm in width traversing the Chazy limestone in lot 31, conc. A, Nepean Township, Carleton County (R.W. Ells, 1899; Geol. Surv. Can., Ann. Rept., XII, p. 44G).

Quebec

31 H/11 Colourless to white radiating fibrous strontianite (about 12 mm across) is associated with calcite in the Gayer Quarry north of St-Bruno (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 54).

31 H/12 Strontianite occurs as white acicular and fibrous tufts, as colourless spheres and as colourless crystals at the Francon Quarry, Montreal Island (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 67).

31 H/12 Strontianite is sparsely distributed in fractures and vugs at the Miron quarry, Jarry Street at Papineau Avenue, Montreal (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 H/12 Strontianite occurs in the form of white fibrous tufts in cracks in concretionary limestone masses in the Utica slate on St. Helen Island (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 61T).

STRONTIODRESSERITE

$(Sr,Ca)Al_2(CO_3)_2(OH)_4.H_2O$

Quebec

31 H/12 A new mineral, strontiodressite, occurs as sparse coatings in a silicocarbonatite sill at the Francon limestone quarry at St-Michel, Montreal Island. Partial analyses by electron microprobe: CaO 2.83, 2.90, 2.60; SrO 24.07, 24.25, 24.75; Al_2O_3 29.16, 29.12, 29.12; Ba and Pb not detected (J.L. Jambor, A.P. Sabina, A.C. Roberts and B.D. Sturman, 1977: Can. Mineralogist, 15, p. 405).

STRUVITE

$NH_4MgPO_4.6H_2O$

Yukon

115 O/14 Struvite was found with newberyite in the fossil tusk of a mammoth at Quartz Creek. Indian River, in the Duncan Creek mining division (G.C. Hoffmann, 1899: Geol. Surv. Can., Ann. Rept., pp. 13, 14R).

115 P/11 Struvite has been observed in the valleys between the cusps of a molar of a mammoth found

on McQuesten Creek, Stewart River in the Duncan Creek mining division (R.A.A. Johnston, 1913: Geol. Surv. Can., Sum. Rept., p. 327).

STÜTZITE

$Ag_{5-x}Te_3$

Quebec

93 E/6 Stützite has been identified with sylvanite and frohbergite in a specimen from Lindquist Lake (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 709-715).

Ontario

41 I/16 Inclusions of stützite, merenskyite, hessite and the new mineral temagamite occur in chalcopyrite at the Temagami copper deposit on Temagami Island in Temagami Lake. Electron microprobe analyses of stützite grains: Te 40.7, Ag 57.1, total 97.8 (L.J. Cabri, J.H.G. Laflamme and J.M. Stewart, 1973: Can. Mineralogist, 12, p. 193).

SUDBURYITE

(Pd,Ni)Sb

Ontario

41 I/6 The new mineral sudburyite occurs as inclusions in sulpharsenides and arsenides in Sudbury ores and is also associated with breithauptite, galena, nickeline and chalcopyrite. It has been identified as a single grain in a sample from the Frood Mine and in sufficient amount to permit description from the Copper Cliff South Mine. Electron microprobe analyses of 10 grains.

	Pd	Ni	Sb	Bi	Te	As	Total
1.	45.2	1.06	52.8	0.53	0.07	2.04	101.70
2.	36.1	7.6	55.5	0.77	0.79	0.71	101.47
3.	36.1	8.0	55.2	0.60	0.82	1.06	101.78
4.	41.9	2.18	49.6	5.4	0.14	0.03	99.25
5.	34.8	8.7	56.2	0.84	0.68	0.96	102.18
6.	31.1	10.3	57.7	0.75	1.13	0.62	101.60
7.	40.8	3.2	51.3	4.5	0.12	0.52	100.44
8.	35.5	7.8	55.5	0.76	0.84	0.80	101.20
9.	44.4	0.53	45.3	3.3	3.9	1.88	99.31
10.	44.4	0.48	49.6	3.2	0.17	0.88	98.73

(L.J. Cabri and J.H.G. Laflamme, 1974: Can. Mineralogist, 12, p. 275)

SULPHUR

S

Alberta

74 D/14 Sulphur occurs in cones deposited by springs at La Saline, 45 km below the confluence of the Athabasca and Clearwater rivers, 800 m east of the river on the edge of a valley (R.G. McConnell, 1890: Geol. Surv. Can., Ann. Rept., V, p. 35D).

83 F/4 Sulphur has been found 4.8 km above Jasper Lake on the Athabasca River (G.M. Dawson, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 162A).

Manitoba

63 J/13 Native sulphur was identified with leonhardite coating specimens from the dumps at Stall Lake Mines Limited about 2.2 km east of Stall (Miller) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 62).

Northwest Territories

85 B/15 Native sulphur occurs in small quantities as a deposit from minerals springs on the south shore of Great Slave Lake, at Sulphur Point (R.G. McConnell, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 31D).

85 B/16 Minor amounts of native sulphur and marcasite are present with the main ore minerals, sphalerite and galena, in the Pine Point deposits south of Great Slave Lake (E.A. Schiller and E.H. Hornbrook, 1964: Geol. Surv. Can., Paper 64-22, p. 30).

Nova Scotia

11 E/6 Scattered crystals of native sulphur have been noted in a gypsum quarry, 3.2 km west of Hilden, Colchester County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 219).

Ontario

30 M/5 At the Canada Crushed Stone quarry of Steetly Industries Limited near Dundas, native sulphur occurs as pale yellow to rusty yellow powder on pyrite-galena-sphalerite assemblages in limestone (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

31 C/16 Sulphur has been reported to occur on lot 2, conc. V, North Burgess Township. Lanark County (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 17R).

31 E/1 Sulphur admixed with pyrite forms black loosely granular masses in small pockets in calcite-diopside rock at the property of Desmont Mining Corporation Limited near Wilberforce (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

31 F/3 Sulphur occurs as a product of the decomposition of pyrite or chalcopyrite on lot 3, conc. I, Denbigh Township, Lennox and Addington counties (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 27R).

40 I/16 Sulphur occurs in conc. XII, lot 3, Charlotteville Township, Norfolk County (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept., vol. 9, p. 210).

Yukon

106 D/4 Yellow to greenish yellow to whitish coatings of sulphur are found on pyrite in placer deposits at Dublin Gulch in the Mayo mining district. Identification was by X-ray diffraction pattern (X-ray Laboratory, Geol. Surv. Can.).

SULVANITE

Cu_3VS_4

British Columbia

94 K/2 Specimens of this rare sulphide were reported to be found by J.J. McDougall of Falconbridge Nickel Mines Limited in a gossan that partly covers a steep mountainside near the headwaters of Gataga River (E.R. Rose, 1967: Geol. Surv. Can., Paper 66-57, p. 9).

sunstone

(see POTASSIUM FELDSPAR)

SURSASSITE

$Mn_5Al_4Si_5O_{21}.3H_2O$

New Brunswick

21 J/4 Sursassite, previously known only from Oberhalbstein, Switzerland, has been found in the Plymouth orebody, on the south side of the Meduxnekeag River about 8 km west-northwest of Woodstock and about 13 km east of Houlton, Maine. The copper-coloured fibrous mineral occurs in veins, with barite, calcite and quartz, cutting black Fe-Mn ore. Chemical analysis by H.B. Wiik: SiO_2 39.39, TiO_2 0.05, Al_2O_3 18.72, Fe_2O_3 3.47, MnO 26.64, MgO 2.68, CaO 2.00, Na_2O 0.18, H_2O 6.70, total 99.83 (E.W. Heinrich, 1962: Can. Mineralogist, 7, p. 291).

SYLVANITE

$AuAgTe_4$

Sylvanite is very similar in chemical and physical properties to krennerite and calaverite. It contains Au and Ag in approximately equal atomic proportions, whereas Au is the dominant metal in the other two tellurides.

British Columbia

92 J/15 Sylvanite is associated with native gold and stibnite on the Ida May property in the Bridge River area (W.S. McCann, 1922: Geol. Surv. Can., Mem. 130, p. 55).

93 E/6 Sylvanite has been found with frohbergite and stützite in a specimen from Lindquist Lake (J. Rucklidge, 1969: Can. Mineralogist, 9, p. 709-715).

94 F/13
94 K/4 Greenish coated cubes of sylvanite up to 3 millimetres in size occur in a gangue of quartz and calcite with small amounts of barite, barytocalcite and sphalerite at Galaga Lakes. Specimens were obtained from J.J. McDougall, Frobisher Limited (R.M. Thompson, 1960: private communication).

Manitoba

63 K/13 Sylvanite makes up a minor part of the lead-copper-zinc sulphide ore mined at Flin Flon (R.F. Coulter, 1962: Can. Inst. Mining Met., Bull. 55, No. 602, p. 376).

Ontario

42 A/1 Specimens of sylvanite have been collected from the Tough Oakes Mine at Kirkland Lake in the Timiskaming district (National Mineral Collection).

42 A/6 Sylvanite has been identified in ore specimens from Dome Mines in the Porcupine area (A.G. Burrows, 1924: Ont. Dept. Mines, Ann. Rept., vol. 33, Pt. II, p. 54).

42 A/11 Sylvanite is associated with native gold at the Pamour Mine. The mine is located along Highway 101 42.7 km west of Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 125).

52 B/10 At the Huronian Gold Mine on lot H, conc. I, Moss Township, sylvanite occurs with argentite and chalcopyrite in a gangue of white subtranslucent quartz (W. McInnes, 1897: Geol. Surv. Can., Ann. Rept., X, p. 59H).

Quebec

32 D/3 Sylvanite occurs associated with gold, pyrite, and chalcopyrite in Dufay Township, Abitibi County, in the Opasatica district (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40 p. 97).

32 D/3 Spectacular showings of native gold with sylvanite and petzite were encountered in quartz-ankerite veins in the underground workings of a deposit at the east end of Fortune Lake about 3.2 km west of Arntfield (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 40).

32 D/6 Sylvanite is one of several telluride minerals that have been found at the Horne Mine at Noranda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 47).

Yukon

105 D/2 At the Buffalo Hamp Group on Mount Stevens, sylvanite occurs with galena and gold (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

Quartz veins carrying sylvanite have been found at the Golden Slipper property on Stevens Mountain (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 333).

105 D/6 Sylvanite occurs with hessite, petzite, telluric ochre, pyrite and gold at the Gold Reef claim on Gold Hill in the Wheaton River district (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

SYLVITE

KCl

Nova Scotia

11 E/14 Sylvite occurs with halite in lenticular deposits of varying thickness at Malagash. Chemical analysis of pale yellow, crystalline, almost pure sylvite by H.V. Ellsworth: Mg 0.01, Ca 0.02, NaCl 6.48, KCl 92.89, H_2O 0.29. SO_4 0.03, Br 0.10, insol. 0.12, total 99.94 (H.V. Ellsworth, 1926: Geol. Surv. Can., Sum. Rept., 1924, Pt. C, p. 189).

Saskatchewan

62 K
62 M
72 P
73 B
73 C
Potash deposits consisting of sylvite admixed with carnallite and halite occur in the upper part of the Prairie Evaporite Formation of Devonian age that underlies southern Saskatchewan and adjacent parts of Manitoba and Alberta. The shallowest occurrences lie along a line from Binscarth, Manitoba, through Yorkton, Saskatoon and Unity, Saskatchewan (C.M. Bartley, 1963: Can. Dept. Mines, Min. Res. Div., Min. Rept., 7, p. 448).

SYMPLESITE

$Fe_3(AsO_4)_2.8H_2O$

Symplesite is a secondary mineral in which, like vivianite, the ferrous iron may oxidize more of less completely to ferric iron and cause changes in colour and optical properties. Ferrisymplesite is thought to be the oxidized equivalent of symplesite.

Ontario

31 M/5 Symplesite is reported to occur at the Penn-Canadian Mine in the Cobalt area (H.V. Ellsworth, 1916: Ont. Dept. Mines, Ann. Rept., vol. 25, Pt. I, p. 237).

Yukon

105 D/2 Nuggets of radiating, green acicular crystals of symplesite, associated with yukonite, occur sparingly on a mining claim on the west side of Windy Arm, Tagish Lake (J.B. Tyrrell and R.P.D. Graham, 1913: Trans. Roy, Soc. Can., Ser. 3, vol. VII, sec. 4, pp. 13-18).

SYNCHYSITE

$Ca(Ce,La)(CO_3)_2F$

Manitoba

52 L/6 Beige synchysite occurs replacing monazite in the central of three small pegmatites on the southeastern shore of Shatford Lake (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 561).

Quebec

31 H/11 Synchysite has been found with bastnaesite in siderite-albite vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

SYNCHYSITE-(Y)

$Ca(Y,Ce)(CO_3)_2F$

Quebec

31 G/13 The yttrium analogue of synchysite, originally known as doverite, has been identified in the Evans-Lou pegmatite as pink crystals on tengerite. The deposit is near Wakefield Lake, 40 km north of Ottawa (N.M. Miles, D.D. Hogarth and D.S. Russell, 1971: Am. Mineralogist, 56, p. 395).

SZÁJBELYITE

$Mg(BO_2)(OH)$

Szájbelyite is isostructural with sussexite and the two form a solid solution series by substitution of Mn for Mg. The minerals camsellite of Ellsworth and Poitevin, and magnesiosussexite of Gruner have been shown to be identical to szájbelyite, by X-ray diffraction studies. Ascharite is a member of the series, having intermediate composition.

British Columbia

92 I/1 Camsellite occurs intimately associated with chrysotile and dolomite, forming sheared veins in serpentine near Douglas Lake. Chemical analysis by H.V. Ellsworth: SiO_2 7.65, Fe_2O_3 0.86, FeO 0.95, MnO 0.85, Al_2O_3 0.26, CaO 3.69, MgO 41.72, B_2O_3 29.07, Na_2O+K_2O 0.03, NiO tr., H_2O (+110°) 9.88, H_2O (-110°) 0.52, CO_2 5.64, total 100.12 (H.V. Ellsworth and E. Poitevin, 1921: Trans. Roy. Soc. Can., 15, p. 1).

Northwest Territories

46 O/4 Crystals of szájbelyite up to 60 cm long occur in skarn with calcite, serpentine and talc at 67°09'58"N, 83°39'02"W, on Southern Melville Peninsula, District of Franklin (X-ray Laboratory, Geol. Surv. Can., sample submitted by J.B. Henderson).

Ontario

31 E/1 The borate minerals szájbelyite, sinhalite and warwickite have been found in crystalline limestone in a road cut on the north side of South Baptiste Lake road 12 km west of its junction with Highway 62, which is 6.7 km north of Bancroft. Szájbelyite occurs sparsely as buff-coloured silky to earthy crusts and nodules (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 338).

Quebec

31 F/10 Szábjelyite and pyroaurite have identified in crystalline limestone exposed by road cuts on Highway 8 just east of the turn-off to Bryson. The szájbelyite is silky white fibrous, hair-like or platy (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 99).

SZMIKITE

$MnSO_4.H_2O$

Yukon

105 M/13
105 M/14 White and flesh coloured efflorescences on rocks from the mine dump on the Silver King property were identified as zincian szmikite with admixed ilesite. Relatively pure szmikite occurs sparingly on several levels at the Calumet Mine. (J.L. Jambor and R.W. Boyle, 1962: Can. Mineralogist, 7, p. 217).

SZOMOLNOKITE

$FeSO_4.H_2O$

British Columbia

82 N/7 Szomolnokite occurring near Golden has been identified by X-ray powder diffraction pattern (X-ray Laboratory, Geol. Surv. Can.).

New Brunswick

21 P/5 The gossan at the Brunswick No. 6 Mine, located 3.2 km from highway 331, on the road to Grand Falls, contains a variety of secondary minerals including white to yellowish white to pale orange-yellow szomolnokite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

Northwest Territories

120 C/13 Szomolnokite from the Lake Hazen area, Ellesmere Island has been identified by X-ray diffraction pattern. It is associated with efflorescent salts along a fault zone (X-ray Laboratory, Geol. Surv. Can.).

Quebec

31 J/7 A small amount of pyrite is associated with graphite at the Castor Lake (Clot) Mine, and the pyrite is coated in places with white szomolnokite (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 63).

32 C/4 White powdery szomolnokite has been identified on ore specimens from the dumps at the Aumaque Mine, 1.3 km south of Highway 59, 6.1 km east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 113).

Yukon

105 M/14 A white efflorescence on a specimen from the Comstock Mine, Keno Hill-Sourdough Hill area in

the Mayo mining district, has been identified by X-ray powder diffraction as szomolnokite (X-ray Laboratory, Geol. Surv. Can.).

TALC

$$Mg_3Si_4O_{10}(OH)_2$$

Talc is the major constituent of rocks known as soapstone of steatite, blocks of which are used for thermal and electrical insulation purposes, and as a material for sculpture by the Eskimos. Uses of talc include: ceramics; filler for paints, paper and rubber; cosmetics preparation; and as a lubricant.

British Columbia

The following occurrences of talc are reported by M.E. Wilson, 1926, in Geol. Surv. Can., Econ, Geol. Ser., 2.

82 E/2 A pure soapstone is said to occur in serpentine at the head of Goosmus Creek west of Grand Forks.

82 N/1 Massive talc deposits occur on the east slope of Mount Whymper about 40 km west of Banff and 17.6 km southwest of Castle Station.

92 B/5 In the 1920's talc was produced from the property of Eagle Talc and Mining Company 0.8 km above the mouth of Wolf Creek, a tributary of Sooke River, Malahat district, Vancouver Island.

92 H/13 A number of talc showings have been worked on the Gisby claims along the banks of the Nahatlach River near its mouth on the Fraser River.

92 J/9 Talc seams were mined in 1919 on the northwest shore of Anderson Lake a few miles northeast of D'Arcy station

Northwest Territories

35 P/16
36 A/6 Deposits of soapstone used by the Eskimo for carving occur on the shore of Baffin Island. The most extensive deposit is on the west shore of Aberdeen Bay near the head of the bay. A small deposit occurs on the south shore of the northwest arm of Korok Inlet. Although the term, soapstone, is commonly used to describe the rock most of the rocks are serpentinized amphibolites (R.G. Blackdar, 1967: Geol. Surv. Can., Memoir 345, p. 48).

Ontario

31 C/5 Brownish white, granular, massive talc occurs in conc. II, lot 24, Clarendon Township, Frontenac County (National Mineral Collection).

31 C/9 The mineral collection at the Royal Ontario Museum includes talc from Charleston Lake, Rear of Leeds and Lansdowne Townships (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 387).

31 C/10 Light green, massive talc occurs with massive pyrite, pyrrhotite and calcite at the Enterprise Mine. The mine is located at about 42 km north of Kingston and 16 km west of Godfrey. Other minerals present in the mine include gypsum, molybdenite, apatite, scapolite, hornblende and pyroxene (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 10).

31 C/11 Pale white, to pale grey, flaky talc occurs at the Henderson Mine, Huntingdon Township, Hastings County, conc. XIV, lot 14, and at the Connolly Mine, conc. XIV, lot 15 (M.E. Wilson, 1922: Can. Mining J., 42, June, p. 356).

31 C/12 Talc occurs at the Eldorado property, Madoc Township, Hastings County, conc. V, lot 21, in an intimate mixture with dolomite, and quartz (M.E. Wilson, 1922: Can. Mining J., 42, p. 356).

31 C/14 Pale green foliated masses of talc occur in Grimsthorpe Township, Hastings County, conc. V, lot 8. Chemical analysis by F.G. Wait: SiO_2 60.45, Al_2O_3 0.27, Fe_2O_3 0.78, FeO 2.04, MgO 29.84, CaO 0.16, NiO 0.50, H_2O^+ 5.42, H_2O^- 0.32, total 99.78; S.G. 2.65 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 358).

41 I/4 The mineral collection at the Royal Ontario Museum includes specimens of talc associated with siderite from lot 1 conc. I, May Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 387).

41 I/6 Soapstone occurs on the northeast shore of Panache Lake on Whitefish Indian Reserve No. 6. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, P. 387).

42 A/1 Talc occurs in Maisonville Township, Nipissing district, at Sesikinika Lake (Donated to the National Mineral Collection, by M.E. Wilson).

42 A/7 Greyish green soapstone suitable for carving is reported to occur at a property explored by Canadian Magnesite Mines Limited about 11.2 km south of Timmins (Ann P. Sabina, 1974: Geol Surv. Can., Paper 73-13, p. 144).

42 B/1 Black soapstone occurs at the Reeves asbestos deposit in Reeves Township at 48°12.5'N, 82°05'W, about 1.3 km south of Highway 101 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 155).

42 D/10 The mineral collection at the Royal Ontario Museum includes talc from a locality at 48°41'N, 86°59'W, on the south side of Francois Islet, Slate Islands, Lake Superior (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 387).

52 E/7 Several occurrences of talc have been reported in the Lake of the Woods area. An extensive deposit on both sides of a canoe channel 2.8 km southwest of French portage is of historical interest as a much used source of material for pipes by the Indians (M.E. Wilson, 1926: Geol. Surv. Can., Econ. Geol. Ser. 2, p. 56).

52 F/10 Dark greenish grey soapstone outcrops on the peninsula forming the western boundary of Barritt Bay in Wabigoon Lake, just west of Wabigoon village; also along the southeast and northwest shores of Mile Lake, south of the southwest end of Wabigoon Lake; and on two islands at the outlet of Trap Lake, south of Mile Lake (Ann P. Sabina, 1963; Geol. Surv. Can., Paper 63-18, p. 41).

Quebec

21 L/2 Soapstone of a uniform quality occurs in a great serpentine belt having a general northeasterly strike about 18 km from Thetford Mines, near Leeds Station, in Broughton Township (R.C. Rowe, 1927: Can. Mining J., 44, pp. 1003-1004).

21 L/2
21 L/7 An outcrop of soapstone about 9 m in width, at a contact zone between intrusive dunite and conglomerate, can be found on the north side of St. Victor River in the Beauceville area (B.R. MacKay, 1921: Geol. Surv. Can., Mem. 127, p. 87).

21 L/3 Translucent, apple-green to greyish green, and rarely mauve talc has been mined at the Kitchener soapstone quarry near Rumpelville and the Broughton quarries near St-Pierre-de-Broughton (west Broughton) (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 55-6).

21 L/3 Veins of high-grade talc occur in soapstone on a property situated 2.4 km south of Clapham in range VII, lot 2, Ireland Township, Megantic County (M.E. Wilson, 1926: Geol. Surv. Can., Econ. Geol. Ser., 2, p. 106).

24 K/13
24 L/16 Gently dipping talc schists underlie a thick gabbro sill in the Leaf Lake area between Baie des Arpenteurs and Baie aux Refuges. The talc, which is mixed with phlogopite, calcite and quartz, is in a schist zone approximately 7.5 m thick (J. Bérard, 1959: Que. Dept. Mines, Prelim. Rept., No 384).

31 F/9 Grey massive talc is common in the orebody at the Hilton mine located between Shawville at Quyon on lots 21 and 22, range II, Bristol Township (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50 p. 91).

31 G/15 Light greenish-grey massive talc is present at the Canadian Refractories Limited Mines at Kilmar (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 72).

31 H/1 At the Van Reet Mine, talc occurs as translucent apple-green foliated aggregates, as silk-white to pale green fibres about 12 mm long, and as white, green or grey, fine-grained masses. The mine, operated by Baker Talc Limited has developed an open pit, adit and shaft. It is located 640 m south of the road from Bolton Centre to Knowlton, 7.2 km from Bolton Centre (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 10).

32 D/8 Dark green to almost black serpentine is mined from an open cut at the Marbridge Mine and shipped to the Arctic for use as a sculpturing stone by the Eskimo. It is referred to commercially as soapstone. The mine is 8 km by road west of LaMotte (Ann P. Sabina, 1974: Geol. Surv Can., Paper 73-30, p. 79).

Saskatchewan

73 I/16 Soapstone suitable for carving into ornamental objects occurs on the south shore of Wapawekha Lake at about 54°56'N, 104°14'W, and on some of the adjacent Pipestone Islands (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 15).

TANTALITE

$(Fe,Mn)(Ta,Nb)_2O_6$

Tantalite is the tantalum rich end member of an isomorphous series involving mutual substitution of Ta and Nb. It is found in granite pegmatites, particulary those with a well-marked albite, Li silicate, and Li-Mn-Fe phosphate phase.

Manitoba

52 L/6 Tantalite and other minerals of the columbite-tantalite series, are present in the lithium-caesium ore deposit at Bernic Lake (R. Brinsmead, 1960: Precambrian, vol. 33, No. 8, p. 25).

52 L/6 An ixiolite-like mineral believed to be disordered tantalite occurs with manganotantalite and wodginite in the Tanco pegmatite, Bernic Lake. Electron microprobe analyses gave:

	(1)	(2)	(3)	(4)	(5)	(6)
MnO	15.0	15.1	14.4	12.1	14.6	14.4
FeO	0.4	0.5	0.1	4.0	0.1	0.1
SnO_2	0.2	1.8	0.6	1.2	0.6	0.9
TiO_2	1.2	1.7	0.8	6.2	0.8	0.6
Ta_2O_5	62.0	64.0	64.0	52.5	64.7	66.2
Nb_2O_5	18.5	18.0	22.0	27.0	21.5	20.5
Total	97.3	101.1	101.9	103.0	102.3	102.7

(J.D. Grice, P. Černý and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 609)

Northwest Territories

85 I/11 Tantalite crystals up to 2.5 cm in length occur in association with columbite in pegmatite dykes at Peg Tantalum Mines Limited at Ross Lake in the Yellowknife district (1945: The Precambrian, vol. 18, pp. 9-15).

Tantalite occurs associated with columbite as crystals up to 5 cm square and several cm long. It occurs within albite near quartz lenses in pegmatite in the Ross Lake area, 72 km northeast of Yellowknife and also in the Yellowknife Beaulieu area (A.W. Jolliffe, 1944: Geol. Surv. Can., Paper 44-12).

Ontario

52 F/13 Crystals of tantalite occur with beryl in a white pegmatite in the area immediately northeast of Medicine Lake in Tustin Township. Crytals up to 2.5 cm in diameter have been found. Tantalite has also been reported in a pegmatite on a small peninsula that extends northeastward from the south shore of Cobble Lake. Black tourmaline is locally abundant (A.P. Pryslak, 1976: Ont. Div. Mines, GR130, p. 40-41).

Quebec

32 D/8 Tantalite, occurring in Figuery Township, Abitibi County, range II, lot 36, is associated with spodumene in as essentially quartz-microcline, albite-muscovite mineral assemblage (W.W. Weber, 1951: Que. Dept. Mines, Prelim. Rept., 257, p. 15).

Tantalite occurs as isolated crystals ranging in size up to 2 cm wide and 7.5 cm long, and as radiating clusters replacing albite and quartz, at points along the exposed length of a pegmatite dyke, in Preissac Township, Abitibi, County, range VII, lot 54 (G.W.H. Norman, 1944: Geol. Surv. Can., Paper 44-9, p. 10).

TAPIOLITE

$FeTa_2O_6$

Tapiolite is the tetragonal form of iron tantalate. Some Nb may substitute for Ta in the structure, but unlike its orthorhombic counterpart, tantalite, the tapiolite series does not appear to extend to the Nb end member. The name mossite has been used for niobian tapiolite. It occurs in granite pegmatites, and as a detrital mineral in areas of granite pegmatites.

Manitoba

52 L/6 Small amounts of tapiolite-ixiolite occurs in the lithium-caesium ore deposit at Bernic Lake (R. Brinsmead, 1960: Precambrian, vol. 33, No. 8, p. 25).

52 L/6 Electron microprobe analyses of two tapiolite grains in polished sections of rocks from the Tanco pegmatite at Bernic Lake: FeO 13.5, 14.0; MnO 2.1, 2.2; SnO_2 0.2, 0.2; TiO_2 0.2, 0.1; Ta_2O_5 85.0, 85.0; Nb_2O_5 2.4, 2.2; total 103.4, 103.7 (J.D. Grice, P. Černý and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 632).

52 L/6 Rounded to subhedral grains of tapiolite occur in stibiotantalite at the Odd West pegmatite about 1 km north of the western end of Rush Lake. Electron microprobe analysis: FeO 13.7, MnO 0.5, Ta_2O_5 79.5, Nb_2O_5 5.8, total 99.5 (P. Černý and D.C. Harris, 1973: Can. Mineralogist, 12, p. 76).

Northwest Territories

85 I/11 Tapiolite occurs at the Peg Tantalum Mine at Ross Lake (R.W. Hutchinson, 1955: Am. Mineralogist, 40, p. 437).

86 C/1 Tapiolite occurs at the Best Bet Pegmatite Mines property on the north shore of Great Slave Lake, in the Ingray Lake area (R.W. Hutchinson, 1955: Am. Mineralogist, 40, p. 442).

TARAMELLITE

$Ba_4(Fe,Mg)Fe_2^{+3}TiSi_2O_{12}(OH)_4$

Yukon

105 J/16 Taramellite is reported to occur with pellyite, barite, hedenbergite, quartz, andradite, gillespite, sanbornite, chalcopyrite and witherite at a contact metasomatic deposit near the headwaters of the Ross and Pelly Rivers approximatly 3.2 km southwest of Gillespite Lake (J.H. Montgomery, R.M. Thompson and E.P. Meagher, 1972: Can. Mineralogist, 11, p. 444).

TARAMITE

$NaCaNa\ Fe_3^{++}Fe_2^{+++}Si_6Al_2O_{22}(OH)_2$

Ontario

31 F/4 Ferri-taramite is a soda-calcic amphibole found in metasomatized alkaline gneiss and nepheline syenite dykes. The crystal structure and site chemistry of potassium ferri-taramite from the York River area, Bancroft, have been determined. Chemical analysis: SiO_2 39.05, Al_2O_3 9.98, TiO_2 1.56, Fe_2O_3 10.98, FeO 18.36, MnO 1.38, MnO 1.38, MgO 3.76, CaO 6.94, Na_2O 4.56, K_2O 1.88, H_2O 1.81, total 100.26 (F.C. Hawthorne and H.D. Grundy, 1978: Can. Mineralogist, 16, p. 53).

TARBUTTITE

Zn_2PO_4OH

British Columbia

82 F/6 Colourless tabular prisms on a specimen from the Oxide claim on Jubilee Mountain, Ymir, have been identified as tarbuttite (X-ray Laboratory, Geol. Surv. Can.).

TELLURANTIMONY

Sb_2Te_3

Quebec

32 F/12 Tellurantimony is a new mineral found in the telluride zone of a massive sulphide deposit at the Mattagami Lake Mine in Galinee Township 8 km southwest of the town of Mattagami. Associated minerals are magnetite, altaite, cobaltite, pyrrhotite, pyrite, hessite and mattagamite. Electron microprobe analysis-average of 8 grains - Sb 37.5, Bi 0.3, Te 61.8, total 99.6 (R.I. Thorpe and D.C. Harris, 1973: Can. Mineralogist, 12, p. 55).

TELLURBISMUTH

Bi_2Te_3

British Columbia

82 E/5 Tellurbismith occurs in quartz veins of varying size and is associated with arsenopyrite, pyrite, and native gold, at Hedley Yuniman Gold Field Limited, 5 miles east of Hedley on Sixteen Mile Creek in the Osoyoos mining division (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 5, p. 75) (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 368).

92 G/11 Tellurbismuth occurs associated with chalcopyrite, arsenopyrite, pyrrhotite, sphalerite, sylvanite, gold, and galena in pyrite and quartz at Ashloo Mine on Howe Sound, near Squamish (H.V. Warren and P. Davies, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 109).

92 K/3 Tellurbismuth intimately associated with gold in white quartz, is found at the Lucky Jim Mine, Quadra Island, in the Nanaimo mining district (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 548).

92 L/3 Plates of tellurbismuth can be found cementing quartz crystals at the Fil-Mil Mine on the south side of Amai Inlet, about 3.2 km from its entrance into Kyuquot Sound, 24 km by boat from Kyuquot (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 507).

103 H/1
103 H/2 Tellurbismuth is present as grains in pyrite, rarely as plates up to 12 mm wide and 3 mm thick, associated with chalcopyrite, arsenopyrite, pyrrhotite, sphalerite, sylvanite and gold at the Hunter Group claims, Khutze Inlet near Swanson Bay (H.V. Warren and P. Davies, 1940: Univ. Toronto Stud., Geol. Ser., 44, p. 109).

Manitoba

52 L/13 Tellurbismuth occurs in quartz as plates up to 10 millimetres across and is closely intergrown with gold, at the Jeep Mine, at Bissett (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 454).

Northwest Territories

76 B Tellurbismuth has been found in association with coarse visible gold at the Number 2 claim of the Ruby group at 64°55'12"N, 107°39'27"W (D.C. Harris, private communication).

85 I/14 Tellurbismuth is associated with bismuth, gold, sphalerite, chalcopyrite and arsenopyrite in quartz veins at Allan Lake, northeast of Yellowknife (H.V. Warren and R.M. Thompson, 1949: Am. Mineralogist 34, p. 458).

Ontario

42 A/11 Tellurbismuth occurs in milky quartz with some greenish white talc containing much visible gold at Porcupine Reef Gold Mines Limited, Pamour, Whitney Township, in the Cochrane district (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 369).

52 B/10 Tellurbismuth was identified with pyrrhotite, chalcopyrite, pyrite and galena in polished sections from the Ardeen Mine, Moss Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 368).

52 B/10 Tellurbismuth was identified by X-ray powder photo from the Huronian Mine. Moss Townhip (E.W. Nuffield and D.H. Gorman, 1960: private communication).

52 E/9 The mineral collection at the Royal Ontario Museum includes tellurbismuth in quartz from a vein at Gold Creek near Pine Portage Bay, Kirkup Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 389).

Quebec

32 C/3 Tellurbismuth was found in a quartz vein with pyrite, chalcopyrite, scheelite, and selenite, at Buffadison Gold Mines, Louvicourt Township, Abitibi County (J. Claveau, W.N. Ingham and W.R. Robinson, 1957: Que. Dept. Mines, Prelim. Rept., 256, p. 44).

32 C/4 Tarnished tellurbismuth in close association with calaverite and calcite was identified in several specimens of tourmalinized quartz at the Louvicourt Goldfields Mine in Louvicourt Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 369).

32 C/4 Tellurbismuth was identified by X-ray powder pattern in a specimen from the Beacon Gold Mine, Louvicourt Township, Abitibi County (E.W. Nuffield and D.H. Gorman, 1960: private cummunication).

32 C/4 Tellurbismuth can be found at the Lamaque Mine, Bourlamaque Township, and at the Sullivan Consolidated Mine, Dubuisson Township, Abitibi County (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 369).

32 D/3 Tellurbismuth was identified in a polished section, intergrown in part with altaite, at the Horne Mine, Noranda (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 369).

32 D/6 Rich aggregates of tellurides, sulphides, and gold, with substantial masses of tellurbismuth and altaite, were found at the Robb-Montbray Mine in Montbray Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 369).

Yukon

115 G/6 Tellurbismuth has been identified from placer workings of Mr. G. Loland, on the Upper Burwash Creek in the Kluane Lake district (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 368).

TELLURITE

TeO_2

Tellurite is a white acicular transparent mineral that forms as an oxidation product of native tellurium of tellurides.

Yukon

105 D/6 Tellurite occurs associated with sylvanite, hessite, petzite, pyrite and native gold at the Gold Reef claims on Gold Hill (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

TELLURIUM

Te

Native tellurium occurs in hydrothermal veins associated with tellurides and sulphides, usually in a quartz gangue.

British Columbia

82 E/2 Tellurium occurs associated with altaite, hessite, gold, copper, chalcocite, chalcopyrite and pyrrhotite at the Lakuria claim, Jewel Lake camp, in the Greenwood mining division (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

92 F/15 Native tellurium has been found in small quantities associated with galena and chalcopyrite in a quartz vein at the Commodore claim, near Vananda, Texada Island, in the Nanaimo mining division (G.C. Hoffmann, 1900: Geol. Surv. Can., Rept., XIII, p. 21R).

103 I/9 Tin white prismatic crystals of tellurium up to 3 m in length have been found at the Grotto Group, 2.4 km from Pitman, on Hardscrabble Creek, 1.6 km west of the Canadian National Railway, in the Skeena mining division (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 527).

Ontario

41 I/16 Tellurium from the Golden Rose Mine on Timagami Lake was identified by X-ray powder pattern (E.W. Nuffield and D.H. Gorman, 1960: private communication.)

TEMAGAMITE

Pd_3HgTe_3

Ontario

41 I/16 The new mineral temagamite was found as tiny inclusions in chalcopyrite, associated with merenskyite, stutzite or hessite at the Temagami Mine on Temagami Island in Temagami Lake. Electron microprobe analyses of 4 grains:

Pd	Hg	Te	Ag	Sb	Bi	Total
34.9	22.1	42.1	nd	nd	nd	99.1
34.6	21.5	41.6	nd	0.3	0.5	98.5
35.1	22.6	42.3	nd	nd	nd	100.0
34.8	22.1	41.6	nd	nd	nd	98.5

(L.J. Cabri, J.H.G. Laflamme and J.M. Stewart, 1973: Can. Mineralogist, 12, p. 193)

temiskamite

(see MAUCHERITE)

TENGERITE

$Y_2(CO_3)_3.3H_2O$

Quebec

31 G/13 Tengerite occurs in the form of white dendritic crusts on fractures in albite in a pegmatite quarry in West Portland Township, range V, lot 2, north of the Lièvre River at lat 45°45'30"N, long. 75°36'30"W (H.S. Spence, 1935: Am. Mineralogist, 20, p. 728).

31 G/13 The hydrous yttrium carbonate minerals, tengerite and lokhaite, occurs as a white powder which coats exposed surfaces, fracture openings and cavities at the Evans-Lou mine near

Wakefield Lake about 40 km north of Ottawa (D.D. Hogarth, 1972: The Mineralogical Record, 3, p. 69).

TENNANTITE

$(Cu,Fe,Zn,Ag)_{12}As_4S_{13}$

Tennantite forms a complete solid solution series with tetrahedrite through subsitution of As for Sb. Cu is the predominant metal but considerable substitution takes place to yield ferrian, zincian, argentian and bismuthian varieties. Tennantite is somewhat less common than tetrahedrite.

British Columbia

82 K/8
82 K/9 Tennantite occurs with barite on Toby Creek, north of Windermere Lake in the Kootenay district (National Mineral Collection: donated by C.D. Ellis).

92 I/14 Quartz veins containing pyrite and chalcopyrite with tennantite have been found on the Bonaparte River 4 km above Hat Creek in the Clinton mining division (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 12R).

93 L/2 Tennantite is one of the ore minerals at a prospect near Owen Lake, northwest of the west end of Francois Lake. Minor amounts of aikinite, berryite and matildite are also present (D.C. Harris and D.R. Owens, 1973: Can. Mineralogist, 11, p. 1016).

93 L/13 Bluish-grey tennantite is common as a coating on pyrite and marcasite at the LOU claims at 54°51'N, 127°42'W, immediately west of Louise Lake, 35.4 km west of Smithers (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C. 1969, p. 80).

104 K/12 The Tulsequah Chief Mine at 58°44'N, 133°35'W, and the Big Bull Mine at 58°40'N, 133°33'W, produced copper, lead, zinc, gold, silver, and cadmium in the period from 1951 to 1957. Sphalerite, chalcopyrite and pyrite were the most abundant metallic minerals. Galena was intimately associated with sphalerite, and bornite and tennantite were also present (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 62-32, p. 62).

New Brunswick

21 G/7 Tennantite is found with chalcopyrite, bornite and covellite in the ore deposit at Mount Pleasant in Charlotte County (A.A. Ruitenberg, 1963: M.Sc. thesis, Univ. New Brunswick).

21 H/10 Quartz-carbonate veins at Teahan in Albert County carry tennantite (W.J. Wright, 1940: New Brunswick, Mines Br., Paper 40-4).

21 H/15 Tennantite occurs in a shear zone at Lumsden in Albert County (D. Abbott, 1965: New Brunswick Res. and Prod. Council, Record 2, Part B).

Newfoundland

12 A/15 The workings of the Buchans Mining Company, Limited, Buchans, contain some tennantite. This mineral forms a minor part of the lead-zinc sulphide ore (R. Guimond, 1961: Precambrian, 34, p. 27).

Nova scotia

21 H/1 Tennantite forms a part of the Magnet Cove barium-lead-zinc-silver deposit. It is the main silver-bearing mineral and is closely associated with chalcopyrite, in which it occurs as irregular intergrowths (R.W. Boyle, 1962: Can. Mining J., 83, No. 4, p. 104).

Ontario

31 C/14 Tennantite occurs with either quartz, quartzo-feldspathic rocks, or fine granular dolomite in Barrie Township, Frontenac County, conc. IX, lots 6, 7, 8, 9 (G.C. Hoffmann, 1892-93: Geol. Surv. Can., Ann. Rept., VI, p. 28R).

32 D/4 Tennantite was identified by X-ray powder pattern in a specimen from Upper Canada Mine, Gauthier Township, in the Kirkland Lake area (E.W. Nuffield and D.H. Gorman, 1960: private communication).

42 A/6 Tennantite, identified by X-ray powder pattern, has been found at the Hollinger Mine, Timmins (E.W. Nuffield and D.H. Gorman, 1960: private communication).

42 A/6 Tennantite is a constituent of the ore at the McIntyre Mine on the shore of Pearl Lake at Schumacher (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 133).

42 A/8 Tennantite has been found at the Ross Mine at Holtyre, 8.8 km from Highway 11 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 111).

42 A/11 Tennantite is an accessory mineral in the ores of the Kidd Creek Mine, lots 3 and 4, conc. V, Kidd Township, about 27 km north of Timmins (R.R. Walker, A. Matulich, A.C. Amos, J.J. Watkins and G.W. Mannard, 1975: Econ. Geol. 70, p. 80).

Quebec

21 E/5 Tennantite occurs at the Crown, Capelton, and Eustis Copper mines in Scott Township, Sherbrooke County, conc. IX, lot 2, with chalcopyrite, pyrite and quartz. Analysis by Harrington: S 27.99, As 15.34, Sb 4.52, Cu 42.09, Fe 3.77, Zn 4.56, Pb 0.25, Ag 0.21, insol. 0.09, total 98.82; S.G. 4.622 (B.J. Harrington, 1885: Trans. Roy. Soc. Can., vol. 1, sec. 3, p. 80).

21 E/5 Tennantite occurs with a fine-grained mixture of chalcocite, galena, sphalerite, chacopyrite and abundant pyrite at the Aldermac Moulton Hill Mine, located 4.8 km south of Highway 1 from a point 8.4 km east of 10th Street, Sherbrooke (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 29).

22 A/13 Tennantite is reported to be one of the lesser abundant sulphides in the Needle Mountain orebody of Gaspé Copper Mines Limited at Murdochville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81).

32 C/4 Tennantite was identified by X-ray powder pattern in a specimen from the Golden Manitou Mine, in Bourlamaque Township, Abitibi County (E.W. Nuffield and D.H. Gorman, 1960: private communication).

TENORITE

CuO

Melaconite, the massive variety of tenorite, is a common mineral in the oxidized portion of copper deposits. It is usually associated with cuprite, iron and manganese oxides, and copper silicates.

British Columbia

82 F/5 Melaconite, a variety of tenorite, occurs at the head of Copper Creek along with many other oxides of iron and copper (R. Bell, 1902: Geol. Surv. Can., Ann. Rept., XV, p. 125A).

82 F/15 Melaconite, is found at the True Blue mining claim, near Kaslo (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 154).

Northwest Territories

78 B/6 Tenorite has been found in the volcanic rocks of the Shaler Mountains on Victoria Island (R. Thorsteinsson and E.T. Tozer, 1962: Geol. Surv. Can., Mem. 330, p. 77).

Quebec

21 31 Some of the copper deposits of the Eastern Townships have shown traces of melaconite (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, 45T).

22 A/13 Minor amounts of tenorite are present in the Copper Mountains deposit of Gaspé Copper Mines Limited at Murdochville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 81).

Yukon

105 D/10 105 D/11 105 D/14 Melaconite, the massive variety of tenorite, is one of the copper minerals found in the copper deposits of the Whitehorse area (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 46)..

TETRADYMITE

Bi_2Te_2S

Tetradymite is found in gold-quartz veins formed at moderate to high temperatures, also in contact metamorphic deposits, associated with tellurides, sulphides and commonly gold.

British Columbia

82 E/2 Tetradymite is associated with altaite at the Rhoderic Dhu claim, Jewel Lake camp in the Greenwood mining division (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

82 F/4 A thin film of tetradymite and gold on monzonite has been described from the Jumbo Mine, Rossland (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 372).

83 K/3 Tetradymite occurs with a little hessite intermixed with altaite 10 km north of Liddle (Lyle?) Creek, Kaslo River, West Kootenay district. Is has a foliated structure and a lead grey to steel grey colour with occasionally a pale yellow tarnish, a metallic lustre, and a black streak. Chemical analysis by R.A.A. Johnston, is as follows: S 4.30, Se tr., Ag 0.91, Te 36.01, Pb 3.50, Bi 51.85, Th tr., insol. 3.52, (quartz), total 100.09; S.G. 7.184 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull, 115, pp. 298, 299).

82 L/4 Foliated tetradymite occurs in intimate association with wehrlite in a quartz body, with pyrrhotite, chalcopyrite and free gold, 24 km southwest of Vernon at the White Elephant Mine. Chemical analysis: (1) by Forward, Bi 59.10, S 4.85, Te 35.90, total 99.85; (2) by Williams, Bi 60.72, 60.88, S 4.29, 4.29, Te 34.71, 34.47, totals 99.72, 99.64; (3) by Williams, tetradymite with minor wehrlite, Bi 61.05, S 3.65, Te 35.10, total 99.80 (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 50 p. 77).

92 G/10 A specimen showing coarse platy masses of tetradymite embedded in a groundmass of quartz, green diopside and scheelite was collected from the Katanga Group on the east side of Pitt Lake near the mouth of Scott (Vickers) Creek, New Westminster mining division (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 548).

92 H/8 Tetradymite associated with gold and arsenopyrite is found at the Nickel Plate Mine, northeast of Hedley in the Osoyoos mining division (E. Thomson, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 97).

92 O/3 Tetradymite was identified from the Taylor Windfall property on Battlement Creek, near the Taseko River, in the Clinton mining district (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 83).

93 E/6 Quartz veins containing tetradymite are irregularly scattered in diorite near its contact with greenstone at the Harrison Group claims, Tweedsmuir Park, on the north side of Lindquist Lake, Omineca mining division (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 76).

Manitoba

63 K/13 The copper-lead-zinc sulphide ore mined at Flin Flon contains a small amount of tetradymite (R.F. Coulter, 1962: Can. Inst. Mining Met., Bull. 55, No. 602, p. 376).

63 L/9 Tetradymite and molybdenite are reported to occur in quartz stringers at the Ace gold deposit on the southwest side of Missi Island in Amisk Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 35).

Ontario

31 M/13 32 D/4 Tetradymite is associated with calaverite, petzite, pyrite, gold, chalcopyrite, and sphalerite at Boston Creek; and with other tellurides, pyrite, chalcopyrite, hematite and galena at Miller Independence Mine; in Pacaud Township, Timiskaming district (E. Thomson, 1936-37: Univ. Toronto, Stud., Geol. Ser., 40, p. 98).

32 D/4 Tetradymite having good cleavage both in polished section and in hand specimen occurs closely associated with matildite, sphalerite, chalcopyrite and calaverite, at Glacier Gulch, 10 km west of Smithers (G.M. Pratt, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 55).

41 I/6 The occurrence of tetradymite and hessite in non-vein galena at Sudbury, has been described. Three mineral associations exist: as small grains in nonmagnetic pyrrhotite; as an impure intergrowth with native bismuth in the galena-Ni-Bi-S type of mineralization; and most commonly as grains in galena (J.E. Hawley and R.K. Stanton, 1962: Can. Mineralogist, 7, p. 102).

41 P/12 Tetradymite occurs on Narrow Peninsula near Clam Lake, Chester Township, Sudbury district, in the Three Duck Lake area (H.C. Laird, 1932: Ont. Dept. Mines, Ann. Rept., vol. 41, Pt. III, p. 33).

42 A/1 The No. 2 vein at the Tough Oakes Mine in the Kirkland Lake area contains tetradymite and hessite (A.G. Burrows, 1923: Ont. Dept. Mines 32, Pt. IV, p. 24).

42 A/6 Tetradymite was one of several telluride minerals found in quartz-ankerite ore veins at the Hollinger Mine in Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 135).

42 A/9 In the vicinity of Painkiller Lake, northeast of Matheson, Beatty Township, Timiskaming district, tetradymite has been deposited contemporaneously with native gold, filling fractures in quartz (E.Thomson, 1922: Univ. Toronto Stud., Geol. Ser., 14, p. 93).

42 A/11 Small amounts of tetradymite and gold occur in massive white quartz at the Broulan Mine, in the Porcupine district (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 371).

42 A/16 Tetradymite and altaite have been reported from conc. IV, lot 7 Rickard Township, Cochrane district, in the Matachewan area (--, 1918: Ont. Dept. Mines, Ann. Rept., vol. 27, Pt. 1, 214).

42 D/14 Examination of a polished section of a specimen from the McKellar Longworth Mine, at Schreiber, revealed the presence of tetradymite, chalcopyrite and gold (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 371).

52 E/9 Tetradymite, calaverite and petzite have been found at Bigstone Bay on Lake of the Woods (E. Thomson, 1935: Univ. Toronto Stud., Geol. Ser., 38, p. 48).

52 F/3 Stringers and tiny blebs of tetradymite occur in quartz and carbonate gangue in veins at Straw Lake, 58 km north of Fort Frances, in the Kenora district (E. Thomson, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 33).

52 N/4 Tetradymite is associated with gold and chalcopyrite in a mixed quartz-carbonate gangue at the Gold Shore Mine, west of Howey Bay, Red Lake, Dome Township (E. Thomson, 1935: Univ. Toronto Stud., Geol. Ser., 38, p. 47). It has also been identified by X-ray powder pattern at the Mackenzie Red Lake Gold Mine, associated with galena (E.W. Nuffield and D.H. Gorman, 1960: private communication).

53 C/13 A quartz vein containing tetradymite and gold occurs on the Zione property, located between Rat House Bay and North Trout Lake, in the Favourable-Sandy Lake area (M.E. Hurst, 1929: Ont. Dept. Mines, Ann. Rept., vol. 38, Pt. 2, p. 69).

Quebec

32 C/4 Small flakes or grains of tetradymite have been found in specimens from the Perron Mine, Pascalis Township, Abitibi County; the Lamaque Mine, Bourlamaque Township; and the Sisco Gold Mine, near Sisco Island in Lac de Montigny (R.M. Thompson, 1949: Am. Mineralogist, 34, pp. 371, 372) (E.W. Nuffield and D.H. Gorman, 1960: private communication).

32 C/5 Specimens from the Eureka Mine, Tiblemont Township, Abitibi County, contain tetradymite, gold and galena as the chief metallic minerals, and some sphalerite and chalcopyrite, in a quartz gangue (E. Thomson, 1934: Univ. Toronto Stud., Geol. Ser., 36, p. 33).

32 D/2 The main metallic mineral at the McWatters Mine in Rouyn Township is tetradymite. It occurs as short veins and bleb-like forms with minor chalcopyrite and gold in a predominantly quartz gangue (E. Thomson, 1935: Univ. Toronto Stud., Geol. Ser., 38, p. 48).

32 D/6 A specimen from the Powell Rouyn Mine, at Noranda consisted of a somewhat decomposed stringer of tetradymite in dark green pyritized quartzose rock, coated on two sides by greenish black chlorite, pink calcite crystals, pyrite and free gold (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 372).

32 D/6 Altaite occurs along cleavage planes in tetradymite to produce a pseudo-eutectic structure that is the predominant metallic mineral phase in parts of the ore at the Robb-Montbray property, located 4.8 km northwest of the southeast corner of Montbray Township (E. Thomson, 1928: Univ. Toronto Stud., Geol. Ser., 27, p. 12).

32 D/6 Tetradymite is one of several telluride minerals identified in the ore of the Horne Mine at Noranda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 47).

Yukon

106 D/4 A small pebble of tetradymite containing an embedded subhedral crystal of gold has been found in placer workings at Dublin Gulch, Mayo district (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 371).

115 H/14
115 I/3 Pebbles of tetradymite up to 10 millimetres in length have been found at Discovery Fork, and along the east fork of Nansen Creek, in the Carmacks district (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 371).

115 J/15 A number of solid compact nuggets of tetradymite, containing some coloradoite, have been taken from the Reno placer property at Canadian Creek (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 454).

TETRAHEDRITE

$(Cu,Fe,Ag,Zn)_{12}Sb_4S_{13}$

Tetrahedrite is one of the most common of sulphosalts, widespread in its occurrence and varied in its association. It forms an apparent complete solid solution series with tennantite through substitution of As for Sb. It is an important ore mineral of copper; and the argentian variety, freibergite, may be an important ore mineral of silver.

British Columbia

82 E/4 Acanthite, tetradedrite, pyrargyrite, cerargyrite, galena, sphalerite, pyrite and chalcopyrite occur as irregular concentrations and bands within a vein system at 49°03'N, 119°41'W, 16 km west-northwest of Osoyoos on Richter Mountain extending from the Similkameen River road to Richter Creek (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 43).

82 E/6 Dull grey, fine-grained, disseminated freibergite occurs in the ore of the Highland Bell Mine, at Wallace Mountain, near Beaverdell, 37 km east of Penticton. It is associated with galena and polybasite. Chemical analyses by

R.N. Williams are as follows: Ag 25.25, 26.40; Cu 17.85, 18.06; Fe 6.68, 5.30; Zn 3.03, 3.59; Pb 0.44, 0.44; Sb 21.20, 21.17; As 1.55, 1.20; S 22.68, 22.91, insol. 1.09, 0.84; total 99.95, 99.91; S.G. 5.02 ± 0.02, 4.94, ± 0.04 (A.B. Staples and H.V. Warren, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 29).

82 F/2 Pyrite, galena, sphalerite, chalcopyrite, tetrahedrite, hessite, petzite and scheelite have been found at the Bayonne Mine on Bayonne Creek, a tributary of Summit Creek (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 101).

82 F/6 Metallic minerals at the Golden Age (Euphrates) property include pyrite, chalcopyrite, sphalerite, tetrahedrite, galena, aikinite, scheelite, gold and silver. The property is at 49°23'N, 117°13'W, 12 km south-southeast of Nelson, astride Highway 6, at elevations between 900 and 1200 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973, p. 65).

82 F/14 Analysis of plumbian-argentian tetrahedrite from the Antelope claim, Carpenter Creek (also called Seaton Creek) in the Slocan mining division, by Johnston: S 21.68, Sb 28.22, As 0.23, Cu 22.14, Ag 11.20, Pb 9.38, Zn 6.22, Fe 0.93, total 100.00; S.G. 5.082 (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 12R).

82 G/11 Tetrahedrite occurs as blebs and in discontinuous veinlets in dolomite at the Coronado property at 49°43'N, 115°29'W, at about 2000 m elevation, 4.8 km east of Wild Horse River and 3.2 km southwest of Mount Haley (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C., 1972, p. 66).

82 G/13 Masses of mercurian tetrahedrite with minor pyrite occur in a quartz-siderite gangue at the Red Rock Group on Copper Creek (also called Sandown Creek) a small tributary of Skookumchuck Creek, 10 km west of Torrent Station, in the Fort Steele mining division. Chemical analyis by R.N. Williams yielded: Cu 36.62, Hg 4.94, Zn 4.50, Fe 4.00, Sb 24.42, As 0.35, S 25.04, total 99.87; S.G. 4.95; cube edge 10.34 Å (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 548).

82 K/3 Argentiferous tetrahedrite occurs with pyrite and some galena and sphalerite at the Molly Hughes property at 50°01'N, 117°22'W, 1.6 km north of New Denver, extending from the mouth of Tryon Creek on Slocan Lake at about 1200 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1973: p. 90).

82 K/3 Quartz veins containing tetrahedrite and acanthite with minor galena and sphalerite are located at 50°04'N, 117°12'W, 14.4 km northeast of New Denver on the southeast slope of London Ridge covering the headwaters of Watson Creek at an elevation of about 1980 m (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974: p. 82).

82 K/4 Galena, tetrahedrite, sphalerite and arsenopyrite occur in a broken quartz vein in graphitic slate at the Millie Mack claims at 50°02.9'N, 117°43.2'W, on the southwest slope of Silver Mountain, on the north side of Caribou Creek 11.2 km northeast of Burton (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 72).

82 K/8 Argentian tetrahedrite, chalcopyrite, galena, sphalerite, azurite and malachite occur in fractures in quartzite and limestone at the Imperial and Copper King claims on the northwest slope of Black Diamond Mountain at the head of Farnham Creek at 50°25'N, 116°29'W (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 343).

82 K/8
82 K/9 Tetrahedrite occurs at the Pretty Girl claim, which is located on the ridge between Boulder (or Bruce) Creek and its tributary Law Creek, both of which empty into Horsethief Creek. The claim is northeast of the peak of Boulder (or Slade) Mountain at an elevation of 2700 m. It is on the property of North Kootenay Mines Limited in the Fort Steele mining division (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 549).

82 K/11
82 K/12 Quartz veins and skarn containing galena, sphalerite, pyrite, chalcopyrite and tetrahedrite have been explored on Great Northern Mountain at 50°42.5'N, 117°30'W, about 3.2 km north of Ferguson (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 77).

82 L/15 Argentiferous tetrahedrite occurs near Craigellachie on the Eagle River (G.C. Hoffmann, 1890-91: Geol. Surv. Can., Ann. Rept., V, p. 65R).

82 M/4 Veins and stringers containing barite, tetrahedrite, galena, sphalerite, pyrite, chalcopyrite, argentite and minor native silver are present on several claims on Homestake Creek at about 900 m elevation at 51°06.7'N, 119°49.5'W, 4.8 km west of Skwaam Bay (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 87).

82 N/5 Remnants of argentian tetrahedrite and galena are found in oxidized lead-zinc ore consisting of anglesite, cerussite, malachite and azurite with minor smithsonite at the Waverley group located just north of Tangier Pass, and accessible from Albert Canyon (J.O. Wheeler, 1963: Geol. Surv. Can., Paper 62-32, p. 28).

92 F/5
92 F/12 Fissure veins in Permian volcanics carry galena, pyrite, sphalerite, tetrahedrite, pyrargyrite, owyheeite and arsenopyrite at the CREAM claims 6.4 km south of Butte Lake at 49°29.5'N, 125°33'W, at 900 to 1500 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 219).

92 H/6 Freibergite occurs at Hope on the Fraser River (C. Camsell, 1911: J. Can. Min. Inst., p. 603).

92 H/7 Veins containing galena, sphalerite, chalcopyrite, tetrahedrite and pyrite occur in chlorite and amphibolite schist at 1770 m elevation at 49°16.5'N, 120°45'W, near the head of Whisper Creek 25.7 km southwest of Princeton (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 118).

92 H/9
92 H/16 Pyrite, chalcopyrite, bornite, tetrahedrite, galena and sphalerite occur in shear zones on Siwash Creek at elevations between 1100 and 1300 m, 9.6 km northwest of Bankeir and 38.5 km northeast of Princeton (B.C. Dept. of Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 141).

92 H/11 Tetrahedrite occurs with pyrite, galena, sphalerite and chalcopyrite in veins and altered quartz monzonite at 49°41.4'N, 121°01.4'W, between 1000 and 2100 m elevation on Coldwater River, 5.6 km north of Coquihalla (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 132).

92 I/10 An argentiferous variety of tetrahedrite is reported to occur in the Vernon mining division at Cherry Creek (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 33T).

92 I/12 Tetrahedrite, massively banded in gangue, has been found on the Fraser River, near Foster Bar (National Mineral Collection).

92 J/15 Tetrahedrite occurs with zinckenite and jamesonite at the Robson Group, Tyaughton Lake area, Bridge River district. Chemical analysis by R.N. Williams yielded: Cu 30.50, Ag 1.80, Pb 1.10, Zn 4.50, Fe 5.73, As 7.26, Sb 20.40, S 23.06, insol. 5.61, total 99.96 (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser., 51, p. 73).

92 O/3 Disseminated masses and crystals of tetrahedrite, up to 6 mm in size, occur in a compact mass of sericite at the Taylor Windfall Mine on Battlement Creek, near its junction with the Taseko River, about 14 km east of Taseko Lake. Chemical analysis by R.N. Williams: Cu 35.03, Fe 2.65, Zn 8.50, Sb 12.54, Pb 2.05, As 12.48, S 26.49, total 99.74; S.G. 4.68 (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 507).

93 L/10 Argentiferous tetrahedrite occurs locally with pyrite, chalcopyrite and sphalerite on Grouse Mountain at the south end of the Babine Range 19.3 km due north of Houston (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 397).

93 L/15 Quartz veins and silicified zones in volcanic rocks contain tetrahedrite, chalcopyrite and bornite at 54°52.1'N, 126°57'W, on Harvey Creek a tributary of Driftwood Creek 19.3 km northeast of Smithers (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 420).

93 M/6 Freibergite and galena occur in fractures and fault fissures in granodiorite at the Sunrise claims located at 55°21'N, 127°29'W, at elevations of 1440 and 1620 m on the north side of Nine Mile Mountain about 21 km northeast of Hazelton (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 175).

93 N/11 Freibergite occurs with andorite, stibnite, jamesonite, arsenopyrite, sphalerite, pyrite, native silver, quartz and calcite at the Kay group on the west side of the pass from Kwanika Creek to Silver Creek 32 km east of Takla Landing (H.V. Warren, 1946: Univ. Toronto Stud., Geol. Ser. 51, p. 72).

103 I/15 Quartz containing tetrahedrite, galena, chalcopyrite and light brown sphalerite occurs in veins and brecciated zones of the Hope (Silver Plate, Silver Cup) claims at 54°58'N, 128°53'W, southeast of Sand Lake near Belway Creek at an elevation of 335 m) (S. Duffell and J.G. Souther, 1964: Geol. Surv. Can., Memoir 329, p. 73).

103 P/12 Argentian tetrahedrite has been identified in drill core from the 320 m adit level on the North Star claim of Torbrit Silver Mines, located 27 km north of Alice Arm on the west side of the Kitsault River at 55°40'N, 129°30'W (D.A. Moddle, 1960: private communication).

103 P/13 Argentian tetrahedrite is the principal sulphide mineral in quartz veins at 55°54.5'N, 129°56'W, on Mount Rainey, immediately southeast of Stewart on the east side of the Portland Canal (E.W. Grove, 1969: B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1969, p. 58).

103 P/13 Quartz-calcite-barite veins carrying argentian tetrahedrite and galena and dark brown sphalerite occur at 55°57'N, 129°53'W, near the head of Glacier Creek at 1100 to 1400 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 510).

104 A/4 Freibergite occurs with sphalerite, arsenopyrite, pyrite and galena on the Goat claims at 56°10'N, 129°36'W, 11.2 km west-northwest of the west end of Meziadin Lake at the headwaters of Surprise Creek at 1370 to 1500 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 330).

104 B/1 Quartz-carbonate veins carrying significant tetrahedrite are found as fracture fillings on claims at 56°08'N, 130°01'W, 19.3 km north of Stewart at about 1070 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 331).

104 B/9 Disseminated tetrahedrite occurs with massive sphalerite on the Kay claims at elevations of 1060 to 1130 m along Eskay Creek on the east slope of Prout Plateau 2.4 km east of Tom Mackay Lake (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 516).

104 K/10 A stockwork of quartz veins with chalcopyrite, tetrahedrite, stibnite and enargite occurs on the Thorn claims in the bottom of a deep valley occupied by a northwesterly flowing tributary of Sutlahine River at about 58°33'N, 132°48'W (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 56).

104 K/11 Replacement of limestone by massive sulphides has been explored on the Ericksen-Ashby property at 58°39'N, 133°28'W. The minerals present are: pyrite, sphalerite, galena and freibergite (J.G. Souther, 1971: Geol. Surv. Can., Memoir 362, p. 55).

104 O/16 Several silver-lead-zinc showings occur northeast of the Cassiar batholith near Tootsee River. They include the Silvertip group about 6.4 km northeast of Tootsee Lake, and the Amy claims 3.2 km northwest of the north end of Tootsee Lake. Galena and sphalerite are associated with tetrahedrite (H. Gabrielse, 1969: Geol. Surv. Can., Paper 68-55, p. 34).

Manitoba

63 J/13 Arsenopyrite, native gold, tourmaline, chalcopyrite, sphalerite, pyrite and tetrahedrite occur in quartz veins cutting quartz-feldspar porphyry and andesite at the Kiski Mine. The mine is 91 m from the east shore of a small bay on the east side of Wekusko Lake 3.7 km south of the settlement of Herb Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 57).

63 K/13 Tetrahedrite-tennantite is reported to be a minor constituent of the orebody at the Flin Flon Mine (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 41).

63 K/16 A small amount of tetrahedrite has been found in the ore of the Chisel Lake Mine which lies below the south end of Chisel Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 65).

63 L/9 Gold-bearing quartz veins at the Prince Albert (Monarch) Mine also carry tetrahedrite. The mine is on the northwest shore of Amisk Lake on the east side of a peninsula that projects southward to Tarrington Island (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 30).

64 I/7 Replacement lenses in altered volcanic rock on the Echimamish Gold property, contain sphalerite, galena, chalcopyrite, jamesonite, and freibergite (C.K. Bell, 1961: Geol. Surv. Can., Paper 61-22, p. 17).

New Brunswick

21 G/1 Quartz veins carrying tetrahedrite occur at Frenchman Creek in Saint John County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, 1st ed., Industrial and Educational Pub. Co., Gardenvale, Que.).

21 G/7 Tetrahedrite is the main host mineral for silver and antimony at the Mount Pleasant deposit of Brunswick Tin Mines (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

21 G/8 Tetrahedrite occurs at McKiel Lake in Queen's County. It is associated with sphalerite, galena, chalcopyrite, pyrite, arsenopyrite and silver (G.S. MacKenzie, 1951: Geol. Surv. Can., Paper 51-15).

21 G/9 Tetrahedrite is one of the minerals found at the lead-zinc-silver prospect at Reserve Brook in Queen's County (G.S. MacKenzie, 1942: New Brunswick, Mines Br., Paper 42-1).

21 H/12 Veins containing galena, chalcocite, tetrahedrite and sphalerite occur in limestone and quartzite at Norton in King's County (W.L. Goodwin, 1928: Geology and Minerals of New Brunswick, 1st ed., Industrial and Educational Pub. Co., Gardenvale, Que.).

21 O/9 Tetrahedrite is a constituent of sulphide bodies on the property of Tetagouche Exploration at Orvan Brook in Restigouche County (A.L. McAllister, 1960: Can. Inst. Mining Met., Bull. 53, No. 574, pp. 88-98).

21 P/5 Tetrahedrite is a minor constituent of the sulphide ores at Brunswick No. 12 and No. 6 mines, in Gloucester County (A.L. McAllister, 1960: Can. Inst. Mining Met., Bull. 53, No. 754, pp. 88-98.

21 O/8
21 P/5
21 P/12 Tetrahedrite is a component of several of the orebodies in the Newcastle and Bathurst areas, notably Heath Steele, Brunswick No. 6, Key Anacon and Nigadoo River Mines (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 114, 117, 118, 125).

Newfoundland

1 N/7 The first attempt at mining in Newfoundland was made in 1778 at a deposit of chalcopyrite, chalcocite, bornite and tetrahedrite in quartz-calcite veins cutting sandstone on the shoreline near Shoal Bay midway between Petty Harbour and Bay Bulls (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 52).

2 E/12 Specimens of galena, pyrite, specularite, chalcopyrite and tetrahedrite were collected from a small roadside mine dump 1 km from Silverdale (Ann P. Sabina, 1975: Geol. Surv. Can. Paper 75-36, p. 114).

Northwest Territories

85 J/8 Tetrahedrite, tennantite and freibergite are of widespread distribution in highly mineralized parts of shear zones of the Con, Negus-Rycon, Giant-Campbell and Crestaurum systems in the Yellowknife camp (R.W. Boyle, 1961: Geol. Surv. Can., Memoir 310, p. 55).

86 F/13 Tetrahedrite is widespread in small amounts in veinlets in late carbonate veins at the B.E.A.R. silver deposit on the north shore of Contact Lake, about 14 km southeast of the Eldorado Mine (G.M. Furnival, 1939: Econ. Geol., 34, p. 753).

86 K/4 Argentian tetrahedrite is reported to be a constituent of the uranium-silver deposits of the Eldorado Mine on Labine Point and the Echo Bay Mine located 1.6 km northeast of Port Radium (D.F. Kidd, 1936: Geol. Surv. Can., Memoir 187, p. 36).

Ontario

31 C/6 A specimen of granular tetrahedrite from lot 9, conc. IV, Hungerford Township, Hastings County, is in the National Mineral Collection.

31 F/2 A specimen of tetrahedrite in barite, found in Lavant Township, Lanark County, conc. VIII, lot 19, was donated to the National Mineral Collection by J.B. Caldwell in 1914.

31 F/2 A property prospected by Carndesson Mines near Clyde Forks, Lanark County, contains disseminated mercurian tetrahedrite and minor cinnabar associated with barite veins in crystalline limestone (I. Jonasson, 1971: Geol. Surv. Can., Paper 71-1A, p. 74).

31 M/4 Specimens of tetrahedrite associated with galena from the Frontier Mine, South Lorrain Township, are in the mineral collection of the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 392).

31 M/5 Chemical analysis of tetrahedrite from Coleman Township in the Timiskaming district, by Burrows: S 22.86, Sb 21.86, Cu 36.04, Pb undet., Zn 8.14, Fe 9.84, total 98.74 (W.G. Miller, 1905: Ont. Bur. Mines, Ann. Rept., vol. 14, Pt. II, p. 22).

Freibergite is present in quartz at the Silver Queen Mine, near Cobalt (National Mineral Collection).

31 M/4
31 M/5
31 M/12
41 P/9
41 P/10
41 P/15
41 P/16 Tetrahedrite is a common mineral in the Cobalt-Gowganda ores, and in carbonate veins and adjacent wallrock. Electron microprobe analyses and unit cell edge measurements are as follows:

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Cu	40.6	35.2	32.2	26.8	26.4	25.9	16.0	15.2	13.4
Ag	0.5	5.1	7.4	18.2	18.7	17.3	30.4	32.9	35.6
Fe	2.5	6.6	2.9	3.5	3.7	3.9	4.7	5.5	6.5
Zn	2.6	1.0	4.8	3.3	2.7	3.0	1.3	1.4	0.1
Sb	24.5	24.5	25.0	26.4	24.7	26.8	26.0	25.4	23.2
As	3.8	0.8	3.2	tr	1.3	0.1	0.1	0.1	0.2
Bi	tr	3.1	-	-	tr	-	-	-	-
S	24.2	25.6	24.1	23.2	22.1	22.4	21.1	20.4	20.1
Total	98.7	101.9	99.7	101.4	99.6	99.4	99.6	100.9	99.0
a_o	10.33	10.43	-	10.49	-	10.48	10.50	10.48	-

(a) Foster Mine - in sulphides. (b) Hi-Ho Mine - in arsenides in ore zone. (c) Silverfields Mine - in arsenides at edge of ore zone. (d) Christopher Mine - at edge of ore zone. (e) Agnico 407 Mine - in wall rock. (f) Christopher Mine - coating on plate silver. (g) Deer Horn Mine - in carbonate vein. (h) Deer Horn Mine - in ore zone. (i) Hi-Ho Mine - in massive pyrargyrite.

(W. Petruk et al., 1971: Can. Mineralogist, 11, p. 200)

32 D/4 Tetrahedrite intergrown with chalcopyrite has been reported from the Argonaut (Huronia) Mine. The mine is reached via Upper Canada Road about 1.6 km from its junction with Highway 66, 29.5 km east of Highway 11 (Ann. P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 31).

41 P/14 Argentian tetrahedrite is present at the Stairs gold mine in Midlothian Township at 47°54'N, 81°04'W (E.G. Bright, 1970: Ont. Dept. Mines, GR 79, p. 26).

42 A/1 Tetrahedrite is associated with native gold and petzite in specimens from the Sylvanite Mine in the east part of Teck Township. Specimens from this locality are in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 392).

42 A/6 The mineral collection at the Royal Ontario Museum includes tetrahedrite from the McIntyre Mine in the northwest quarter of the north half of lot 9, conc. II, Tisdale Township (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 391).

42 E/11 Tetrahedrite occurs as fine irregular replacement blebs in arsenopyrite and chalcopyrite at Bankfield Consolidated Mines and the Little Long Lac Mine, Errington Township (E.G. Pye, 1941: Ont. Dept. Mines, Ann. Rept., vol. 60, Pt. VI, p. 60).

42 L/7 An occurrence of tetrahedrite is reported at Kupfer Lake in the O'Sullivan Lake area (W.W. Moorhouse, 1956: Ont. Dept. Mines, Ann. Rept., vol. 64, Pt. IV, p. 22).

52 G/15 Sphalerite, chalcopyrite, galena and tetrahedrite-tennantite are the main ore minerals in the massive orebody at the Mattabi Mine, boulangerite and bournonite are rare. The mine is about 80 km north of Ignace between Sturgeon Lake and Bell Lake (J.M. Franklin, J. Kasarda and K.H. Poulsen, 1977: Econ. Geol., 70, p. 63).

52 N/4 The massive sulphide ore at the Cochenour-Willans Mine, at Red Lake, in Dome Township, contains tetrahedrite associated with stibnite, berthierite, jamesonite, pyrite, pyrrhotite, arsenopyrite and gold (M.H. Frohberg: private communication).

52 O/4 A specimen of tetrahedrite associated with pyrite, pyrrhotite, sphalerite and galena in the mineral collection at the Royal Ontario Museum was obtained from the Sanderson prospect at 52°11'N, 91°32'W, north of Bamaji Lake (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 391).

53 B/14 Massive tetrahedrite is reported to occur in a quartz fissure vein at the contact between a diorite and basic volcanic rocks at the Ayrhart showing, between Agutua Arm and Weagamow Lake and Randall Lake, Kenora district (D.A. Moddle, 1960: private communication).

Quebec

21 E/5 The orebody at the Eustis (Crown, Hartford, Lower Canada) Mine contains some tetrahedrite-tennantite with galena, sphalerite, chalcopyrite and pyrite. The property is located near Eustis, about 6.4 km south of Lennoxville (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 21).

21 E/14 The ore at the Solbec Mine consists of fine-grained massive sulphides, including some tetrahedrite-tennantite, and magnetite. The mine is 1.6 km north of Highway 34, 12.4 km fron the junction with Highway 1 (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 40).

22 G/1 Tetrahedrite, chalcopyrite, and arsenopyrite occur with more abundant galena, pyrite and sphalerite at the Candego Mine, about 19 km south of Marsoui (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 75).

31 F/10 Tetrahedrite-tennantite is reported to be a constituent of the New Calumet Mine orebody. The mine is on the west shore of the south half of Calumet Island (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 102).

32 C/4 Massive sulphide ore from a high grade shoot at Golden Manitou Mines, Bourlamaque Township, Abitibi County, was found to contain tetrahedrite (M.H. Frohberg: private communication).

32 D/6 Tetrahedrite has been reported in the orebody of the Horne Mine at Noranda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 47).

Saskatchewan

63 K/12 The ore at the Coronation Mine contained a small amount of tetrahedrite. The mine is situated near the shore of Phil (McNally) Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 27).

63 L/10 The main ore zone at the Western Nuclear Mine consisted of massive galena and sphalerite with lesser amounts of pyrite, pyrrhotite, chalcopyrite, arsenopyrite, acanthite and tetrahedrite. The orebody lies beneath Hanson Lake 180 m east of the shore between Bertrum Bay and McIlvenna Bay (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 17).

Yukon

105 D/2 Tetrahedrite occurs with galena, native silver, acanthite, pyrargyrite, pyrite and arsenopyrite at the Montana Mine property of Arctic Gold and Silver Mines Limited at Montana Mountain, near Carcross (D.C. Findlay, 1969: Geol. Surv. Can., Paper 68-68, p. 59).

105 D/10
105 D/11
105 D/14 Chalcopyrite and bornite are the chief ore minerals of the Whitehorse copper deposits that extend along a northwest-trending belt for 29.7 km from Cowley Lake to Porter Creek. Tetrahedrite, chalcocite, cuprite, tenorite, covellite, native copper and valeriite are associated (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 46).

105 G/3 Argentian tetrahedrite has been identified in specimens from Tintina Silver Mines Limited at 61°09'N, 131°09'W, 11 km northwest of the confluence of the Ings and Upper Liard Rivers. Jamesonite, galena, sphalerite, pyrite, arsenopyrite, marcasite, bournonite, owyheeite, tintinaite, pyrrhotite and chalcopyrite are associated (D.C. Harris, J.L. Jambor, G.R. Lachance and R.I. Thorpe, 1968: Can. Mineralogist, 9, p. 371-382).

105 K/6 The orebody at the Anvil Mine consists of a massive assemblage of pyrite, pyrrhotite, galena and sphalerite with minor chalcopyrite and magnetite. Tetrahedrite, bournonite, arsenopyrite and marcasite are also present.

The mine is located at 62°21.5N, 133°22'W, in the Anvil Range at 1200 m elevation near Faro Creek, a tributary of Rose Creek (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 87).

105 M/14 Freibergite occurs at a number of localities in the Mayo district. Among them are the following: (1) at the Bunny Highlander and Cub Group at Keno Hill in a shear zone with siderite, pyrite, galena and sphalerite; (2) on the Silver King property at Galena Hill with galena, siderite and sphalerite in a vein; (3) in a vein with galena, pyrite, siderite, quartz, cerussite, limonite and manganese oxides at the Arctic Mastif property, Galena Hill; (4) at the Elsa Mine on the north slope of Galena Hill with native silver, galena (bearing ruby silver) and argentite (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 507) (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 601).

105 M/14 Freibergite occurs in the lodes of both longitudinal and transverse vein faults on Mount Haldane, Galena Hill, Keno Hill and Sourdough Hill. It is a hypogene mineral and generally occurs disseminated throught the galena-sphalerite lodes, closely associated with galena, sphalerite, chalcopyrite and pyrargyrite. In the oxidized parts of the lodes freibergite is altered to limonite, malachite, azurite and bindheimite. Freibergite may carry up to 18 per cent silver, and is the most important silver mineral in the lodes (R.W. Boyle, 1965: Geol. Surv. Can., Bull. 111, p. 136).

106 D/4 At the Rex property of Peso Silver Mines Limited, 64°00'N, 135°54'W, tetrahedrite occurs in the veins as irregular grains up to about 5 mm in diameter. Associated minerals are: siderite, quartz, jamesonite, boulangerite, galena, pyrite and arsenopyrite (L.H. Green, 1965: Geol. Surv. Can., Paper 65-19, p. 20-21).

106 D/6 A vein of siderite, freibergite and pyrite 76 cm wide has been described at a property at 64°24'N, 135°17'W on the northwest slope of Grey Copper Hill, southeast of Carpenter Creek, a tributary of the Beaver River (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 22).

115 I/3 Argentian tetrahedrite has been identified in the undergroup working of Mount Nansen Mines Limited (62°03'30"N, 137°10'30"W) between Nansen and Victoria Creeks (L.H. Green, 1965: Geol. Surv. Can., Paper 64-19, p. 34).

116 B/5 A quartz-carbonate rock containing small amounts of argentian tetrahedrite and galena occurs on the Silver City property at 64°18.5'N, 139°52'W. The showing, on the north bank of Fifteenmile River, is about 4 km from the River mouth (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 24).

THAUMASITE

$Ca_3Si(CO_3)(SO_4)(OH)_6.12H_2O$

Ontario

42 F/4 Thaumasite is reported to occur at the Willecho Mine in the east central part of Mapledoram Township. Specimens are in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 393).

Quebec

31 H/11 Thaumasite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

THENARDITE

Na_2SO_4

Thenardite is formed in lakes in arid regions by evaporation of relatively concentrated brine waters in warm weather. The hydrated sulphate, mirabilite, forms instead of thenardite at lower temperatures and from more dilute brines.

Alberta

83 I/3 Thenardite occurs at the bottom of a small lake near Pozerville (R.A.A. Johnston, 1909: Geol. Surv. Can., Sum. Rept., p. 250).

Northwest Territories

120 C/13 Thenardite has been identified by X-ray diffraction pattern and spectrographic analysis in specimens of efflorescent salts collected from the Hazen Lake area on Ellesmere Island (X-ray Laboratory, Geol. Surv. Can.).

Quebec

31 H/12 A white powdery coating on sill rock at the Francon quarry, Montreal Island, has been identified as thenardite (Ann P. Sabina, 1976: Geol. Surv. Can., Paper 76-1B, p. 18).

THOMSONITE

$NaCa_2Al_5Si_5O_{20}.6H_2O$

Thomsonite is a mineral of the zeolite group of hydrated aluminosilicates which have the characteristic properties of: (1) losing water without change of crystal structure, and absorbing other compounds in place of water; and (2) undergoing cation exchange.

British Columbia

82 E/5 Zeolites are abundant along the north shore of Yellow Lake about 14.4 km west of Okanagan Falls. They occur as nodules up to 7.5 cm in diameter and include natrolite, heulandite, laumontite, thomsonite and analcime (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 20).

82 L/5 Road cuts on logging roads south of Monte Lake expose basalts containing the zeolite minerals thomsonite, analcime, levyne, cowlesite, ferrierite, stilbite, heulandite and chabazite (W.S. Wise and R.W. Tschernich, 1975: Am. Mineralogist, 60, p. 951).

93 K/4 Thomsonite, phillipsite and natrolite are associated on a specimen collected at Marinol Lake near Burns Lake (X-ray Laboratory, Geol. Surv. Can.).

New Brunswick

21 B/10
21 B/15 Zeolite-filled amygdules are plentiful along the shoreline of Grand Manan Island and are most numerous along the coastline known as Seven Days Work. Scolecite, heulandite, laumontite, analcime, natrolite, epistilbite, thomsonite and stilbite have been identified (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 10).

22 B/1 Cavities and fractures in volcanic rocks along the shoreline between Inch Arran and Bon Ami Point are filled with one or more of the following: thomsonite, stilbite, laumontite, heulandite, chlorite, chalcedony, quartz, calcite, prehnite and hematite (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 103).

Nova Scotia

21 A/NW
21 H/SE Abundant zeolites occur in the trap rocks that outcrop along the shores of the Bay of Fundy and Minas Basin. Thomsonite usually occurs as radiating masses of delicate fibres, sometimes pearly in lustre and asbestiform in appearance. It may be readily confused with mesolite. Compact forms have also been found. Notable localties include: Port Lorne, Annapolis County (21 A/14); west end of Digby Neck, Digby County (21 B/8); Margaretsville and Port George, Annapolis County (21 H/3); Amethyst Cove, Kings County and Five Islands, Cumberland County (21 H/8). Chemical analyses by E.W. Todd (I and II) and H. How (III): I - asbestiform variety from Amethyst Cove: SiO_2 39.96, Al_2O_3 31.02, Fe_2O_3 0.14, CaO 11.98, Na_2O 4.19, K_2O 0.18, H_2O 12.85, total 100.32; S.G. 2.299; II - compact variety from about 1.2 km east of Port George: SiO_2 39.74, Al_2O_3 31.08, Fe_2O_3 0.08, CaO 12.24, Na_2O 4.17, K_2O 0.06, H_2O 12.98, total 100.35; S.G. 2.339; III - mean of 2 analyses of thomsonite from Port George: SiO_2 41.45, Al_2O_3 29.65, CaO 11.81, Na_2O 4.37, H_2O 12.85, total 100.13 (T.L. Walker and A.L. Parsons, 1922: Univ. Toronto Stud., Geol. Ser., 14, pp. 72, 73).

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Thomsonite is one of the less common zeolites found in the amygdaloidal basalts of the Minas Basin - Bay of Fundy area. The following list of localities and associated minerals has been compiled from Geol. Surv. Can., Paper 64-10, Rocks and Minerals for the Collector, Bay of Fundy Area, by Ann P. Sabina (1964).

	Locality	Associated Minerals
21 A/14	Port Lorne	jasper, chalcedony, stilbite, mesolite, apophyllite, laumontite.
21 H/1	Woodworth (Bennett) Bay	chalcedony, jasper, heulandite, analcime, mordenite, stilbite
21 H/2	Halls Harbour	stilbite, heulandite, laumontite, apophyllite, amethyst
21 H/3	Port George	chalcedony, stilbite, heulandite, analcime, mesolite, apophyllite, laumontite, gmelinite
21 H/7	Horseshoe Cove-Cape D'Or	analcime, stilbite, laumontite, apophyllite, chabazite, mesolite, natrolite, heulandite, jasper, copper, calcite
21 H/8	Cape Blomidon - Cape Split	apophyllite, heulandite, natrolite, stilbite, chabazite, analcime, gmelinite, laumontite, mesolite, amethyst, jasper, agate, calcite, celadonite
	Pinnacle Island	analcime, chabazite, natrolite, stilbite, heulandite, gmelinite, calcite

Ontario

41 N/12
41 N/13 Thomsonite has been reported from Michipicoten Island in Lake Superior (G.C. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 17).

42 I/4 Radiating masses of thomsonite are found in cavities in augite at Sextant Rapids on the Abitibi River in the Timiskaming district. Some of the thomsonite crystals are terminated with crystal faces (T.L. Walker, 1932: Univ. Toronto Stud., Geol. Ser., 32, p. 5).

Quebec

21 L/3 At the Caribou Chrome pit, thomsonite is associated with albite and grossular garnets as minute crystals filling vugs in altered aplite and pegmatitic granite. It was also found at the Jacob, King, Johnston, Bencer, Martin and Bennett asbestos pits. Chemical analysis by R.J.C. Fabry: SiO_2 38.10, Al_2O_3 28.98, Fe_2O_3 0.38, CaO 13.61, MgO 0.38, Na_2O 5.28, K_2O 0.22, H_2O 12.76, total 99.71; S.G. 2.36-2.37 (E. Poitevin, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 63).

31 G/9 Thomsonite has been identified in specimens from the mine dumps of the Oka Rare Metals Mine located about 32 km west of Montreal on the north shore of the Lake of Two Mountains (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 61).

31 H/11 Thomsonite is associated with pectolite and calcite inclusions in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

THORIANITE

ThO_2

A complete solid solution series exists between thorianite and uraninite through substitution of U for Th. Rare-earth elements may substitute for Th in amounts up to several per cent, and Pb is usually present as a daughter product of radioactive decay.

British Columbia

92 I/4 Thorianite occurs in the black sand of the Fraser River near Lytton as grains from 50 to 100 microns in diameter, some rounded and others almost perfect cubes (R.M. Thompson, 1954: Am. Mineralogist, 39, p. 526).

Ontario

31 D/16 Specimens of uranian thorianite in the mineral collection of the Royal Ontario Museum are from: Canadian All Metals prospect (adit), north half of lot 6, conc IX; and Canadian All Metals prospect (Track showing), south half of lot 6, conc. IX, Monmouth Township (J. Satterly, 1977: Ont. Geol. Surv., p. 395).

31 E/1 Thorianite has been identified by X-ray powder pattern in a specimen from Baptiste Lake, Herschel Township (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 F/4 Uranian thorianite is present as cubes up to 6 mm in diameter, some of which are twinned, in

zones marked by salmon coloured calcite and phlogopite in country rock composed of impure micaceous marble and schist intruded by granite, at Normingo Mines Limited, Dungannon Township, Hastings County, conc. XVI, lot 14. Partial chemical analysis: U_3O_8 40.0, ThO_2 46.4, PbO 8.0, total 94.4 (S.C. Robinson and A.P. Sabina, 1955: Am. Mineralogist, 40, p. 627).

31 F/4 Specimens of uranian thorianite in the mineral collection at the Royal Ontario Museum were collected at the South State Musclow occurrence, lot 17/18, conc. II, Monteagle Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 395).

Quebec

31 F/9 A pyroxenite body in which thorianite is associated with scapolite, diopside and hornblende occurs on the Stratmat property, range X, lots 54, 55, Masham Township, Gatineau County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 44).

31 F/15 (1) Uranian thorianite is associated with monazite, rutile, and garnet in diopside-calcite-phlogopite rock at Calumet Uranium Mines Limited, Grand Calumet Township, Pontiac County, range VII, lot 29. Partial chemical analysis: U_3O_8 39.8, ThO_2 41.0, PbO 8.4, total 89.2.

(2) The Yates Uranium Mine Limited deposit on lot 20, range IV, Huddersfield Township, Pontiac County is made up of a salmon coloured calcite, euhedral diopside and bands of phlogopite in impure crystalline limestone. Uranian thorianite is disseminated in the calcite. Thorite, titanite and minor chondrodite, allanite and pyrite are associated. Partial chemical analysis: U_3O_8 25.0, ThO_2 55.5, PbO 6.8, total 87.3.

(3) Small cubes of uranian thorianite, some of which are twinned, occur in calcite-diopside-phlogopite rock at the Yates Uranium Mines Limited deposit on lot 20, range V, Huddersfield Township, Pontiac County. Actinolite and chondrodite are locally abundant; thorite and lessingite have also been identified. Partial chemical analysis: U_3O_8 36.8, ThO_2 40.1, PbO 7.7, total 84.6.

(4) Interpenetration cubes of uranian thorianite up to 12 mm in diameter have been found in radioactive calcite-diopside-phlogopite zones in crystalline limestone on the property of Huddersfield Uranium and Minerals Limited, lot 21, 22, range V. Huddersfield Township, Pontiac County. Partial chemical analysis: U_3O_8 36.3, ThO_2 49.7, PbO 8.6, total 94.6 (S.C. Robinson and A.P. Sabina, 1955: Am. Mineralogist, 40, pp. 624-633). Thorianite has also been reported at the following properties: Calumet Uranium Mines Limited, lots 31 and 32, range VI, Grand Calumet Township; and Soma-Duveray Gold Mines Limited, lot 26, range IV, Huddersfield Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, pp. 31-40).

31 J/12
31 J/13 An occurrence of thorianite is reported from Baskatong Lake (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Saskatchewan

74 P/7 Thorianite and uraninite occur with biotite and molybdenite in sheared pegmatite at the Row Group on the south shore of Charlebois Lake in the Fond-du-Lac region (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 112).

THORITE

$ThSiO_4$

All analyzed thorites depart to a considerable extent from the ideal composition. Variation in the primary mineral involves substitution of U for Th, and such uranoan thorite is commonly called uranothorite. The rare-earth elements, and Ca, Zr, Fe, Mn and Al may also substitute for Th. A second chemical variant, for which the name thorogummite is used, results from substitution of $(OH)_4$ for (SiO_4). It occurs as an alteration product and is usually metamict. Thorite is isostructural with zircon and has an identical crystal habit. It inverts on heating to the monoclinic polymorph, huttonite.

British Columbia

82 F/1 Thorite has been reported at the Lucky Mining claims near the junction of Arrow Creek and Goat River (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 234).

82 F/5 Samarskite, fergusonite, thorite and monazite have been found in pegmatite 1.6 km south of the Slocan River and 0.8 km west of Crescent Valley radio station (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 234).

82 K/15 Placer deposits on Bugaboo Creek operated by Quebec Metallurigical Industries Limited contained uranothorite, zircon, euxenite, pyrochlore, uraninite and allanite (A.H. Lang, J.W. Griffith, and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 230).

82 M/12 Radioactive zones occur in trachyitic rocks on the Rexspar property in central British Columbia 4.8 km south of Birch Island Station, on the main line of the Canadian National Railway, about 128 km north of Kamloops. Uraninite and uranothorite are the principle radioactive minerals; uranoan thorianite, bastnaesite, torbernite and metatorbernite have also been reported (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 206).

Manitoba

52 E/14 Thorite occurs in a zone composed of alternating bands of pegmatite and biotite schist and gneiss at the East Found Group, 1.6 km west of Star Lake and 16 km east of Rennie Station (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 116).

Nova Scotia

11 E/16 Cyrtolite and minor uranothorite occur in a pegmatite dyke exposed at low tide on the sea-shore about 0.8 km northwest of the church at Georgeville and about 360 m southwest of the mouth of McInnis Brook (G.A. Gross, 1957: Geol. Surv. Can., Paper 57-2, p. 22).

Ontario

31 D/9 Uranothorite has been reported from the Zenmac property, lots 17 and 18, conc. I, Anstruther Township; the Newkirk Mining property, lots 26 and 27, conc. I, Anstruther Township; and from lots 23 to 25, conc. XI and XII, Burleigh Township. Uraninite, allanite, zircon and melanocerite also occur at the Newkirk property (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 246-7).

31 D/9 The following occurrences of uranothorite have been reported in Cavendish Township:

lot	conc.	name	other minerals
3	III	Silanco Mining	zircon, fergusonite
16,21(N1/2)	III	Drude	allanite, zircon
5,7,8	IV	Macfie Expl.	allanite
14(N1/2)	V	Cromwell U.	allanite, zircon
13	VI	Cromwell U.	uranophane, betafite
11	VI	Ganymede	
14(S1/2)	VII	Amal. R.E.	allanite, uraninite, cyrtolite

(A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 255)

31 D/9
31 D/10 Two radioactive occurrences in Harvey Township have been prospected. The Cavendish Uranium property on lot 18, conc. XII, contains thorite, uranothorite and zircon. The latter two minerals have also been found on the Big Nell property on lot 26, conc. XVI (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 263).

31 D/15 A specimen of uranothorite in the mineral collection at the Royal Ontario Museum is from the E.R. Windover occurrence, lot 19, conc. VIII, Snowdon Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 400).

31 D/15 Thorite and uranothorite are reported with allanite in pegmatite on the Hogan property, lot 11, conc. VIII, Lutterworth Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 266).

31 D/16 Thorite (uranothorite) has been identified in specimens from the following localities:

	Lot	Concession	Township
Haliburton County			
Kemp Uranium	5	XIV	Cardiff
Kenmac Uranium	6	XIV	Cardiff
Dyno	12	VIII	Cardiff
Aumacho River	22	IX	Cardiff
Canada Radium	8,11	XII, XIII	Cardiff
Nu-Cycle Uranium	26, 28	II	Glamorgan
Blue Rock Cerium	18, 20	V, VI	Monmouth
Silanco	32	VI	Monmouth
Rare Earth	20	VIII	Monmouth
Roford	13	XIII	Monmouth
Saranac Uranium	24	X	Monmouth
Hastings County			
Faraday Uranium	16, 17	XI	Faraday
Peterborough County			
Cavendish Uranium	14, 15	VII	Cavendish

(X-ray Laboratory, Geol. Surv. Can.)

31 D/16 Partial chemical analyses of thorite crystals by Sydney Abbey: (1) brown to black crystals, partly altered, from the Saranac property, lot 24, conc. X, Monmouth Township, Haliburton County - SiO_2 45.5, PbO 0.32, U_3O_8 0.3, ThO_2 28.2, rare earths 1.5, Fe_2O_3 5.3, CaO 1.25, H_2O 6.0, total 86.37; (2) rough brown crystals, partly altered, from the Kemp property, lot 5, conc. XIV, Cardiff Township, Haliburton County - SiO_2 52.7, PbO 0.48, U_3O_8 1.08, ThO_2 29.89, rare earths 0.25, Fe_2O_3 6.37, CaO 0.94, H_2O 5.92, total 97.61 (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., Vol. 65, Pt. VI, pp. 16, 17).

31 D/16 Partial chemical analyses of uranothorites by Sydney Abbey: (1) black subhedral to massive uranothorite from No. 1 showing, Kenmac Chibougamau Uranium Mines Limited, lot 6, conc. XIV, Cardiff Township, Haliburton County: SiO_2 19.20, PbO 0.64, U_3O_8 11.72, ThO_2 51.56, rare earths <0.2, Fe_2O_3 3.96, CaO 2.16, H_2O 9.3, C 0.1, total 98.86; S.G. 4.37; (2) red massive uranothorite, same locality as (1) above - SiO_2 19.32, PbO 0.50, U_3O_8 10.83, ThO_2 48.29, rare earths 2.05, Fe_2O_3 2.40, CaO 2.59, H_2O 11.1, total 97.08; S.G. 4.20;

(3) black uranothorite from the Silanco property, lot 32, conc. VI, Monmouth Township, Haliburton County - SiO_2 19.18, PbO 1.23, U_3O_8 9.00, ThO_2 52.42, rare earths <0.2, Fe_2O_3 2.74, CaO 2.37, H_2O 9.75, C 0.59, CO_2 0.26, total 97.74; S.G. 4.34 (4) red uranothorite from the same locality as (3) above - SiO_2 18.83, PbO 1.03, U_3O_8 1.68, ThO_2 58.98, rare earths <0.2, Fe_2O_3 3.96, CaO 3.32, H_2O 8.92, C 0.25, CO_2 0.54, total 97.51; S.G. 4.48; (5) black uranothorite crystals from the Roford property, lot 13, conc. XIII, Monmouth Township, Haliburton County - SiO_2 17.62, PbO 1.27, U_3O_8 5.78, ThO_2 57.55, rare earths 1.69, Fe_2O_3 3.89, CaO 2.42, H_2O 9.54, total 99.76; S.G. 4.41 (S.C. Robinson and S. Abbey, 1957: Can. Mineralogist, 6, pp. 1-15).

31 D/16 Uranothorite has been found at the following localities:

lot	conc.	owner	other minerals
Anstruther Township			
22-28	III		
23-27S(1/2)	IV	Farcroft Mines	uraninite, allanite
23-27	IV,V	Brunsman Mines	
2-3(N1/2)	IX	Gray Wolfe Expl.	allanite, zircon
29-35	IX,X,XI	El Sol Gold Mines	zircon
2(N1/2)	X	Higgins Uranium	zircon
3(S1/2)	XII	Higgins Uranium	zircon
5,6	XVII	Garland Mining Co.	(uraninite, (allanite,
4.9	XVIII	Garland Mining Co.	(cyrtolite
Cardiff Township			
9	I,II	Triton U.M.L.	allanite
10	II	R. Doubt	allanite
6(S1/2)	VI	Consol. Thor. Mines	allanite
10,11	V	Milhol Expl.	allanite
9(N1/2)	VII	J. Gilbert	cyrtolite
12	VIII	Dyno Mines	allanite, pyrochlore uraninite
22	IX	Aumacho River Mines	allanite, uraninite
11-13	X	Pickering Metal Mines	allanite, zircon
11(N1/2)	XI	Molybdenum Corp.	allanite
11(S1/2)	XI	Climax Molybdenum	allanite, zircon
27,28	XI	Bicroft U.M.L.	allanite, pyrochlore, uraninite
7-11	XII	Canada Radium	pyrochlore, uraninite
7,8	XIII	Canada Radium	pyrochlore, uraninite
9	XIII	West Lake Mining	
5(N1/2)	XIV	Kemp Uranium	thorite
6,7	XIV	Kenmac Mine	allanite

lot	conc.	owner	other minerals
11(S1/2)	XIV	Mindus Corp.	pyrochlore, allanite
6,7	XV	Halo Mine	pyrochlore, uraninite

Cavendish Township

16	IX	Drude U.M.L.	allanite, zircon
14(S1/2)	XI	Drude U.M.L.	allanite, zircon
15	X	D.J. Smith	
21(N1/2)	XI	Silanco Mining	(allanite, (zircon
24,25	XIV	Kelbec Rare Metals	

(uraninite

Chandos Township

9(S1/2)	XVI		

Galway Township

23,25	X	Silver Crater	allanite, zircon thorite, uranophane
23,24	XI,XII	Kenmac Chibougamau	

zircon, uraninite

Glamorgan Township

19(S1/2)	II	Nu-World U.M.L.	allanite, uraninite cyrtolite
26-28	II	Nu-Cycle U.M.L.	allanite, zircon
18-20.22-24	I,II	Webster U.M.L.	uraninite, allanite
15-17	III	Webster U.M.L.	uraninite, allanite
32	V	Webster U.M.L.	uraninite, allanite

Monmouth Township

4	III	Fairley Red Lake	allanite, zircon
3-5	III	Cassiar Rainbow	euxenite, allanite
2-4	IV	Cassiar Rainbow	euxenite, allanite
14	IV	Jesko U.M.L.	allanite
19	VI	Blue Rock Cerium	fergusonite, uraninite
32(S1/2)	VI	Silanco	
20	VIII	Rare Earth Mine	fergusonite, cyrtolite uraninite
7,8	X	Nu-Age U.M.L.	
24(S1/2)	X	Saranac U.M.L.	allanite, zircon, thorite
9-12	XI	Nu-Age U.M.L.	
35	XI	Empire Oil & Minerals	allanite, zircon, uraninite thorite
13(N1/2)	XIII	Roford	thorite

(A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 247-271).

31 D/16 Thorite and uraninite with secondary kasolite and uranophane occur in marble exposed by an open-cut on a ridge which parallels the Gibson road at Tory Hill. The occurrence is north of McCue Lake about 1.1 km by road west of the junction of the Gibson road and Highway 121. (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 D/16 Uranothorite specimens in the mineral collection at the Royal Ontario Museum were collected from the following Cavendish Mine properties in Cavendish Township: lot 16 (N1/2), conc. VI; lot 14, conc. VII (shaft); lot 15, conc. VII (Pit B) (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 401-2).

31 E/1 Uranothorite has been found at the following localities:

lot	conc.	owner	other minerals
Cardiff Township			
31	XIII	Consolidated Tungsten	uraninite
20(S1/2)	XV	D.E. Foster	allanite, zircon
32	XV	Croft Mine	monazite, allanite, uraninite, cyrtolite
A(N1/2)	XVII	Cardiff U.M.L.	uraninite
4,5(S1/2)	XVIII	Halo Mine	thorite
7(S1/2)	XX	Burma Shore	uraninite
4-6	XXI	Richardson Mine	allanite, uraninite, zircon
8	XXI	Nu-Age U.M.L.	uraninite
5	XXII	Bancroft U.M.L.	allanite
13	XXII	Topspar Fluorite	
Herschel Township			
26(N1/2)	V		
Monmouth Township			
33(N1/2)	XVI	Acmac Mining	thorite
29,30	XVI	T. Cudney	kasolite, zircon
30,31	XVII	Desmont Mining	allanite, uraninite

(A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 252-271)

31 E/1 Partial chemical analyses of uranothorites by Sydney Abbey: (1) massive brown to black uranothorite, adit level, No. 2 dyke, station 301, Bicroft Uranium Mines Limited, lots 26 and 27, conc. XI, Cardiff Township, Haliburton County - SiO_2 20.84, PbO 3.16, U_3O_8 12.31, ThO_2 43.49, rare earths <0.2, Fe_2O_3 2.70, CaO 3.29, H_2O 11.1, C 0.24, CO_2 0.04, total 97.17; S.G. 3.98-4.13; (2) yellow to brown, massive to platy uranothorite, 45 m level, Bicroft Uranium Mines Limited, lots 26 and 27, conc. XI, Cardiff Township, Haliburton County - SiO_2 21.06, PbO 3.48, U_3O_8 15.09, ThO_2 39.46, rare earths <0.2, Fe_2O_3 2.26, CaO 3.88, H_2O 11.08, total 96.31; S.G. 4.1; (3) cigar-shaped crystal of submetallic to pitchy uranothorite from Fission Mines Limited, lots 5 and 8, conc. XXI, Cardiff Township, Haliburton County - SiO_2 17.80, PbO 1.46, U_3O_8 11.32, ThO_2 49.08, rare earths 1.66, Fe_2O_3 3.42, CaO 2.30, total 87.04; (4) massive black uranothorite from east wall of adit 3 m south of portal, Topspar Fluorite Mines, lot 13, conc. XXII, Cardiff Township, Haliburton County - SiO_2 19.73, PbO 1.58, U_3O_8 13.94, ThO_2 46.78, rare earths 3.99, Fe_2O_3 0.36, CaO 5.75, H_2O 9.72, total 101.85; S.G. 4.33 (S.C. Robinson and S. Abbey, 1957: Can. Mineralogist, 6, pp. 1-15).

31 E/1 Specimens of uranothorite from the P.J. McLean occurrence, lot 6, conc. IV, Harcourt Township, are included in the mineral collection at the Royal Ontario Museum (J. Satterly 1977: Ont. Geol. Surv., MP70, p. 398).

31 F/4 Elongated square prisms of uranothorite occur in a pegmatite dyke at the MacDonald Mine, lots 18 and 19, conc. VII, Monteagle Township, Hastings County. Chemical analysis by H.V. Ellsworth: SiO_2 19.56, ThO_2 46.33, UO_3 9.46, UO_2 7.67, PbO 1.32, Fe_2O_3 0.75, MnO 0.07, FeO 0.43, MgO 0.01, $(Ce,La,Di)_2O_3$ 0.08, $(Y,Er)_2O_3$ 0.36, H_2O 9.24, BeO + Al_2O_3 0.13, CaO 4.38, insol. 0.15, total 99.94; S.G. 4.414 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 204).

31 F/4 The following occurrences of uranothorite are reported:

lot	conc.	owner	other minerals
Carlow Township			
1	III		
2	IV		
1-4	V		
Faraday Township			
13	A	Greyhawk U.M.L.	
21-24	A	Bonville Gold Mines	pyrochlore
29	A	Silver Crater (Lockwood)	allanite
28	B	Silver Crater (Kerr)	allanite
16-18	XI	Faraday U.M.L.	allanite, cyrtolite, uraninite
9-11	XII	Greyhawk U.M.L.	pyrochlore, uraninite, zircon
27-29	XV	Silver Crater	allanite
31-32	XVI	G.L. Reasor	pyrochlore, uraninite
Herschel Township			
39	VIII		pyrochlore, euxenite
Monteagle Township			
5(S1/2)	I	Carr, Quirk, Mellish	allanite
1	III	Mentor Expl.	allanite
7,8	III	S.J. Carr	allanite
12	IV	Mentor Expl.	allanite
5	IV	W.M. Thompson	
11,12	IV	Quirk	pyrochlore, thorite
1-4	V	Mentor	allanite
4-5	VII	W.M. Thompson	
18-19	VII	MacDonald Mine	pyrochlore, cyrtolite uraninite
29(S1/2)	VIII	Peter Rock Mining Co.	allanite

(A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 260-273)

31 F/6 Uranothorite occurs as subhedral crystals in leucogranite cementing brecciated metapyroxenite in conc. X, lot 24, Brudenell Township, Renfrew County, at Rockingham Mines Limited. Partial analysis yielded: SiO_2 19.81, PbO 1.72, U_3O_8 20.73, ThO_2 40.37, rare-earth oxides <0.2, Fe_2O_3 0.20, CaO 5.17, H_2O 9.88, total 98.08; S.G. 4.3. It also occurs in leucogranite pegmatite in conc. C, lot 39, Sebastopol Township, Renfrew County. Partial analysis yielded: SiO_2 20.40, PbO 3.62, U_3O_8 10.73, ThO_2 49.92, rare-earth oxides 0.41, Fe_2O_3 2.44, CaO 2.79, H_2O 9.48, C 0.31, CO_2 0.19, total 100.29 (S.C. Robinson and S. Abbey, 1957: Can. Mineralogist, 6, pp. 1-15).

31 F/7 A pegmatite containing uranothorite and allanite is exposed on lot 1, conc. III, Horton Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 264).

31 K/4 Dull brown prisms of thorite occur in pegmatite at the Carey quarry 3.2 km north of Mackey and accessible by road to the Deep River cub scout camp (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 64).

41 H/8 The mineral collection at the Royal Ontario Museum includes uranothorite from the Ascot (Trio) occurrence, lot 15, conc. A, McDougall Township, Parry Sound district (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 401).

41 H/16 Dull black laths of thorite occur in pegmatite exposed along the side of a knoll on the south shore of the western narrows of Caribou Lake (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 74).

41 I/1 An occurrence of thorite in pegmatite has been reported on lot D, conc. V, Loudon Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 266).

42 D/9 Thorite was identified in a specimen sent to the Geological Survey of Canada from the property of the Pic Bamoos Syndicate, 3.2 km west of Marathon, north of Lake Superior (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 119).

52 F/13 Thorite is distributed erratically in pegmatite and in shear zones along contacts between pegmatite and lava on the Byberg property, located along the Trans-Canada Highway, 48 km east of Kenora (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 118).

52 F/13 An occurrence of uranothorite with uraninite, beta-uranophane and allanite has been found in MacNicol Township about 51 km east of Kenora on property owned by Campbell Island Mines and Exploration Limited (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 267).

Quebec

21 L/12 Uranothorite and uraninite have been reported to occur at a molybdenite deposit near Portneuf (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 90).

31 F/10 A yellowish mineral found in a pegmatite dyke on the property of Struon Uranium Mines Limited was identified as thorite by its X-ray powder pattern. The property is on lots 11 and 12, range IX, Grand Calumet Township, Pontiac County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 34).

31 F/15 Grains of red uranothorite occur in a skarn deposit on the Calumet Uranium Mines property in Grand Calumet Township, lots 29 and 30, range VII, Pontiac County.

Dark brown elongated square prisms of uranothorite are found in fluorite on claims held by Calumet Contract Uranium Mines Limited, lot 31, range VIII, Grand Calumet Township, Pontiac County.

Rounded grains of pale red-brown uranothorite are reported to be present in pinkish calcite at Huddersfield Uranium Mines Limited, lots 21 and 22, range V, Huddersfield Township, Pontiac County.

Red uranothorite is present in scapolite-diopside rock, and grey-black prisms occur in the skarn zone at the Yates Uranium Mines property, lot 20, range V, Huddersfield Township, Pontiac County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, pp. 30-40).

31 F/15 Uranothorite and thorite are associated with monazite and uraninite in contact metasmatic and pegmatitic deposits in Grand Calumet Township at the following localities: lots 30-33, range V; lots 23 and 27-34, range VI; lots 24-34, range VII, and lots 11-12 and 22-34, range VIII. Similar deposits occur in Huddersfield Township, lot 26-32, ranges I and II; and lots 19-21, ranges IV and V (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 287).

31 F/16 Uranothorite occurs with allanite, cyrtolite and uraninite on lots 38, 39 and 42-49, range II, and lots 28,46, range III, Clapham Township; and on lots 30,31, range XI, Low Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 285, 289).

31 G/11 Thorite has been reported at a feldspar quarry near Buckingham and at the Pedneaud Quarry near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 12, 21).

31 G/12 Uranothorite occurs with allanite at O'Leary-Malartic Mines Limited, range III, lot 25, Wakefield Township, Gatineau County.

31 G/13 Black thorite has been found near Notre-Dame-de-la-Salette at the Hart and Villeneuve mines (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 32, 40).

31 J/5 A prospect containing uranothorite, allanite and thorite has been explored on lot 48, range 7, Kensington Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 288).

31 J/12 Uranothorite occurs in round grains less than 6 mm in diameter at the Dewex Oils and Mines Limited property, near Mercier Dam on the Gatineau River, Mitchell Township, Gatineau County.

Grains of uranothorite in association with uraninite were found in a zone of metamorphic pyroxenite at the Gatineau Uranium Mines property, range II, lots 29-31, Baskatong Townshiip, Gatineau County.

(D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept. 80)

31 J/12 Pegmatitic deposits containing uraninite, uranophane, uranothorite, allanite and zircon occur in Sicotte Township lots 22-30, range I; and lots 26-29, range II (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 292).

31 K/1 Showings of uranothorite, allanite and thorite in pegmatite have been explored on lots 39 and 40, range IX, Dorion Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 286).

31 K/8 Strings of red uranothorite grains occur in a zone of microcline granite at the Maniwaki Kid Uranium Mining Corporation property, range V, lots 39 and 40, Egan Township, Gatineau County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80).

31 K/9 Thorite, allanite and zircon are reported to occur in pegmatite on lots 37,38, range III, Lytton Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 289).

31 K/16 A pegmatite containing monazite, allanite, thorite, uraninite, uranothorite and euxenite occurs in Briand Township about 8 km northwest of Lépine Depot (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 293).

31 O/6 Three pegmatite dykes containing uranothorite and uraninite have been drilled and trenched on the Scandia property in Joliette 60 Township near Mitchinamécus reservoir (H.W. Little, 1974: Geol. Surv. Can., Paper 74-1A, p. 53).

32 A/16 Patches of shiny black thorite are found in calcite near where it is cut by pegmatite dykes at the Les-Calcites-du-Nord Quarry north of Dolbeau (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 111).

Saskatchewan

74 N/9 Anhedral elongated masses of uranothorite up to 1 cm long occur in a pegmatite dyke at the west end of Viking Lake. Pyrochlore, magnetite, titanite, uraninite and cyrtolite are associated (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 35).

thucholite

(see HYDROCARBONS)

TIEMANNITE

HgSe

Saskatchewan

74 N/8 Tiemannite has been identified in the high-grade gold-pitchblende lens of the No. 2 zone at Nicholson Mines Limited, located about 60 m east of the head of a small bay called Nicholson Bay on the north shore of Lake Athabasca, 3.2 km east of Goldfields (A.H. Lang, 1952; Geol. Surv. Can., Econ. Geol. Ser., 16, p. 95).

timiskamite

(see MAUCHERITE)

TIN

Sn

Saskatchewan

74 N/9 Native tin can be found in association with pitchblende in fractures crosscutting a slaty formation at Nesbitt Labine Uranium Mines in the Beaverlodge area. The tin is creamy white in colour, ductile, very soft, and occurs in discrete grains up to 1.5 millimetres in diameter in feathery tongues in the host calcite (J.F.B. Silman, 1954: Am. Mineralogist, 39, p. 529).

TINTINAITE

$5PbS.4Sb_2S_3$

Tintinaite, the antimony analogue of kobellite, was discovered through re-examination of the type kobellite from Hvena, Sweden, and other new kobellites from Colorado; Rossland, British Columbia; and Tintina, Yukon Territory. Electron probe analyses showed that a solid solution series extends from a high bismuth end-member to the pure antimony end-member. It was proposed that the name kobellite be retained for minerals in the series having Bi:Sb >1.0 and that the name tintinaite be used for antimony dominant members.

British Columbia

82 F/4 A mineral from the Deer Park Mine, Rossland camp, previously identified as kobellite has been found by electron probe analysis to be bismuthian tintinaite with a composition near the mid point of the tintinaite - kobellite series. Electron probe analysis by G.R. Lachance: Pb 42.3, Bi 23.0, Sb 17.6, S 20.0, total 102.9 (D.C. Harris, J.L. Jambor, G.R. Lachance and R.I. Thorpe, 1968: Can. Mineralogist, 9, p. 371-382).

Yukon

105 G/3 The type specimen of tintinaite came from the property of Tintina Silver Mines Limited at 61°09'N, 131°09'W, some 11 km northwest of the confluence of the Ings and Upper Liard Rivers. Associated minerals are jamesonite, argentian tetrahedrite, galena, sphalerite, pyrite, arsenopyrite, marcasite, bournonite, owyheeite, pyrrhotite, and chalcopyrite. Electron microprobe analysis by G.R. Lachance: Pb 42.3, Sb 34.5, S 21.3, total 98.1 (D.C. Harris, J.L. Jambor, G.R. Lachance and R.I. Thorpe, 1968: Can. Mineralogist, 9, p. 371-382).

titanite

(see SPHENE)

TOCHILINITE

$6Fe_{0.9}S.5(Mg,Fe)(OH)_2$

Ontario

31 F/10
31 F/11 Tochilinite occurs sparingly in crystalline limestone exposed by road cuts on Highway 60, 2 km northwest of its juction with County Road 5 near Douglas, and 2.3 km west of Golden Lake village (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 257).

Quebec

31 G/12 At the Maxwell and Stephen Cross quarries near Wakefield, which were formerly mined for brucite, tochilinite occurs fairly abundantly in serpentine marble. Perovskite is present as an accessory mineral (Ann P. Sabina, 1878: Geol. Surv. Can., Paper 78-1A, p. 257).

32 D/9 Tochilinite has been identified as thin coatings on fractures in a nickel-bearing ultramafic rock on the Dumont Nickel Corporation property near Amos. A partial electron microprobe analysis gave: Fe 44.92, Mg 10.94, S 21.73 (J.L. Jambor, 1976: Geol. Surv. Can., Paper 76-1B, p. 65).

TOPAZ

$Al_2SiO_4(OH,F)_2$

Topaz is found chiefly in veins and druses in granites, in pegmatites, and in high temperature quartz veins. Transparent topaz is valued as a gemstone.

Alberta

83 F/4 Topaz has been observed in the gravel of a small river to the west of Jasper House, Jasper Park, in the Rocky Mountain district (G.C. Hoffmann, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 18R).

British Columbia

83 D/14 Topaz occurs associated with large plates of mica at Mica Mountain near Tête Jaune Cache, south of the junction of the Fraser River and McLennan River in the Cariboo mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 226).

Manitoba

52 L/6 A number of unusual minerals, including topaz, beryl and lithian mica have been reported on the property of Contact Minerals Limited (Dyke Group) situated on the south shore of the eastern part of Shatford Lake (R.W. Mulligan, 1965: Geol. Surv. Can., Econ. Geol. Rept., 21, p. 78).

Crude, long, pyramidal crystals and crystalline masses of topaz can be found at the Bear mineral claim, 4.8 km southeast of Lamprey Falls on the Winnipeg River. The whitish or blue-green crystals have well-developed basal cleavage. Analysis by R.J.C. Fabry: SiO_2 32.13, Al_2O_3 58.16, F_2 16.51, Na_2O 0.24, MgO 0.37, H_2O 0.24, less O for F 6.95, total 100.70 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 156).

Cleavable masses of topaz with very poor crystal outlines can be found in the Winnipeg River district, section 17, township 16, range 16, 16 km northeast of Pointe du Bois (E. Poitevin, R.J. C. Fabry and C.H. Stockwell, 1926-27: Geol. Surv. Can., Unpublished file No. 21, p. 2).

52 L/6 A beryl-bearing pegmatite outcrops 1200 m southeast of the eastern end of Shatford Lake. Large columnar crystals of water-clear or milky topaz up to 30 cm long and 12 cm wide were found in the central parts of this pegmatite (P. Černý and N.A. Bristol, 1972: Can. Mineralogist, 11, p. 561).

New Brunswick

21 G/7 Topaz is abundant in greisen zones as microscopic crystals and dense aggregates at the Brunswick Tin Mines property at Mount Pleasant (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 120).

21 J/10 Topaz occurs as crystalline masses and individual crystals up to 2 cm in diameter at a deposit near the mouth of Burnt Hill Brook, Southwest Miramichi River, York County. The colour is generally milk white but some small translucent smoky grey crystals have been observed. Associated minerals include wolframite, molybdenite and cassiterite (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 226).

Newfoundland

13 O/2 Irregular grains of topaz occur in an amazonite aplite dyke on the south shore of northern Adlavik Island, 1.6 km east of Maconet Bay, Long Tickle (E.P. Wheeler, 1935: Am. Mineralogist, 20, p. 44).

Ontario

52 G/15 Topaz has been observed by E.D. Moore in some of the hornblende syenite in the Sturgeon Lake gold field, on the eastern shore of the upper portion of the narrows of the lake, Thunder Bay district (N.L. Bowen, 1911: Ont. Bur. Mines, Ann. Rept., vol. 20, p. 155).

Quebec

22 D/11
22 D/12 A small pegmatite in Taché Township, Chicoutimi County, range V, lot 13, contains massive topaz, intergrown with muscovite and albite. The topaz is greenish and somewhat darker in colour than associated greenish beryl (H.V. Ellwsorth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 252).

22 D/12 Greenish topaz occurs as rough crystals and in massive form at the Lac à la Mère Mine north of the Saguenay River near St-Nazaire. Most of the topaz is massive and intergrowth with muscovite and albite (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 110).

Yukon

105 B/3 Gem quality topaz crystals have been found on claims situated on the north face of a 1,800 m mountain on the east side of Seagull Creek about 7 km north of Swift River, km 1180 Alaska Highway, at lat. 60°04'N, long. 131°08.5'W (R. Skinner, 1961: private communication).

TORBERNITE

$$Cu(UO_2)_2(PO_4)_2.12H_2O$$

Northwest Territories

86 D/9
86 D/16 The secondary mineral torbernite has been identified with pitchblende at the Pitch claims near the south end of Hottah Lake; in the Beverley Bay area; and on the north shore of the east arm of Beaverlodge Lake (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 59).

Ontario

31 E/1 A specimen of torbernite is listed in the catalogue of the mineral collection at the Royal Ontario Museum as coming from near Wilberforce, Cardiff Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 407).

TOURMALINE

$$Na(Mg,Fe)_3Al_6(BO_3)_3Si_6O_{18}(OH,F)_4$$

Tourmaline is characteristically a mineral of granites, granite pegmatites, and pneumatolytic veins, but is also occurs in some metasomatic and metamorphic rocks and as a detrital mineral in sediments. The composition of tourmaline is extremely variable: Na may be replaced by Ca, and Al by Fe; and Li is often present. Varietal names include: rubellite, the red variety; siberite, violet-red; dravite, brown; and schorl, black.

Tourmaline is of common occurrence in many parts of Canada and no attempt at a complete listing is made here. Instead, only occurrences of special interest, and some localities from which good specimens have been taken, are listed.

British Columbia

82 L/16 Abundant black tourmaline is reported in pegmatite dykes on the northeast slope of Mount Begbie, south of Revelstoke. Green and red tourmaline was observed in one dyke close to the snowfield (A.G. Jones, 1959: Geol. Surv. Can., Memoir 296, p. 162).

92 I/6
92 I/11 Extraordinarily large amounts of black irregular masses of small closely packed crystals of tourmaline and specular hematite occur in quartz-diorite rock, in the Highland Valley copper area, east of Ashcroft (J.S. Stevenson, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 127).

Manitoba

52 L/5 Rubellite tourmaline is present as a minor constituent of the lithium-cesium ore at the Chemalloy property (R. Brinsmead, 1960: Precambrian, 33, No. 8, p. 25).

52 L/6 Tourmaline, blue in colour, associated with spessarite and apatite, occurs 4.8 km southeast from Lamprey Falls on the Winnipeg River at the Bear mineral claim (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 157).

53 N/2 Pink tourmaline crystals up to 6 mm long occur with purple rubidian mica in a swarm of dykes at the northeastern end of Red Cross Lake, approximately 2.8 km northwest of Red Sucker River (J.L. Jambor and R.R. Potter, 1967: Geol. Surv. Can., Paper 67-51, p. 2).

63 J/13 Native gold is associated with black tourmaline in quartz veins at the Rex, Bingo, Moose Horn and Kiski mines along the east shore of Wekusko (Herb) Lake, and at the McCafferty Mine east of the narrows between Wekusko Lake and Crowduck Bay (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 54,56,57,58).

63 K/16 Crystals of black tourmaline are associated with the ore at the Chisel Lake and Nor Acme Mines (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 65,67).

Newfoundland

2 F/4 Prisms of black tourmaline are associated with beryl and chrysoberyl in pegmatite that outcrops along the Wesleyville Road (Highway 40) (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 92).

Nova Scotia

21 A/14 Fine crystals of tourmaline occur in quartz near Paradise, southwest of Middleton, Annapolis County (L.B. Bailey, 1896: Geol. Surv. Can., Ann. Rept., IX, p. 149M).

Ontario

31 C/6 A peculiar variety of black tourmaline is found in white quartz, near Madoc, Hastings County. It forms veins, 2.5 cm or more in width, made up of very fine fibres transverse to the side of the vein, velvet black in colour (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 493).

31 C/7 Tourmaline is found as coal-black masses as well as large crystal aggregates in a pegmatite dyke on the north side of Sand Road about 3.2 km west of Highway 38. Sand Road branches out on the west side of Highway 38 about 800 m south of Verona (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 11).

31 C/8 Large crystals of black tourmaline occur in pegmatite on Yeo's Island, near the Upper end of Tar Island, on the north side of English Channel, Thousand Islands (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 492).

31 C/8 Dark brown columnar aggregates of tourmaline up to 7.5 cm long are exposed in roadcuts on Highway 15, 37.8 km north of Kingston (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 42).

31 C/9 Black tourmaline crystals up to 13 cm long have been found in pegmatite at a feldspar quarry about 66 km (road log) north of Kingston on the Kingston-Westport-Perth road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 C/9 Roadcuts on Highway 15, about 68.9 km north of Kingston show tourmaline as orange to brown transparent striated crystals (up to 3.8 cm long, 12 mm across) which fluoresce deep yellow under "short" ultraviolet rays (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 46).

31 C/10 Tourmaline occurs as yellowish orange, amber-coloured or dark reddish brown scattered grains, individual crystals (about 12 mm across) and crystalline aggregates (up to 13 cm across) in crystalline limestone in roadcuts about 5 km from Godfrey on the Westport Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 13).

31 C/10 Dark brown to reddish brown crystalline masses of tourmaline measuring 2.5 to 7.5 cm across are found in the dumps of the Kingson (Bedford) Mic Mine. The mine is located at about 1.6 km southeast of the paved road running from Godfrey to Westport, and is about 5 km east of Highway 38 (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 14).

31 C/10 Brownish-black tourmaline crystals averaging 12 mm across are conspicuous in pinkish white calcite at the Hickey-Murphy lead mine. Several pits and two old shafts are present on the Hickey and Murphy farms located along the Westport road, 15.2 km from Godfrey (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 17).

31 C/10 Massive jet-black tourmaline occurs with calcite in apatite-rich veins at the Eagle Lake (Blessington) Mine. Other minerals present in the abandoned phosphate mine are hornblend, pyroxene and scapolite. The mine is located on the West side of Highway 38 about 63 km north of Kingston near Tichborne (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 21).

31 C/11 Small, randomly-oriented, black prismatic crystals of tourmaline can be found in siliceous limestone in Huntingdon Township, Hastings County, lot 16, conc. XIV (donated to the National Mineral Collection by A.T. McKinnon, 1919).

31 C/12 Acicular prisms of black tourmaline penetrating fibrolamellar masses of bismuthinite were found at Smith's Mine, lot 34, conc. III, Tudor Township, Hastings County (C.W. Willimott, 1883: Geol. Surv. Can., Rept. Prog., p. 9L).

Black, divergent crystal groups of tourmaline have been collected in Lake Township, lot 7, conc. XI, Hastings County (donated to the National Mineral Collection by R.L. Broadbent, 1901).

31 C/15 Dark brown tourmaline occurring as crystals (measuring up to 7.5 cm long) and crystalline masses is common in crystalline limestone at roadcuts on Highway 38 just north of the causeway of the narrows of Sharbot Lake (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 22).

31 C/16 Fine terminated crystals of black tourmaline, 2.5 cm in diameter occur in white quartz on lot 18, conc. IV, Bathurst Township, Lanark County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 493).

31 C/16 Brownish green transparent, massive tourmaline is reported to occur at the Silver Queen mica-apatite Mine. The mine is located about 73.2 km (road log) north of Kingston, along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 C/16 Jet black massive tourmaline and reddish brown transparent sphene crystals occur in quartz at the old McLaren Mine west of Otty Lake and about 7.2 km south of Perth (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 35).

31 E/1 Terminated crystals of the dravite variety of tourmaline have been found in distintegrated green diopside rock at the east showing of Desmont Mining Corporation (formerly Homer Yellowknife) on lot 31, conc. XVII, Monmouth Township, Haliburton County (D.A. Moddle, 1960: private communication).

31 E/1 Dark green and crimson gem-quality tourmaline has been found at Wilberforce in Monmouth Township, Haliburton County (G.G. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 77).

31 E/1 Large, greenish black, prismatic crystals of tourmaline occur in Cardiff Township, Haliburton County, conc. XXI, lot 1 (National Mineral Collection).

31 F/6 Black tourmaline crystals up to 5 cm in diameter and several cm long are abundant at the Keyfortmore pegmatite deposit on the St. Louis farm along Highway 41, 13.8 km south of its junction with Highway 60 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 25).

31 F/7 Crystals of golden brown transparent tourmaline 2 cm in diameter are common in crystalline limestone at the Jamieson lime quarry 3.2 km south of Renfrew along Raglan Street. Orange-brown granular tourmaline is present in old quarries on the south side of the ridge just south of Renfrew County Road 4, 2.4 km east of Renfrew (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 13,27).

31 G/5 Black tourmaline is a common accessory mineral in a pegmatite quarry 4.2 km south of South March (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 5).

31 L/7 Crystals of black tourmaline up to 20 cm long occur with sparse yellowish beryl in pegmatite on the farm of R. MacLaren about 6.4 km south of Highway 17 along Highway 630 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 70).

32 D/4 Black massive tourmaline was common in the ore zone of the Upper Canada Mine. The mine is on

Upper Canada Road about 1.6 km from Highway 66, 29.5 km east of Highway 11 (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 29).

42 A/6 Tourmaline was a common mineral in the gold-bearing quartz-carbonate veins of the Timmins area. At the Ankerite Mine, brown tourmaline was the most abundant constituent of the veins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 130-150).

52 F/15 Well-developed black crystals of tourmaline occur in pegmatite exposed in Zealand Township on lots 15 to 19, concession VII, and on lot 17 at the boundary of concession VII and VIII (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 42).

52 P/3 An occurrence of pink tourmaline (rubellite) is reported at Beavis Lake at 51°10'N, 89°05'W, in the Thunder Bay district. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 411).

52 P/9 Three pegmatite dykes containing much coarse pink tourmaline appreciable quantities of spodumene and lepidolite, and some fluorite, outcrop just north of Lily Pad Lakes in the Fort Hope area (V.K. Prest, 1942: Ont. Dept. Mines, Ann. Rept., vol. 51, Pt. III, p. 27).

Quebec

22 C/5 Good crystals of tourmaline, garnet, beryl and minor apatite have been reported at a deposit known as the McGee Mine on the northeast shore of Charlotte Lake (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 100).

31 F/10 Partly translucent brown crystals of tourmaline, up to 2.5 cm in diameter, occur with vesuvianite is flesh red limestone at Grand Falls (or Calumet Falls) on Calumet Island (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 493).

31 G/5 Squat, brown, perfect tourmaline crystals up to 5 cm across were found in a small vug in a pyritized quartz vein in Hull Township, Gatineau County, range VI, lot 14, near Pinks Lake (D.D. Hogarth: private communication).

31 G/5 Black crystals and brown masses of tourmaline have been found in roadcuts along the Gatineau Parkway, and at the Headley Mine north of Aylmer (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 7, 13).

31 G/9 Pale green, slender, prismatic crystals of tourmaline have been collected in Chatham Township, Argenteuil County, range XI, lot 10 (National Mineral Collection).

31 G/11 Tourmaline occurs at a feldspar quarry near Buckingham, and at the Pedneaud quarry, Derry Mine, Jack Lake Mine, Burnt Lake Mine, Wallingford Mine, Smith Lake Mine and Glen Almond Mine, all near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 16, 21, 23, 24, 26, 27).

31 G/12 Fine specimens of black tourmaline crystals, often with terminal faces can be found in Hull Township, range XIV, lots 10, 17 and 18, and in Wakefield Township, range VII, lot 26, and range VIII, lot 25, Gatineau County (National Mineral Collection).

31 G/12 The Leduc Mine, on the east half of lot 25, range VII, Wakefield Township, Gatineau County, is interesting as the only mine ever worked in Canada with the idea of producing gem tourmaline. The tourmaline occurred abundantly as large crystals up to 5 cm in diameter and also in aggregates showing different colours in different parts of the crystals. Colours included shades of pink and brown, and light green passing to darker green, to greenish blue, and almost black. The crystals were generally too much fractured to yield profitable gem material (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 239).

31 G/12 Radiating aggregates of black tourmaline crystals are associated with silky dark green actinolite, brown sphene crystals and pink calcite at the Jackson Rae Mine near Perkins Mills. Black tourmaline crystals up to 2 cm across occur in greyish white feldspar in roadcuts on Highway 35 near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 13, 31).

31 G/12 Tourmaline is exposed in roadcuts along the Gatineau Parkway; at the Chamberlain Quarry and Scott Mine near Old Chelsea; at the Nellie and Blanche Mine, Blackburn Mine, Coté Quarry and Dacey Mine north of Hull; and at the Lake Girard Mine, Templeton Quarry, Gemmill Mine and McGlashan Mine near St-Pierre-de-Wakefield (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 17, 18, 20, 21, 25, 28, 29, 31, 37, 38, 39).

31 G/13 The Villeneuve Mine, located on the east end of a low hill, a short distance north of the main road from Notre-Dame-de-la-Salette, on lot 31, range I, Villeneuve Township, was one of Canada's greatest producers of muscovite, operating from 1884 to 1909. Black tourmaline was an abundant constituent of the pegmatite and occurred as crystals up to 5 cm in diameter and 60 to 90 cm in length. Most of the crystals were coated with mica and some small crystal pseudomorphs of mica after tourmaline were found (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 240).

31 G/13 Black tourmaline crystals up to 20 cm long are common at the Lapointe Mine near Notre-Dame-de-la-Salette, and patches of massive amber tourmaline are exposed in roadcuts along Highway 35, north of Val-des-Bois (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 34, 45).

31 G/14 Black tourmaline crystals up to several cm long and 2 cm across occur at the Cole Lake Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 28).

31 I/6 Small, yellowish brown, translucent crystals of tourmaline were found near Hunterstown, Hunterstown Township, Maskinonge County (National Mineral Collection).

31 I/10 Black, prismatic tourmaline crystals in quartz from St. Boniface, Shawinigan Township, St. Maurice County, were donated to the National Mineral Collection by E. Bergeron.

31 I/16 Dark amber masses of tourmaline occur in tremolite at the Tetreault Mine at Montauban-les-Mines (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 88).

31 J/1
31 J/2 Crystalline aggregates of greenish brown tourmaline may be seen in roadcuts along Highway 11 between St-Jovite and Ste-Agathe-des-Monts (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 65).

31 J/16 Black tourmaline occurs at the Maisonneuve Mine near St-Michel-des-Saints (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 78).

31 K/1
31 K/8 Short, black, prismatic crystals of tourmaline were found in Egan Township, Gatineau County, range III, lot 29, by G.W. Willimott, and donated to the National Mineral Collection.

32 C/3
32 C/4
32 D/1
32 D/2
32 D/3
32 D/7 Tourmaline is a constituent of many of the gold deposits that extend along Highway 59 from Rouyn to Val d'Or. The following occurrences have been noted: Stadacona and Granada, south of Rouyn; McWatters, Rouyn-Merger, Heva and Hosco, between Rouyn and Joannès; Mooshla, near Cléricy; Bouscadillac, O'Brien, Central Cadillac, Amm, West Malartic, Canadian Malartic, East Malartic, Malartic Goldfields, in the Cadillac-Malartic area; Elmac Malartic and Gale, between Malartic and Val d'Or; Sullivan, Sisco, Lamaque and Sigma, near Val d'Or; Louvicourt, Akasaba, Cournor, Perron, Vicour and Bevcon, east of Val d'Or (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 60-121).

Yukon

115 I/6 Gold occurs with arsenopyrite, pyrite and tourmaline in quartz veins on Freegold Mountain 67 km by rough road from Carmacks (Ann P. Sabina, 1973: Geol. Surv. Can., Paper 72-32, p. 86).

TREMOLITE

$$Ca_2Mg_5Si_8O_{22}(OH)_2$$

Tremolite, a member of the amphibole group, together with actinolite forms a series in which tremolite is the iron-free member and actinolite has a significant iron content, replacing magnesium. The division between the two varieties is arbitrary and usually based on colour; tremolite is white and actinolite green. Tremolite is of common occurrence in metamorphosed dolomitic rocks across Canada and only a few of the known occurrences will be recorded here.

Ontario

31 C/10 Greenish grey columnar or banded aggregates of tremolite are found in association with dark amber mica in quartz-feldspar veins at the Kingston (Bedford) mica mine. The mine is located about 3.2 km east of Highway 38 and about 800 m southeast of the Godfrey-Westport road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 14).

31 C/13 Tremolite crystals, apparently weathered from a limestone ridge were found in soil on lot 27, conc. B, Faraday Township, Hastings County. The morphology was studied in detail. Chemical analysis by H.C. Rickaby: SiO_2 57.36, TiO_2 0.14, Al_2O_3 1.04, Fe_2O_3 0.21, FeO 0.72, CaO 12.41, MgO 25.22, Na_2O 1.49, K_2O 0.47, H_2O 0.44, total 99.50; S.G. 2.96 (T.L. Walker and A.L. Parsons, 1927: Univ. Toronto Stud., Geol. Ser., 24, p. 15).

31 C/16 Tremolite-asbestos ('mountain leather') occurs as white, fibrous sheets in a sugary apatite at the Silver Queen mica-apatite mine. The mine is located about 73.2 km north of Kingston, along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

31 C
31 F Partial chemical analyses of some Ontario tremolites by Johnston: (1) fine fibrous, very pale greenish grey, FeO 0.96, lot 37, conc. VII, Clarendon Township, Frontenac County, 31 C/15; (2) faint greenish grey, FeO 0.92, lot 26, west half, conc. XII, Bathurst Township, Lanark County, 31 C/16; (3) radiating fibrous, faintly greenish greyish white, FeO 0.91, lot 13, conc. III, Bagot Township, Renfrew County, 31 F/7; (4) fibrous, light greenish grey, FeO 2.25, lots 22 and 23, conc. IV, Blythfield Township, Renfrew County, 31 F/7; (5) greyish white, translucent, vitreous lustre, FeO 0.17, lot 23, conc. IV, Ross Township, Renfrew County, 31 F/10 (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., IX, p. 53R).

31 F/6 Light green radiating tremolite is abundant in a pegmatite exposed in road-cuts on both sides of Highway 512, 12.5 km south of its junction with Highway 60 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 49).

31 F/7 Colourless, light green and yellow tremolite crystals are abundant at the Jamieson lime quarry on lot 5, conc. II, Horton Township, 3.2 km southeast of Renfrew. Bladed aggregates of light green, grey and light brown tremolite are common at the Renprior deposit on lot 1, conc. IV, Adamston Township. Colourless tremolite occurs in stone quarries on the south side of the ridge just south of Renfrew County Road 4, 2.4 km east of Highway 17. Crystals of smoky light brown tremolite are abundant at a lime quarry just off Highway 17, 4.8 km west of Renfrew (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, pp. 13,14,27,28).

31 F/10 Colourless, light blue and green tremolite is abundant at a quarry formerly worked for terrazzo on the farm of Herb Wright located 800 m south of Highway 653, about 800 m from Highway 17 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 58).

42 A/6 White fibrous tremolite with fibres more than 15 cm long has been found in outcrops of serpentinized peridotite just south of the Redstone River near where it crosses the west Carman Township line (E.J. Leahy, 1971: Ont. Dept. Mines, GR 96, p. 64).

52 H/9 Light green asbestiform material along fractures in serpentinized peridotite forms a zone about 6 m wide on a cliff along the Lake Nipigon shoreline midway between Bish and West bays. The mineral has been identified as tremolite. The fibres are soft and flexible and are up to 12 cm long (W.O. Mackasey, 1975: Ont. Div. Mines, GR 122, p. 38).

Quebec

31 G/5 Radiating crystal aggregates of green tremolite are exposed in roadcuts along the Gatineau Parkway (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 7).

31 G/11 Tremolite is present at the Glen Almond Emerald Mine and the Davis Mine, near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 20, 27).

31 G/12 Abundant white to grey tremolite is exposed in roadcuts along the road from Buckingham to Perkins Mills, about 800 m south of the Perkins Mills intersection. Colourless to light grey tremolite occurs in roadcuts on Highway 35 near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 8, 31).

31 G/12 Colourless to pale green tremolite is present at the Nellie and Blanche Mine north of Hull, at

the McGlashan Mine near St-Pierre-de-Wakefield, and at the McConnell Mine near Meach Lake (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-70, p. 17, 31, 31).

31 H/8 Masses of fine, silky white fibres of tremolite are found on coarse prismatic crystals of diopside at the Orford Mine, one mile south of Rocaille (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 17).

31 I/15 Light tan-coloured tremolite occurs at the Ste-Thècle Marble Quarry (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 85).

31 I/16 The most abundant gangue mineral at the Tetreault Mine near Montauban-les-Mines, is tremolite which fluoresces pink under "short" ultraviolet rays and pinkish orange under "long" ultraviolet rays (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 88).

31 J/4 Yellow green to dark green serpentine and colourless to grey tremolite form bands in the rock exposed on the north bank of the du Lièvre River immediately downstream from the des Cèdres dam (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 51).

31 J/7 Brownish grey columnar tremolite occurs at the Canada Marble and Lime Quarry near L'Annonciation (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 60).

31 J/11 Limestone marble at the Val-Barrette Quarries contains abundant tremolite occurring as white, grey and green (actinolite) bladed aggregates and as greenish white to apple-green dense fibrous masses (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 57).

TRIDYMITE

SiO_2

Nova Scotia

11 D/14 Tridymite has been identified as a gangue mineral at the Dunbrack deposit, 5.6 km NNW of Musquodoboit Harbour, Halifax County, at 44°49'10"N, 63°11'30"W. The ore minerals are galena, sphalerite, chalcopyrite, chalcocite and pyrite (C.G.I. Friedlander, 1968: Can. Mineralogist, 9, p. 572).

TRIPHYLITE

$Li(Fe,Mn)PO_4$

A complete series exists between triphylite and lithiophilite by mutual substitution of Fe for Mn. These minerals occur in lithium-bearing granite pegmatites.

Manitoba

52 L/6 A crystal fragment of triphylite, bounded by basal and prismatic (110) cleavage was found in the vicinity of the Huron claim at Pointe du Bois, township 16, range 16, lot 17.

Chemical analysis by V.J. Oswald: LiO_2 8.36, Na_2O 0.12, K_2O 0.44, H_2O 0.99, MgO 0.23, CaO 0.65, FeO 21.70, MnO 21.13, P_2O_5 46.41, insol. 0.20, total 100.23; S.G. 3.482. It occurs in a well-formed salmon pink, medium-grained pegmatite dyke consisting largely of feldspar, mostly albite-oligoclase (T.L. Walker, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 10).

Northwest Territories

83 I/1 A member of the triphylite-lithophilite series was identified in specimens of pegmatite from the Best Bet property at lat. 62°11'N, long. 112°17'W. Huhnerkobelite is associated (X-ray Laboratory, Geol. Surv. Can., collected by R. Mulligan, 1957).

85 I/13 A member of the triphylite-lithiophilite series has been identified in specimens of pegmatite from the Cota Group of claims at lat. 62°51'N, long. 113°33'W, in the Blaisdell Lake area. It is associated with huhnerkobelite, columbite, and apatite (X-ray Laboratory, Geol. Surv. Can., collected by R. Mulligan, 1958).

Nova Scotia

21 A/9 Triphylite has been found near Lake Ramsey, New Ross, in Lunenburg County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 229).

TULAMEENITE

Pt_2FeCu

British Columbia

82 E
92 H Tulameenite is a new mineral found in placer deposits along the valleys of the Tulameen and Similkameen rivers. Electron microprobe analyses gave:

Pt	Ir	Fe	Cu	Ni	Sb	Total
76.65	nd	10.55	6.95	3.77	2.07	99.99
74.87	nd	8.39	9.38	3.52	3.52	99.68
73.98	1.99	10.38	13.13	nd	nd	99.48
73.68	1.95	11.22	11.25	nd	nd	98.10
76.66	0.22	11.94	8.68	0.50	1.40	99.40
77.24	0.20	12.21	8.43	0.51	1.23	99.82
77.31	nd	11.23	9.17	0.60	1.04	99.35
77.83	0.25	12.87	8.01	0.56	0.65	100.17

(L.J. Cabri, D.R. Owens and J.H.G. Laflamme, 1973: Can. Mineralogist, 12, p. 21)

Electron microprobe analysis of tulameenite from the south bank of the Tulameen River halfway between Coalmont and Princeton: Pt. 70.5, Ir 6.3, Fe 12.5, Cu 10.0, Ni 0.31, total 99.61 (L.J. Cabri and M.N. Hey, 1974: Can. Mineralogist, 12, p. 301).

TUNDRITE

$Na_3(Ce,La)_4(Ti,Nb)_2(SiO_4)_2(CO_3)_3(OH).2H_2O$

Quebec

31 H/11 Tundrite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

TUNGSTENITE

WS_2

Ontario

42 A/1 Tungstenite has been identified as a rare constituent of a bornite-rich ore zone on the 1200 level of the Kidd Creek Mine north of Timmins. The mine is 25.7 km north of Highway 101 via Highway 655 (R.I. Thorpe, G.J. Pringle and A.G. Plant, 1976: Geol. Surv. Can., Paper 76-1A, p. 311).

TUNGSTITE

$WO_3.H_2O$

Tungstite is found as a yellowish alteration product of wolframite and other tungsten minerals. Pseudomorphs of tungstite after scheelite are known and have been named meymacite.

British Columbia

82 F/3 Massive tungstite with small druses lines with tiny tungstite crystals occurs with wolframite and gold at the Kootenay Belle Mine, near Salmo (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 229).

93 A/14 Tungstite occurs in a narrow quartz vein 2.5 to 10 cm wide, that is exposed 48 km southwest of Wells on the southwestern rim of Snowshoe Plateau, at the Taylor scheelite prospect in the Cariboo district. It is associated with scheelite, stolzite and pyrite (J.S. Stevenson, 1941: Univ. Toronto Stud., Geol. Ser., 46, p. 137).

Newfoundland

2 E/8 A large quartz vein containing scheelite and tungstite is located a short distance inland from Charles Cove at a point 5.6 km north of the wharf at Victoria Cove on the west side of Gander Bay (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 202).

Nova Scotia

11 D/15 Tungstite was found 3.2 km west of Moose River in Halifax County (National Mineral Collection).

11 K/6 Tungstite occurs at Emerald, Inverness County (National Mineral Collection).

Quebec

21 E/15 Meymacite is found associated with scheelite in Marlow Township, Beauce County, range VII, lot 1 (G.C. Hoffmann, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 14R).

TWINNITE

$PbS.(Sb,As)_2S_3$

Ontario

31 C/6 Twinnite, the antimony analogue of sartorite, was found in polished sections of specimens collected from a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed Taylor of Madoc. Electron probe microanalysis by G.R. Lachance: Pb 41, Sb 28, As 11, S 23, total 103 (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 191-213).

TYRRELLITE

near $Co_3Ni_2Cu_{3.5}Se_{9.5}$

Saskatchewan

74 N/10 Although never formally introduced, the name tyrrellite (after the Canadian geologist J.B. Tyrrell) has crept into the literature and has been applied to the selenide mineral discovered by S.C. Robinson in 1950 and described by Robinson and Brooker in 1952. The mineral was found at the western part of the Eagle claims and also at a deposit near the head of Ato Bay on Beaverlodge Lake in the Goldfields district (S.C. Robinson and E.J. Brooker, 1952: Am. Mineralogist, 37, p. 542).

TYUYAMUNITE

$Ca(UO_2)_2(VO_4)_2.5\text{-}8\,1/2H_2O$

Saskatchewan

74 N/7 Tyuyamunite has been identified as a secondary mineral at the Pitche claims, a vanadiferous uranium deposit at the southwest corner of Beaverlodge Lake (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 42).

ULEXITE

$NaCaB_5O_9.8H_2O$

Ulexite is typically found in salt playas and saline lakes but may also be associated with bedded gypsum deposits, as in the Canadian occurrences.

New Brunswick

21 H/15 Ulexite occurs with inyoite at Hillsborough (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 54).

Newfoundland

12 B/7 Irregular patches of fine felted fibres of ulexite occur on gypsum and anhydrite at the Flat Bay gypsum quarry (V.S. Papezik and C.C.K. Fong, 1975: Can. Mineralogist, 13, p. 370).

Nova Scotia

11 E/3 Ulexite and howlite have been found in drill-core from a lead-zinc deposit at Gays River about 8 km southeast of Shubenacadie, and ulexite needles have been noted in a large gypsum quarry near Milford Station (V.S. Papezik and C.C.K. Fong, 1975: Can. Mineralogist, 13, p. 370).

11 K/16 Irregular white patches of ulexite have been observed along joint planes in anhydrite at the Dingwall gypsum quarry, near the northwest end. White nodules of howlite are associated (Ann P. Sabina, 1965: Geol. Surv. Can., Paper 65-10, p. 26).

21 A/16 Ulexite occurs with cryptomorphite, howlite, mirabilite, halite, aragonite and selenite at Windsor, Three Mile Plains, and Wentworth Creek in Hants County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, pp. 63, 64T).

Chemical analysis by E.W. Todd of ulexite from Windsor: CaO 14.06, Na_2O 7.32, H_2O 34.59, B_2O_3 44.46, total 100.43; S.G. 1.91 (T.L. Walker, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 54).

21 H/1 Ulexite occurs with cryptomorphite, howlite, mirabilite, halite, aragonite and selenite at Bramber and Newport Station (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, pp. 63, 64T).

Chemical analysis: B_2O_3 44.10, CaO 14.20, Na_2O 7.21, H_2O 34.49, total 100.00 (H. How, --: Phil. Mag, Ser. 4, vol. 35, pp. 36, 37 also Am. J. Sci., vol. 32, p. 9).

ULLMANNITE

NiSbS

Ullmannite is a member of the cobaltite group, and is isostructural with gersdorffite and cobaltite. It occurs in veins, most frequently in a siderite gangue, with other nickel minerals such as gersdorffite and nickeline.

Ontario

31 M/5 Ullmannite, identified by X-ray diffraction studies and ore microscopy has been found in calcite in the Deer Horn and Silverfields Mines (W. Petruk, D.C. Harris and J.M. Stewart, 1971: Can. Mineralogist, 11, p. 185).

31 M/5 A specimen of ullmannite from the Silver Bar Mine located in the southwest quarter, north half of lot 5, conc. IV, Coleman Township, is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 415).

32 D/4 Ullmannite has been identified by X-ray powder pattern as occurring at the Kerr Addison Mine, McGarry Township, in the Timiskaming district (E.W. Nuffield and D.H. Gorman, 1960: private communication).

42 B/1 Ullmannite is reported to occur with berthierite, stibnite, native antimony and several other antimony and arsenic minerals at a deposit explored by Card Lake Copper Mines Limited in Sewell Township at about 48°12'N, 82°00.5'W. The occurrence is 6.7 km by road south of Highway 101 from a junction 19.3 km west of the Little Star Lake road (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 154).

Saskatchewan

74 N/8 Ullmannite has been identified by X-ray powder pattern in specimens from the Nicholson Mine, No. 4 zone, located about 3.2 km east of Goldfields (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31, p. 18).

UMANGITE

Cu_3Se_2

Northwest Territories

56 D/2 The copper selenide minerals umangite, berzelianite and athabascaite have been found as fracture fillings in carbonatized mafic intrusive rock from Christopher Island, Baker Lake. Umangite occurs in finer grained portions of the veins where it is commonly mantled by berzelianite and athabascaite. Electron microprobe analyses of umangite containing minute grey inclusions:

Cu	49.1	46.7	47.7
Se	43.8	40.7	40.0
Fe	0.4	2.1	1.6
Pb	3.2	7.0	4.3
Cl	0.3	0.5	0.3
	96.8	97.0	93.9

(G.J. Pringle and A.R. Miller, 1977: Geol. Surv. Can., Paper 77-1B, p. 113)

Quebec

32 D/6 The selenide minerals umangite and klockmannite are present with a suite of telluride minerals, native gold and electrum at the Horne Mine, Noranda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 47).

Saskatchewan

74 N/7
74 N/10 Umangite has been identified in specimens from three deposits in the Goldfields mining camp. It is the most abundant of the selenides, although not as widespread as clausthalite, and is associated with other selenides, hematite, pitchblende, and locally with pyrite and chalcopyrite.

At the Eagle Group, three small deposits north of Hal Lake about 450 m west of the Eagle shaft contain massive selenides including umangite, klockmannite, tyrrellite, berzelianite and clausthalite.

Carbonate veins containing pitchblende, hematite, sulphides, umangite and klockmannite occur at the Gil Group located along the shore of Lodge Bay of Lake Athabasca extending across the ridge that separates that lake from Beaverlodge Lake.

Umangite, klockmannite, berzelianite and clausthalite have been identified with pitchblende, hematite, copper sulphides, native copper and carbonate at the Martin Lake Mine on the west side of Beaverlodge Lake (S.C. Robinson, 1955: Geol. Surv. Can., Bull. 31).

URANINITE

UO_2

Uraninite and its variety, pitchblende, are important ore minerals of uranium because they are relatively abundant, have high contents of uranium, and are amenable to chemical extraction of the uranium. Although uraninite is the preferred species name, it is commonly used to denote the crystalline variety that contains several per cent of thorium and rare earths; and pitchblende is used for the cryptocrystalline variety, usually massive, botryoidal, banded or colloform, containing no more than traces (less than 0.1 per cent) of thorium and rare earths. Uraninite forms a complete ismorphous series with thorianite and is isostructural with cerianite.

The following list of properties where uraninite or pitchblende have been found is taken, unless otherwise noted, from Geol. Surv. Can., Econ. Geol. Ser. 16, Canadian Deposits of Uranium and Thorium, by A.H. Lang, J.W. Griffith, and H.R. Steacy, 1962, to which the reader is referred for additional details.

Alberta

74 L/14 Chip-Chico-Kazan-Lassie groups of New Delhi Mines Limited, 10 to 16 km north of fort Chipewyan, with monazite and secondary minerals in pegmatite.

74 L/15 Range 6, Township 113, west end of Lake Athabasca, known as Giauque discovery, in pegmatite with monazite and secondary minerals.

74 M/1 TBY and BYT groups of Goldfields Uranium Mines Limited, 8 km north of Lake Athabasca at Fidler Point, pitchblende veins.

74 N/10 All-Rabo property of Dog River Mining Company in the Leggo Lake area, vein pitchblende.

British Columbia

82 E/1 Small grains of uraninite in biotite have been identified as a source of radioactivity in pegmatites at 1174 m elevation on the crest of a ridge between Toronto and Snowball Creeks at 49°07.4'N, 118°23.4'W, 4 km east of Granby River and 10.5 km north-northwest of Grand Forks (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 432).

82 E/11 Uraninite accompanied by purple fluorite occurs sporadically in granodiorite on the DOE and IVY claims at 49°31'N, 119°10'W, 29 km east of Penticton extending south from the north side of Wilkinson Creek east of Saunier Creek to within about 3.2 km of Carmi at about 1220 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 60).

Molly Mine, a molybdenite property at Lost Creek, south of Salmo, uraninite.

82 F/4 Uraninite and monazite in pegmatite at the Genelle area occurrence, 11 km north of Trail, near Highway 3.

82 F/5 Gibson creek occurrence, north of Castlegar, uraninite.

82 F/6 Uraninite in pegmatite at the Lucky-Bill-Tag deposit on the Kootenay River near the CPR bridge at Sproule Creek.

82 K/15 Placer deposits on Bugaboo Creek, uraninite with uranothorite, zircon, euxenite, pyrochlore, and allanite.

82 L/6 In pegmatite 8 km east of Armstrong.

82 L/7 In pegmatite at 50°17.8'N, 118°49'W, at about 760 m elevation, northeast of Shuswap Falls 12.8 km northeast of Lumby (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1972, p. 80).

82 M/12 With uranothorite at the Rexpar property, formerly Smuggler Claim, 4.8 km south of Birch Island Station on the Canadian National Railways.

83 D/6 Verity property, 37 km north of Blue River Village, uraninite with columbite, pyrochlore and zircon.

92 H/6 Ain property of Canan Mining Corporation on a Skagit River tributary near km 48 on the Hope-Princeton Highway, uraninite and monazite.

92 I/4 Uraninite in placer at Lytton on the Fraser River.

92 I/12 Index molybdenite property on Texas Creek near Lillooet, vein uraninite.

92 J/15 Pacific Gold, and Gem properties 40 km northwest of the Bridge River camp, uraninite and allanite.

93 M/4 Vein uraninite at the Golden Wonder claim at Juniper Creek and at the Rocher Déboulé Mine on Rocher Déboulé Mountain south of Hazelton. Also at the Victoria Mine in the Hazelton camp.

93 N/11 Quartz stringers contain uraninite on the Smoke claims at 55°35'N, 125°19'W, 6.4 km north of the junction of Kwanika and West Kwanika creeks at about 1200 m elevation (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1974, p. 280).

93 O/5 Placer deposit containing uraninite and monazite, Nation River, Omineca Mining District.

104 N/11 Uraninite, zeunerite and metazeunerite at the Boulder group at the headwaters of Boulder Creek northeast of Atlin.

104 N/12 Husselbee occurrence, 16 km northwest of Atlin between Atlin Lake and Tagish Lake, uraninite and thorite.

Manitoba

52 E/14 West Hawk Lake area, Triangle and West Found deposits north and south of the Trans-Canada Highway at km 162, and East Found property 1.6 km west of Star Lake. Uraninite in pegmatite with cyrtolite, thorite, allanite and uranothorite.

52 L/6 Uraninite was discovered during 1930 in a pegmatite on the Huron claim, located about 800 m inland from a point on the southeast shore of Winnipeg River, about 15 km above Point du Bois. Chemical analyses by Ellsworth: I. panned concentrate, PbO 16.63, U_3O_8 63.08, ThO 14.18, Ce_2O_3 oxides 0.37, Y_2O_3 oxides 1.02, Fe_2O_3 0.64, MnO 0.18, BeO + Al_2O_3 0.10, CaO 1.45, MgO 0.07, SiO_2 0.67, insol. 0.12, total 98.51; S.G. 8.082; II. panned concentrate washed with dilute hydrochloric acid, PbO 16.71, U_3O_8 64.86, ThO_2 13.94, Ce_2O_3 oxides 0.28, Y_2O_3 oxides 1.19, Fe_2O_3 0.75, MnO 0.13, BeO + Al_2O_3 0.12, CaO 1.72, MgO 0.06, SiO_2 0.37, total 100.13; S.G. 8.968 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 268).

New Brunswick

21 O/15 Coxs Brook occurrence, mouth of Coxs Brook on the Upsalquitch River near Robinsonville.

21 P/10 Nodules in sandstone at Chaisson Beach, about 4.8 km southeast of Savoy Landing, Shippigan Island.

Newfoundland

12 B/9 Indian Head occurrence, St. George's Bay.

13 K/5 Seal Lake occurrence in the Ten Mile Lake area, pitchblende, kasolite, monazite, pyrochlore.

13 O/3 Kitt's showing and Monkey Hill occurrence, Kaipokok Bay, Makkovik area, vein and pegmatite types.

Northwest Territories

55 M/12 Pitchblende occurs as smears and massive veins in fracture systems at 63°41'N, 95°46'W. The systems are marked by zones of feldspathic and hematitic alteration. The occurrences are within a few miles of Kazan Falls (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 67; Dept. Indian and Northern Affairs).

56 D/2 Four mineralized zones have been investigated in the Baker Lake area on and near Christopher Island. The main zone at 64°04'35"N, 94°32'53"W, near the centre of the island, consists of uranite and traces of chalcopyrite in calcite veins. The second zone, 450 m to the northwest at 64°06'21"N, 94°36'57"W, consists of uraninite-pyrite-bornite veinlets. Pitchblende- and bornite-filled fractures occur in a third zone, at the northwestern tip of Christopher Island at 64°06'42"N, 94°37'12"W. Fine-grained uraninite has also been found in narrow calcite veinlets on the mainland 9.6 km north of Christopher Island at 64°10'11"N, 94°33'25"W (P.J. Laporte, 1974: Mineral Industry Report 1969 and 1970, Vol. 2, p. 76; Dept. Indian and

Northern Affairs) Botryoidal pitchblende is reported filling interstices in breccia on the north shore of Baker lake at 64°09'N, 94°33'W (P.J. Laporte, 1974: Mineral Industry Report 1971 and 1972, Vol. 2, p. 40; Dept. Indian and Northern Affairs).

75 C/13 Key (Eldorado) property at 60°54'N, 109°42'W, vein pitchblende.

75 L/6 GM group of American Yellowknife Mines, 2.4 km northeast of the entrance to Murky Channel, east arm of Great Slave Lake, pitchblende vein.

75 L/8 Hab 1-14 claims of Eldorado at McLean Bay near Snowdrift, east arm of Great Slave Lake. Sedimentary deposit containing uraninite and monazite.

75 L/8 Pitchblende veins on the JG and Rag claims on the south shore of Stark Lake, and uraninite at the Rex Mine at Stark Lake.

75 L/16 XAM group in the Barnston River area, uraninite and secondary minerals.

85 N/7 Rayrock Mine near Maryleer Lake; BM group; Ca 1-7 groups; Gamma group; Marian group, north of Marian Lake; Ted group, Treasure Lake; and Sun group; all in the Marian River area.

86 C UR group on giant quartz vein containing hematite and seams of pitchblende at Hidden Bay of Hardisty Lake.

86 D/9 Pitchblende veins at the Cormac group and adjoining Pitch-Ind group on the north shore of the east arm of Beaverlodge Lake.

86 D/16 Bingo group at the southeast corner of Hottah Lake, pitchblende in quartz veins.

86 D/16 Pitch 8-10 group at the shore of Hottah Lake, 10.2 km north of the south end of the lake includes showings of hematite, pitchblende and torbernite.

86 E/1 Pitch 27,28 group 1.2 km east of the northeast corner of Hottah lake contains pitchblende and secondary minerals.

86 K/4
86 K/5
86 K/6
86 L/1 Pitchblende deposits at the east end of Great Bear Lake include: Achook Island; Contact Lake, 14.4 km southeast of Eldorado; Echo Bay, east of Labina Point; El Bonanza group, 10 km south of Port Radium; Glen Lake occurrence at the southwest end of the lake, 2.4 km east of El Bonanza; Hunter Bay; Mystery Island; Bow Lake, Thompson occurrence; and Workman Island.

86 L/1 Uraninite in massive form (pitchblende) is associated with silver and gold at Labine Point, 56 km south of Hunter Bay, on Great Bear Lake in the Mackenzie district. It is found in shear and shatter zones traversing the altered rocks of the point in a general east-northeast direction. Analysis from the property of Eldorado Gold Mines Limited: U_3O_8 61.56, Pb 10.51, ThO_2 0.01, SiO_2 15.26, CaO 1.44, MgO 0.26, ZrO_2 0.00, CuO 1.11, Ag 0.01, MnO 0.01, Ce_2O_3 0.18, Yt_2O_3 0.53, La_2O_3 0.39, other rare earths 0.31, Fe_2O_3 1.52, Al_2O_3 0.27, TiO_2 0.05, BaO 0.01, K_2O and Na_2O 1.36, Y_2O_5 and MoO_3 1.14, NiO and CoO 2.41, S 0.75, H_2O (-110°) 0.66, H O (+110°) 0.87, total 100.63; S.G. 5.95 (J.P. Marble, 1939: Am. Mineralogist, 24, p. 272).

Ontario

31 C/12 Uraninite and brannerite are associated with native gold in specimens from the Richardson Mine, the first gold mine in Ontario, near the village of Eldorado in Madoc Township (H.R. Steacy, A.G. Plant and R.W. Boyle, 1974: Can. Mineralogist, 12, p. 360).

31 C/13 Faraday Township, lot 29, conc. A, Lockwood property at Silver Crater Mines. Uraninite and uranthorite.

31 C/15 Palmerston Township, lot 9, conc. III, and lots 2-3, conc. V, uraninite.

31 C/16 South Sherbrooke Township, lot 18 (N1/2), conc. III, Christie Lake Mines. Uraninite, brannerite, thorite.

31 D/9 Burleigh Township, lots 23-25, concs. XI, XII, Newkirk Mining Corp. Uraninite, allanite, uranothorite, zircon, melanocerite.

Galway Township, lot 27, conc. VIII; lot 30 (S1/2), conc. IX, Newkirk Mining Corp.

31 D/15 Snowdon Township, lot 11, conc. II, uraninite and thorite.

31 D/16 Anstruther Township

lots 26-27, conc. I, Newkirk Mining Corp. Uraninite, allanite, uranothorite, zircon, melanocerite.

lots 22-28, conc. III; lots 23-27, conc. IV; Farcroft Mines Limited, uraninite, allanite, uranothorite.

lots 5-6, XVII; lots 4-9, conc. XVIII; Garland Mining Company, uraninite, allanite, uranothorite, cyrtolite.

31 D/16 Cardiff Township

lot 8 (N1/2), conc. II, Triton Uranium Mines.

lot 12, conc. VIII, Canadian Dyno Mines, uraninite, uranothorite, allanite, cyrtolite, hatchettolite, uranophane.

lot 22, conc. IX, Aumacho River Mines, allanite, uraninite, uranothorite.

lots 7-11, conc. XII; lots 7-8, conc. XIII; Canada Radium Corp., ellsworthite, uraninite, uranothorite.

31 D/16 Cavendish Township

lot 14 (S1/2), conc. VII, Amalgamated Rare Earth Mining Company Cavendish Mine. Uranothorite, thorite, uraninite, allanite, cyrtolite, anatase.

lot 21 (N1/2), conc. XI, Silanco Mining and Refining Company, allanite, zircon, uraninite, uranothorite.

lot 24 (S1/2), and lot 25 (N1/2), conc. XIV, Kelbec Rare Metals Corp. Uraninite, uranophane, uranothorite, allanite.

31 D/16 Galway Township

lots 23-24, conc. XI; lot 24 (S1/2), conc. XII; Kenmac Chibougamau Mines, zircon, uraninite, uranothorite

31 D/16 Glamorgan Township

lots 18-20 and 22-24, conc. I; lots 17-20 and 22-24, conc. II; lots 15-17, conc. III; lot 32, conc. V; Webster Uranium Mines Limited, uraninite, allanite, uranothorite.

31 D/16 Monmouth Township

lot 19 (N1/2), conc. IV, Urotomic Mines Limited.

lot 5 (N1/2), lot 18,19 (S1/2), conc. VI; Wadasa Gold Mines Limited.

lots 5-8, conc. IX, Canadian All Metals Exploration, thorian uraninite, pyrochlore.

lots 5-6, conc. XI, Red Bark Mines Limited.

lot 13, conc. XII, Long Ridge Uranium Mines.

31 D/16 Uraninite cubes, rarely modified by octahedra, up to 1 cm in diameter occur in radioactive zones composed mainly of rounded diopside and phlogopite crystals in salmon coloured calcite at Wadasa Gold Mines Limited, conc. VI, lot 5, Monmouth Township, Haliburton County. Partial XRF analysis: U_3O_8 53.0, ThO_2 27.0, PbO 10.0; unit cell edge 5.510Å (S.C. Robinson and Ann P. Sabina, 1955: Am. Mineralogist, 40, p. 626).

31 E/1 (1) Cubes of uraninite up to 6 mm in diameter occur in calcite-diopside-phlogopite skarn at the property of Homer Yellowknife Mines Limited, conc. XVII, lot 30, Monmouth Township, Haliburton County. Partial XRF analysis: U_3O_8 48.0, ThO_2 28.8, PbO 9.4; unit cell edge 5.519Å.

(2) At the Centre Lake Mine, concs. XI, XII, lots 27, 28, Cardiff Township, Haliburton County, subhedral grains of uraninite up to 3 mm in diameter are found in the fine-grained footwall of No. 1 dyke at the adit level. Partial XRF analysis: U_3O_8 64.5, ThO_2 9.2, PbO 11.9; unit cell edge 5.468Å.

(3) Disseminated uraninite occurs in No. 4 dyke at the Centre Lake Mine in a lens-shaped band of oligoclase-microcline along with minor diopside, titanite, biotite and fluorite. Partial XRF analysis of uraninite from the 205-foot level: U_3O_8 65.0, ThO_2 7.7, PbO 11.9; unit cell edge 5.461Å.

(4) Crystals of uraninite up to 2.5 cm in diameter occur in biotite-rich pyroxenite at the Centre Lake Mine. Partial XRF analysis: U_3O_8 68.0, ThO_2 17.0, PbO 10.75; unit cell edge 5.475Å.

(5) Anhedral to subhedral grains of uraninite up to 6 mm in diameter were found in a small syenite dyke, conc. XV, lot 6, Cardiff Township, Haliburton County. Partial XRF analysis: U_3O_8 66.7, ThO_2 8.5, PbO 11.4; unit cell edge 5.461Å.

(6) Partly rounded cubes of uraninite up to 3.8 cm in diameter occur in calcite-fluorite dykes at Cardiff Uranium Mines Limited, conc. XVII, lot A, Cardiff Township, Haliburton County. Partial XRF analysis of crystals from the 125-foot level of of the mine: U_3O_8 62.8, ThO_2 13.6, PbO 12.8; unit cell edge 5.497Å.

(7) Partial XRF analysis of uraninite from syenite and calcite-diopside rock collected at the Cardiff Uranium Mines Limited adit, conc. XIX, lot 2, Cardiff Township: U_3O_8 62.7, ThO_2 14.3, PbO 10.7; unit cell edge 5.491Å.

(8) Uraninite occurs in mica pyroxenite on the property of Anuwon Uranium Mines Limited, conc. XIX, lot 8, Cardiff Township. Partial XRF analysis: U_3O_8 59.6, ThO_2 16.3, PbO 10.3; unit cell edge 5.477Å.

(9) Partial XRF analysis of uraninite from a small pegmatite or migmatite band, conc. XX, lot 7, Cardiff Township, Haliburton County: U_3O_8 73.0, ThO_2 7.7, PbO 10.75; unit cell edge 5.45Å.

(10) Uraninite cubes up to 2.5 cm in diameter occur in a lens-shaped pegmatite on conc. XXI, lot 8, Cardiff Township, Haliburton County. Partial XRF analysis: U_3O_8 59.0, ThO_2 17.6, PbO 10.5; unit cell edge 5.488Å.

(11) Subhedral grains of uraninite are present in fine-grained syenite associated with an irregular pegmatite in conc. XXI, lot 9, Cardiff Township. Partial XRF analysis: U_3O_8 66.7, ThO_2 10.0, PbO 8.4; unit cell edge 5.469Å (S.C. Robinson and Ann P. Sabina, 1955: Am. Mineralogist, 40, p. 626).

31 E/1 Chemical analysis by E.W. Todd of a large uraninite crystal from the Wilberforce showings, conc. XXI, lot 4, Cardiff Township, Haliburton County: UO_2 45.18, UO_3 24.90, ThO_2 11.40, PbO 10.40, Ce_2O_3 group 1.82, Y_2O_3 group 2.74, MgO 0.19, CaO 0.28, MnO 0.04, Fe_2O_3 0.58, SiO_2 0.43, H_2O 0.61, He 0.35, total 98.92; S.G. 9.082 (T.L. Walker, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 42).

31 E/1 Chemical anlaysis by H.V. Ellsworth of a large uraninite crystal from the Wilberforce showings, conc. XII, lot 4, Cardiff Township: UO_2 39.10, UO_3 32.40, ThO_2 10.60, PbO 10.95, Ce_2O_3 group 1.88, Y_2O_3 group 2.14, Fe_2O_3 0.43, MnO 0.03, BeO + Al_2O_3 0.09, CaO 1.01, MgO 0.08, SiO_2 0.19, H_2O 0.70, He 0.31, insol. 0.15. total 100.06; S.G. 9.062.

Chemical analysis by H.V. Ellsworth of altered uraninite from the Wilberforce showings, conc. XXI, lot 4, Cardiff Township: UO_2 13.55, UO_3 52.04, ThO_2 13.56, PbO 11.05, Ce_2O_3 group 1.26, Y_2O_3 group 1.87, Fe_2O_3 0.47, MnO 0.03, BeO + Al_2O_3 0.11, CaO 0.27, MgO 0.07, SiO_2 0.58, H_2O 1.60, insol. 0.67, CO_2 0.67, SO_3 0.58, P_2O_3 0.04, total 98.42; S.G. 7.178 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 268).

31 E/1 Partial chemical analyses by A. Sherwood of portions of a uraninite crystal from the Wilberforce showings, conc. XXI, lot 4, Cardiff Township: (a) outer 4 millimetres - UO_2 44.0, UO_3 23.7, ThO_2 13.5, PbO 9.47, R.E. 1.9, CaO 0.02; (b) core - UO_2 39.5, UO_3 27.9, ThO_2 13.4, PbO 9.47, R.E. 0.7, CaO 0.02 (R.M. Berman, 1957: Am. Mineralogist, 42, p. 710).

31 E/1 Cardiff Township

lots 27-28 (N1/2), conc. XI, Bicroft Uranium Mines Limited,

Bicroft Mine, uraninite, uranothorite, zircon, allanite.

lot 31 (S1/2), conc. XIII, Consolidated Tungsten Mining Corp., uraninite, urnaothorite.

lot 11 (S1/2), conc. XIV, Mindus Corp., uranothorite, allanite, uraninite, ellsworthite.

lots 6-7, conc. XV, Halo Mine, South Zone, uranothorite, uraninite, betafite.

lots 2-3 (S1/2), conc. XV; lots 1-3 and 4 (N1/2), conc. XVI; Stratmat Limited, Reasor property, uraninite, allanite.

lot A (N1/2), conc. XVII, Cardiff Uranium Mines, C Zone, uraninite, uranothorite.

lots 4, 5 (S1/2) and 6 (N1/2), conc. XVIII, Halo Mine, uraninite, uranothorite, thorite.

lots 8-10, conc. XIX, Anuwon Uranium Mines, also known as McLean-Hogan property.

lot 7 (S1/2), conc. XX, Burma Shore Uranium Mines, uraninite, uranothorite.

lots 7-8, conc. XX, Pickens property, calcite-fluorite, uraninite, allanite.

lots 4-6, 7 (N1/2), conc. XXI, Fission Mines Limited Richardson deposit, uraninite, allanite, uranothorite, zircon.

lots 8-9, conc. XXI, Nu-Age Uranium Mines, Tripp and Montgomery properties, uraninite and uranothorite.

31 E/1 Monmouth Township

lot 27 (S1/2), conc. XVI, Cordell Gold Mines Limited.

lots 30-31, conc. XVII, Desmont Mining Corp., uranothorite, allanite, uraninite.

31 E/4 Uraninite occurs as scattered crystals in the feldspathic parts of a pegmatite dyke on lots 9 and 10, conc. IX, Conger Township, near a bay of Blackstone Lake. The uraninite is often very fresh, unusually hard and heavy, and almost a steel grey colour. Three chemical analyses are reported by H.V. Ellsworth: I. 30 crystals carefully selected for freshness and hand picked purity; II. a second sample of 30 crystals prepared as for I; and III. a single crystal considerably altered to the black stage.

The analyses were: I. PbO 11.67, UO_2 53.63, UO_3 26.32, ThO_2 3.22, Ce_2O_3 group 0.98, Y_2O_3 group 2.19, Fe_2O_3 0.15, MnO 0.01, BeO + Al_2O_3 0.03, CaO 0.41, MgO 0.02, SiO_2 0.29, H_2O 0.72, He 0.37, insol. 0.13, total 100.14; S.G. 9.116; II. PbO 11.60, UO_2 51.27, UO_3 28.37, ThO_2 3.55, Ce_2O_3 group 0.44, Y_2O_3 group 2.31, Fe_2O_3 0.27, MnO 0.03, BeO + Al_2O_3 0.02, CaO 0.47, MgO 0.03, SiO_2 0.35, Na_2O 0.23, H_2O 0.74, insol. 0.17, total 99.85; S.G. 9.026; III. PbO 10.52, UO_2 38.05, UO_3 39.13, ThO_2 3.35, Ce_2O_3 group 0.78 Y_2O_3 group 1.90, Fe_2O_3 0.91, MnO 0.04, BeO + Al_2O_3 0.11, CaO 1.40, MgO 0.17, SiO_2 1.36, H_2O (-110°) 0.45, H_2O (+110°) 1.08, insol. 0.14, total 99.39 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 268).

31 E/4 Conger Township, lots 4, 7, 9, 10, conc. IX, pegmatite deposits, uraninite, calciosamarskite, thucholite, cyrtolite, allanite

31 E/9 Uraninite has been found in granite pegmatite on lot 14, conc. IV, Murchison Township, Nipissing district (D.F. Hewitt, 1960: private communication).

31 E/10 Uraninite was discovered in 1919 in a granite pegmatite carrying considerable muscovite, in Butt Township, conc. VII, on the south half of lot 13. Four chemical analyses were made by H.V. Ellsworth: I. good quality single crystal - PbO 10.80, U_3O_8 79.48, ThO_2 1.56, R.E. oxides 5.02, Fe_2O_3 0.40, MnO 0.12, BeO + Al_2O_3 0.08, CaO 1.18, MgO 0.07, SiO_2 0.31, H_2O (-110°) 0.26, H_2O (+110°) 0.35, insol. 0.35, total 99.98; S.G. 8.859; II. mixed fragments - PbO 9.84, U_3O_8 76.87, ThO_2 1.83, Ce_2O_3 group 2.71, Y_2O_3 group 2.77, Fe_2O_3 0.53, MnO 0.21, BeO + Al_2O_3 0.03, CaO 1.50, MgO 0.03, SiO_2 1.02, H_2O 1.33, insol. 1.40, total 100.07; III. mixed fragments - PbO 10.58, UO_2 43.33, UO_3 33.42, ThO_2 1.23, Ce_2O_3 group 0.96, Y_2O_3 group 4.02, Fe_2O_3 0.62, MnO 0.06, BeO + Al_2O_3 0.10, CaO 0.98, MgO 0.04, SiO_2 0.36, H_2O (-110°) 0.40, H_2O (+110°) 0.34, insol. 2.27, total 98.71; S.G. 8.788; IV. altered crystal - PbO 10.36, U_3O_8 75.74, ThO_2 1.13, R.E. oxides 5.58, Fe_2O_3 0.86, MnO 0.16, BeO + Al_2O_3 0.07, CaO 1.35, MgO 0.03, SiO_2 2.04, H_2O (-110°) 0.72, H_2O (+110°) 1.20, insol. 0.43, total 99.67 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 268).

31 F/4 Faraday Township

lots 16-18, Conc. XI, Faraday Mine, uraninite, uranothorite, allanite, cyrtolite, uranophane.

lots 9-10, conc. XII, Greyhawk Mine, uraninite, uranothorite, pyrochlore, zircon, allanite.

31 F/4 (1) The Faraday Mine is located on conc. XI, lots 16, 17, Faraday, Township, Hastings County. In the west drift of the west adit, small subhedral grains of uraninite occur in an ore shoot which consists of equal amounts of feldspar, magnetite and locally, titanite. Partial XRF analysis: U_3O_8 70.0, ThO_2 7.7, PbO 13.7; unit cell edge 5.460Å.

(2) Rounded grains of uraninite occur with subhedral uranothorite in coarse-grained tremolite-calcite rock on J. Lockwood's farm, along the Monck Road, in conc. A. lot 29, Faraday Township, Hastings County. Partial XRF analysis: U_3O_8 46.0, ThO_2 35.0, PbO 9.0; unit cell edge 5.540Å (S.C. Robinson and Ann P. Sabina, 1955: Am. Mineralogist, 40, pp. 625-627).

31 F/4 Monteagle Township

lots 17-18, conc. II, South State Mines, also known as Musclow property.

lot 3 (N1/2), conc. III, Robson property, uraninite and zircon.

lots 18,19 (N1/2), conc. VII, Phillips-Doubt Grubstake Syndicate, also known as MacDonald feldspar mine. Ellsworthite, uranothorite, cyrtolite, allanite, uraninite.

31 F/5 Raglan Township, lots 3-4, conc. XVIII, Craig Mine near Craigmont, Wartime Metals Corp., allanite, uraninite, euxenite.

31 F/7 Bagot Township, lot 23, conc. IV, Goldyke Mines Limited.

31 G/5 A small amount of uraninite was discovered in a pegmatite dyke worked for feldspar on lot 6, conc. II, March Township, Carleton County. Chemical analysis by Ellsworth: PbO 11.61, UO_2 49.44, UO_3 24.28, ThO_2 4.92, Ce_2O_3 group 2.10, Y_2O_3 group 2.30, Fe_2O_3 0.37, MnO 0.02, BeO + Al_2O_3 0.05, CaO 1.56, MgO 0.11, SiO_2 0.64, H_2O (-110°) 0.22, H_2O (+110°) 1.33, insol. 0.16, total 99.11; S.G. 8.674 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 268).

31 L/5 Uraninite has been identified in limestone at the Beaucage Mine, Manitou Islands, Lake Nipissing (D.F. Hewitt, 1960: prviate communication).

31 L/7 Mattawan Township, lots 6-7, conc. II, Purdy Mica Mines Limited.

41 H/8 McDougall Township, lot 27, conc. IX, Fenn property, uraninite, thucholite.

41 H/8 McDougall Township, lot 12, conc. A, Ascot occurrence. Uraninite specimen in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 419).

41 H/15 Uraninite is intimately associated with thucholite in the Besner pegmatite, lot 5, conc. B, Henvey Township, Parry Sound district. Three analyses are reported by Ellsworth: I. panned concentrate - S.G. 8.173, PbO 8.66, UO_2 49.35, UO_3 29.76, ThO_2 1.78, Ce_2O_3 group 1.47, Y_2O_3 group 1.48, Fe_2O_3 0.88, MnO 0.02, BeO + Al_2O_3 0.17, CaO 2.69, MgO 0.03, CuO 0.03, SiO_2 1.36, H_2O 1.44, total 99.12; II. panned concentrate - S.G. 7.827, PbO 8.09, U_3O_8 79.30, ThO_2 1.73, R.E. oxides 2.87, CaO 2.82, CuO 0.03, SiO_2 1.76, total 96.60; III. heavy fraction from single crystal - S.G. 7.809, PbO 8.16, U_3O_8 79.35, ThO_2 2.11, R.E. oxides 3.48, MnO 0.02, CaO 1.97, CuO 0.02, SiO_2 2.12, total 97.23 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 268).

41 I/9 Uraninite is reported to have been identified in Loughrin Township, Sudbury district (E.W. Nuffield and D.H. Gorman, 1960: private communication).

41 I/14 Uraninite of detrital origin occurs in bedded argillite bands in quartz pebble conglomerate at the Leslie showing in Creelman Township, lots 10 and 11, conc. III. The uraninite grains are interbedded with ilmenite and zircon (J.E. Thomson, 1960: Ont. Dept. Mines, GR 1, p. 30).

41 J/2 Long Township, Pronto Mine, uraninite, brannerite, thorogummite, thucholite, monazite.

41 J/5 Tarbutt Township, lot 1, conc. III, Tarbutt Mines Limited, pitchblende.

41 J/7 Township 149, Buckles Mine, brannerite, uraninite, monazite.

41 J/7 Township, 144, Can-Met Mine, Quirke Lake, uraninite, monazite, brannerite.

41 J/7 Township 150, Consolidated Denison Mine, on west shore of Quirke Lake, brannerite, uraninite, monazite.

41 J/7 Township 149, Lacnor Mine, brannerite, uraninite, thucholite, monazite.

41 J/7 Township 149, Milliken Lake Mine, brannerite, monazite, uraninite, thucholite.

41 J/7 Township 149, Nordic Mine, Algom Uranium Mines Limited, brannerite, uraninite, monazite.

41 J/7 Township 144, Panel Mine, Quirke Lake, brannerite, uraninite.

41 J/7 Township 150, Spanish-American Mine, brannerite, uraninite, monazite, thucholite.

41 J/7 Townships 149 and 155, Stanleigh Mine, brannerite, uraninite, monazite.

41 J/7 Townships 144 and 150, Stanrock Mine, brannerite, uraninite, monazite, thucholite.

41 J/10 Township 150, Quirke Mine, Quirke Lake, brannerite, uraninite, monazite, uranothorite, thucholite.

41 N/2 Partial chemical analysis of vein pitchblende from calcareous reddish quartzite, Theano point, Algoma district, by H. Levine, PbO 5.25, UO_2 20.4, UO_3 43.2, R.E. oxides 0.53, CaO 13.24, SiO_2 2.60 (R.M. Berman, 1957: Am. Mineralogist, 42, p. 730).

What appears to have been the first Canadian discovery of uranium was recorded by the American geologist LeConte in 1847. He stated that he had found a mineral resembling pitchblende in a collection made by a Mr. Stenard on the north shore of Lake Superior, and he named it "coracite". The mineral was subsequently re-examined by Whitney (1849: J. Boston Soc. Nat. Hist., p. 36) and Genth (1857: Am. J. Sci., Ser. 2, p. 421) who stated they believed it to be pitchblende. Chemical analyses: by Whitney, UO_2 + UO_3 59.30, PbO 5.36, Fe_2O_3 2.24, Al_2O_3 0.90, CaO 14.44, SiO_2 4.35, CO_2 7.47, H_2O 4.64, total 98.70; S.G. 4.38; by Genth, UO_2 16.47, UO_3 46.21, PbO 7.39, Fe_2O_3 3.51, Al_2O_3 0.52, CaO 5.33, MgO 0.56, SiO_2 13.15, CO_2 + H_2O 6.14, total 99.28 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, pp. 78, 79).

41 N/7 Franz group north of Agawa Bay, pitchblende vein deposit.

41 N/7 Soo-Tomic Uranium Mines Limited at mouth of Baldhead River, pitchblende vein deposit.

41 N/7 Dolan group, north side of MacGregor Cove, also known as Beaver Rock group. Pitchblende vein deposit.

41 N/7 Jalore property, km 168 on Algoma Central Railway, pitchblende vein deposit.

41 N/7 Ranson occurrence, at lower dam on Montreal River, pitchblende vein deposit.

41 N/7 Ranwick property, Townships 28 and 29, Ranges 14 and 15, 2.4 km southeast of the mouth of the Montreal River. Pitchblende vein deposit. Roche group, north of Ranwick property.

41 N/7 Township 28, Range 14, Labine-McCarthy and Patrick Uranium Mines Limited properties, pitchblende vein deposits.

41 N/7 Township 28, Range 16, known as Barnes-Prior property, pitchblende vein deposit.

41 P/9 Cane Township, lot 2, conc. II, Caneonti Mines Limited, formerly Cane Silver Mines Limited, pitchblende vein deposit.

52 A/15 Christianson deposit, west side of Greenwich Lake, 48 km northeast of Port Arthur, pitchblende and uranophane.

52 B/12 Eric Nelson occurrence, 72 km west of Port Arthur, rock cut along the Trans-Canada Highway, uraninite in pegmatite.

52 E/16 A radioactive pegmatite is reported in MacNicol Township north of Hawk Lake village. The main showing is 240 m south of Highway 17 and 200 m east of the boundary between MacNicol and Jackman townships. Uraninite, euxenite, uranophane and beta-uranophane are present (A.P. Pryslak, 1976: Ont. Div. Mines, GR 130, p. 42).

52 F/13 MacNicol Township, Campbell Island Mines and Exploration Limited, Richard Lake about 51 km east of Kenora. Uraninite, uranothorite, beta-uranotile, allanite.

52 F/13 Tustin Township, Hawes property near Game Lake, uranophane and uraninite.

52 F/16 Cameron property, about 3.2 km east of the south end of Vermilion Lake, uraninite and monazite.

52 K/1 Vermilion Lake property, 2.4 km east of Vermilion Lake. Monazite and uraninite in pegmatite.

Quebec

21 L/12 Portneuf County, parishes of Deschambault and Portneuf. Range 2, Portneuf Molybdenum Corp., uraninite and uranothorite. Range 3, Gaudry-Caron property, uraninite, uranothorite, secondary minerals.

21 M/16 In 1893 or 1894 J. Obalski, Inspector of Mines for Quebec, collected a crystal of uraninite about 5 cm in diameter from a pegmatite dyke worked for muscovite on the north side of Lac Pied des Monts, about 29 km northeast of Murray Bay, Charlevoix County. A fragment weighing 4 1/2 grams was later sawn from the crystal and analyzed by Ellsworth: PbO 11.69, U_3O_8 86.16, ThO_2 0.10, Ce_2O_3 oxides 0.06, Y_2O_3 oxides 0.73, Fe_2O_3 + Al_2O_3 0.35, MnO 0.14, CaO 0.35, MgO 0.06, SiO_2 0.21, total 99.85; S.G. 8.958 (H.V. Ellsworth and F. Fitz-Osborne, 1934: Am. Mineralogist, 19, p. 421).

21 N/13 Callières Township: lots 4-7 (SW1/4), 8 (NW1/2), 20-24, range SWI; lots 1-9, 10 (SE1/2), range SWII, lots 1-3, range NEII; lots 1-10, range SWIII. Uraninite, allanite and fergusonite in pegmatite.

22 B/2 Mann Township, lots 1-3, range I, Cross Point, pitchblende vein deposit.

22 J/8 Letellier Township, 16 km northeast of Seven Islands, uraninite in pegmatite.

31 F/9 Black cubes of uraninite are scattered sporadically through metamorphic pyroxenite on the property of Quebec Metallurgical Industries Limited, lot 5, range XII, and lot 3, range XIII, Clarendon Township, Pontiac County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 24).

31 F/10
31 F/15 Grand Calumet Township

lots 30-33, range V; lots 27-34, ranges VI and VII; Calumet Uranium Mines Limited, uranothorite, monazite, thorite, uraninite-thorianite.

lots 11-12, range VIII; lots 9-12, range XI; Struan Uranium Mines Limited, uranothorite, uraninite, allanite.

31 F/16 Clapham Township: lots 38, 39, 42-49, range II; lot 46, range III; lot 28, range III; allanite, cyrtolite, uranothorite, uraninite in pegmatite.

31 F/16 Low Township: lot 22 (N1/2), range VIII; lots 19-24, 25 (N1/2), range IX; lots 30-31, range XI; D'Eldona Gold Mines Limited and Wilkie property, uraninite, allanite, uranothorite and zircon in pegmatite.

31 G/5 A small amount of uraninite has been found on the Payne property located along the slope below the east end of Champlain lookout, 18.3 km along the Gatineau Parkway from Gamelin boulevard (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 10).

31 G/8 Quebec Columbium Limited, Oka, Two Mountains County, uraninite, monazite, betafite, pyrochlore.

31 G/11 Uraninite has been found at the Pedneaud Quarry and the Back (Wallingford) Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 21, 24).

31 G/12 Wakefield Township, lots 24-25, range III, O'Leary-Malartic Mines Limited, uraninite and euxenite in pegmatite.

31 G/12 Uraninite crystals up to 1.2 cm in diameter occur at the contact between a zoned granite pegmatite and amphibolite on lot 26, range III, Wakefield Township, Gatineau County. Partial XRF analysis: U_3O_8 69.0, ThO_2 8.1, PbO 13.9; unit cell edge 5.44Å (S.C. Robinson and Ann P. Sabina, 1955: Am. Mineralogist, 40, p. 625).

31 G/13 The Villeneuve Mine, lot 31, range I, Villeneuve Township, is located on the east end of a low hill a short distance north of the main road from Notre-Dame-de-la-Salette, about 32 km north of Buckingham. In 1886, G.C. Hoffmann of the Geological Survey of Canada reported receipt of a specimen of uraninite weighing nearly 450 gm from this mine. Chemical analysis by W.F. Hillebrand (1891) gave: PbO 11.27, UO_2 34.67, UO_3 41.06, ThO_2 6.41, Ce_2O_3 group 1.51, Y_2O_3 group 2.57, Fe_2O_3 + Al_2O_3 0.10, CaO 0.39, SiO_2 0.19, H_2O 1.47, Bi_2O_3 0.09, total 99.73. Three distinct zones due to progressive alteration were analyzed by Ellsworth with the following results: Zone A, nearest the centre of the crystal and least altered, S.G. 9.144 steely black colour, PbO 11.43, UO_2 41.08, UO_3 34.98, ThO_2 6.40, Ce_2O_3 oxides 0.79, Y_2O_3 oxides 3.31, Fe_2O_3 + Al_2O_3 0.18, CaO 0.36, MgO 0.03, SiO_2 0.21, H_2O 1.70, total 99.47; Zone B, next stage of alteration, S.G. 7.779, colour pitch black, PbO 10.73, UO_2 9.49, UO_3 62.42, ThO_2 6.23, Ce_2O_3 oxides 0.68, Y_2O_3 oxides 2.97, Fe_2O_3 + Al_2O_3 0.13, CaO 0.42, MgO 0.02, SiO_2 0.34, H_2O 5.97, total 99.40; Zone C, "flame-scarlet" coloured substance, S.G. 5.273, PbO 14.93, UO_2 none, UO_3 60.36, ThO_2 7.66, Ce_2O_3 group 0.14, Y_2O_3 group 1.61, Fe_2O_3 + Al_2O_3 0.14, CaO 1.37, MgO

0.12, SiO_2 3.81, H_2O 9.42, total 99.56 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 272).

31 G/13 Portland Township, lots 29-32, range X; Villeneuve Township, lots 30, 35, 37 (S1/2) 38, range I, lots 30-35 (S1/2), range II, uraninite, fourmarierite.

31 J/5 A pegmatite sill containing uraninite and sphene occurs on the property of Opawica Explorers Limited, Kensington Township, Gatineau County (D.M. Sahw, 1958: Queb. Dept. Mines, Geol. Rept., 80, p. 42).

31 J/11 Near Lièvre River, 1.6 km from Mont Laurier, Arbic property, ellsworthite, allanite, uraninite and uranothorite in pegmatite.

31 J/12 Sicotte Township, lot 22-30, range I; lots 26-29, range II. Alta Mines and Nemrod Mining Company, uraninite, uranophane, uranothorite, allanite, zircon.

31 J/13 Uraninite and uranothorite occur in metamorphic pyroxenite on lots 29-31, range II, Baskatong Township, Gatineau County (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 19).

31 J/16 Maisonneuve Mine, Maisonneuve Township, lots 1-2, range II, euxenite, uraninite, samarskite and fergusonite in pegmatite.

31 K/8 Egan Township, lots 6-13, range III, Cobalt Consolidated Mining Corp. and Silanco Mining, uraninite in pegmatite; lot 1, range I, McSheffrey property, uraninite, zircon, uranothorite.

31 L/15 Atwater Township, Belleterre Quebec Mines Limited, 1.6 km southeast of Hunter's Point, Lake Kipawa, uraninite, uranophane, allanite.

31 O/6 Three pegmatite dykes containing uraninite and uranothorite have been trenched and drilled on the Scandia property in Joliette 60 Township near Mitchinamécus reservoir (H.W. Little, 1974: Geol. Surv. Can., Paper 74-1A, p. 53).

32 A/16 Specks of uraninite are contained in calcite near pegmatite dykes at the Les Calcites du Nord Quarry north of Dolbeau (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 111).

32 G/15 Levy Township, Chibougamau area, Opemiska Mine. Uraninite or pitchblende in veins.

Saskatchewan

64 D/8 Alda claims, Dumont Lake, uraninite in pegmatite.

64 D/9 WS claims of Columbia Metals Exploration Limited at Bleasdell Lake, uraninite, kasolite, uranophane.

64 L/4 Massive pitchblende is the principal ore mineral at the Rabbit Lake deposit at 58°11'00"N, 103°42'36"W, west of Wollaston Lake. Electron microprobe analysis: UO_2 85.1, PbO 11.7, SiO_2 0.1, TiO_2 0.3, FeO 0.1, CaO 1.3, total 98.6 (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1B, p. 235).

73 P/1 Hub claim of Northern Uranium Limited at the north end of Hunter Bay, Lac la Ronge, uraninite, monazite, allanite.

73 P/1 Nunn Lake, uraninite and monazite in pegmatite, near Hunter Bay, Lac la Ronge.

73 P/1 Uraninite crystals up to 3 cm in diameter have been found at the Lee (Jahala) Lake pegmatite deposit at 55°12'N, 104°17'W on the side of a hill facing the northeastern end of Lee Lake (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 10).

73 P/8 Uraninite occurs in pegmatite at the La Ronge Mine at 55°29'N, 104°28'W, near the corner of Nistowiak Lake, 6.4 km east of Stanley (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 12).

74 A/11 Uraninite and davidite on Baska Uranium Mines Limited claims 1-63, Foster Lakes area.

74 A/11 Bur-Hub-Rub claims of Ad Astra Minerals Limited, Foster Lake area, uraninite and pitchblende.

74 A/11 Eldorado claims, Middle Foster Lake area, pitchblende.

74 A/11 Pro claims, Eldorado, Foster Lakes area, uraninite in pegmatite.

74 B/6 Blackstone Lake, Kara claims, uraninite in pegmatite.

74 K/6 Pitchblende is the main uranium mineral at the D uranium deposit east of the northern tip of Cluff Lake (V. Ruzicka, 1975: Geol. Surv. Can., Paper 75-1C, p. 279).

74 N/6 St. Joseph Point, Lake Athabasca, pitchblende and secondary minerals on the Pitch-Blende-Hope and Point claims.

74 N/7
74 N/8
74 N/9
74 N/10 Pitchblende deposits of the Beaverlodge (Goldfields) area, north shore of Lake Athabasca are as follows:

AA concession of Clix Athabasca Uranium Mines Limited on a peninsula east of Black Bay.

ABC Mine, Nesbitt-LaBine, at the northwest corner of Beaverlodge Lake.

Ace Mine, Eldorado, south of Ace Lake.

AL group, Norancon Exploration at the west shore of Felix Bay, Lake Athabasca, 18 km east of Goldfields.

Alco group (Lorado Mine) at the southwest end of Beaverlodge Lake.

Amax Athabasca claims northeast of Black Bay.

Arco-Gulch claims, Black Bay.

Axe group, between Martin and Cinch Lakes.

Azor claims (Cayzor Mine) on the east shore of Jean Lake, 2.8 km northwest of Uranium City.

Bar claims, Beaverlodge Uranium Mines, Mickey Lake.

Baska claims, Fish Lake and Raggs Lake.

Bat claims, Prince Lake.

Bay claims, Black Bay.

Bev claims of Larum Mines Limited on Crackingstone Peninsula.

Bob claims, Cameron Island, Lake Athabasca

Bolger deposit, Eldorado, northeast of the Ace-Verna Mine.

Boom claims, Goldfields Uranium Mines Limited

Box Mine, Consolidate Mining and Smelting, former gold mine.

Cab, Paul, Mike, Tom and Jim groups, between Eagle and Donaldson Lakes.

Car group, Black Bay.

CC concessions, Aurora Yellowknife Mines, northeast of Black Bay between Martin and Freddy Lakes.

Chum group, 8 km northwest of Martin Lake.

Dette property, Fredette Lake.

Di claims of Baska Uranium Mines on Crackingstone peninsula.

Dick claims, Crackingstone Point.

Dill claims of Detta Minerals, Fredette Lake.

Don group, Mitchell Island, Lake Athabasca

Eagle group, Eldorado, north of Beaverlodge Lake between Melville Lake and Eagle Lake.

Gunnar Mine (Ed-Bon claims) at the south shore of Crackingstone peninsula.

Ed-Tom claims of Basalt Bay Mines at the southwest end of Mickey Lake to the west end of Raggs Lake.

Fish-hook Bay group, Eldorado, at Fish Hook Bay of Lake Athabasca about 4.8 km east of Goldfields.

Fold claims of New Hosco Mines at Fold Lake.

Fox claims of St. Michael Uranium Mines, Crackingstone Peninsula.

Gal property, Camdeck Mines Limited, Mickey Lake.

GC group, Crackingstone Point

Gil claims, Eldorado, along the shore of Lodge Bay, Lake Athabasca.

Gretta group (Black Bay Mine) near the south shore of Murmac Bay, Beaverlodge Lake.

Hab group, Eldorado, 1.6 km north of Donaldson Lake, pitchblende and thucholite.

Ham claims, Iso Uranium Mines Limited, Crackingstone Point, Lake Athabasca.

Hap 1-9 claims, Milliken Lake.

Holm group, Goldfields Uranium Mines Limited, Alces Lake.

HU-HP group of Oldman River Uranium Mines Limited, Oldman River, uraninite and soddyite.

HW group of 9 claims immediately west of the Eagle claims, North of Beaverlodge Lake.

IO claims on Stewart Island, Lake Athabasca.

Jag claims of Parbec Mines Limited, St. Mary's Channel.

Jam group, Cinch Lake Uranium Mines Limited, west of Martin Lake.

Jam-Mag claims of Nesbitt-Labine Uranium Mines Limited, between Eagle Lake and Ace Lake.

Jim-Gal property, Camdeck Mines Limited, Mickey Lake.

JO claims, Milliken Lake.

Kix claims, Lodge Bay.

LB claims, Virgin Lake.

L and B claims, MacIntosh Bay, Lake Athabasca.

Lac-Mac-Doc group, Murmac Bay, Beaverlodge Lake.

Lor property, also known as the Viking Lake deposit of Lorado Uranium Mines Limited, pegmatitic and vein types, uraninite, monazite, pitchblende, uranothorite, pyrochlore, cyrtolite.

Mar claims, St. Mary's Channel, Lake Athabasca.

Martin Lake Mine, east side of Martin Lake.

Mic Lake property, Eldorado.

Mick claims of Nesbitt-Labine Uranium Mines Limited on Crackingstone Point and at St. Mary's Channel, Lake Athabasca.

Mor property, Gateway Uranium Mines Limited, Nero Lake.

Nagus (Dello) group, Reed Bay, Lake Athabasca.

Net-Ver-Vic-Wil claims of Goldfields Uranium Mines Limited at Fredette Lake.

Nicholson Mine on the north side of Lake Athabasca, 3.2 km east of Goldfields. Pitchblende, thucholite, liebigite, zippeite, cuprosklodowskite.

NW-GC-LEE group, southeast of Ace Lake.

Orb group claims at Augier Lake and at Orbit Bay, Lake Athabasca.

Pat group (National Exploration Mine) 19.3 km northeast of Uranium City and 4.8 km northeast of the Eldorado camp, near Donaldson Lake.

Pitch group of Canroc Oils Limited at Max Lake.

Pitchco claims near Guest Lake.

Pitche group at the southwest corner of Beaverlodge Lake.

Pitch-Ore group at the west side of Beaverlodge Lake, south of the RA group which includes the Martin Lake mine.

Ran group at Martin Lake.

Raz claims of St. Michael Uranium Mines Limited, 3.2 km west of Uranium City.

Reno claims at Donaldson Lake.

Rix Mine, about 10 km by road from Uranium City and about 11 km north of Bushell.

RL group, Felix Bay, Lake Athabasca.

Ron claims at Gatzke (Nesbitt) Lake, in part pegmatitic with uraninite, thorite and monazite.

Strike claims, north of Ace Lake.

Sure claims at Gatzke Lake, uraninite.

Tena group near Goldfields.

Tot claims near Elder Lake.

Ura group at the north end of Beaverlodge Lake, includes the main Eldorado camp.

Van property, Cornwall Bay, Lake Athabasca.

White Dog property near Moose Island, Lake Athabasca.

YBY claims on Crackingstone Point.

YK claims at the north end of Milliken Lake.

74 N/14
74 N/15 The following occurrences have been reported in the vicinity of Tazin Lake.

Andy claims, Laird Island.

B Claims, Dewdney Island.

Jos claims, Laird Island, in part pegmatitic with uraninite and monazite.

Laird-Dew claims, Laird Island.

Lux claims, Laird Island.

MH claims, Laird Island, in part pegmatitic with uraninite and allanite.

Mike claims, Laird Island.

Nap-Hy-Bunny claims Laird Island.

OJ claims, Soulier Lake.

Voy claims, Laird Island.

74 O/5 Pitchblende occurs on several claims in the Beaver River area about 11 km east of Goldfields at about 59°24'N, 107°45'W.

74 O/7 Pitchblende has been found on the FKR claims at Sucker Bay and the JN claims at Grease Bay, at the east end of Lake Athabasca.

74 O/12 An occurrence of pitchblende is reported at Neiman lake, about 40 km northeast of Goldfields.

74 P/3 Nisto-Tobey claims at the west side of Black Lake, pitchblende.

74 P/5 Butch group near the mouth of the Carp River, 6.4 km east of Stony Rapids, pitchblende.

74 P/7 Bell, Corrigan, Row-Mike claims at Charlebois Lake. Uraninite and thorianite.

Yukon

106 C/14
106 E/1
106 E/2 The following occurrences of pitchblende have been reported in the Wernecke Mountains:
(1) at 1750 m elevation, 64°57'15"N, 133°17'57"W, disseminated and in veins in breccias and stratiform rocks.
(2) at 1190 m elevation, 65°08'25"N, 134°24'00"W, disseminated and in veins in breccia and stratiform rocks.
(3) at 1200 m elevation, 65°02'30"N, 134°38'20"W, disseminated and in veins in breccia.

(R.T. Bell and G.D. Delaney, 1977: Geol. Surv. Can., Paper 77-1A, p. 33)

URANOPHANE AND BETA-URANOPHANE

$CaO.2UO_3.2SiO_2.6H_2O$

Uranophane and beta-uranophane are dimorphous minerals which are similar in appearance but may be distinguished optically and by their X-ray powder patterns. Uranophane is probably the most commonly occurring uranium silicate mineral.

British Columbia

82 E/1 A bright yellow stain on pegmatitic rocks containing uraninite has been identified as uranophane. The showing is a 1174 m elevation on the crest of the ridge between Toronto Creek and Snowball Creek, 49°07.4'N, 118°23.4'W, 4 km east of Granby River and 10.5 km north-northwest of Grand Forks (B.C. Dept. Mines and Pet. Res.; Geol. Exp. and Mining in B.C., 1970, p. 432).

Northwest Territories

86 L/1 Uranophane is reported to occur as an oxidation product of pitchblende at Great Bear Lake (C. Palache and H. Berman, 1933: Am. Mineralogist, 18, p. 20).

Ontario

31 C/11 Beta-uranophane has been identified in pegmatite on lot 18, conc. III, Kennebeck Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, p. 265).

31 D/16 Uranophane has been identified by X-ray diffraction in specimens from Canada Radium Mines Limited, lots 8-11, concs. XII and XIII, Cardiff Township; and beta-uranophane from Blue Rock Cerium Mines Limited, lots 18-20, concs. V and VI, Monmouth Township, both in Haliburton County (X-ray Laboratory, Geol. Surv. Can.).

31 D/16 Specimens of uranophane in the mineral collection at the Royal Ontario Museum were collected from the Dyno Mine, lot 12, conc. VIII, Cardiff Township, and the Cavendish Mine, lot 14, conc. VII, Cavendish Township (J. Satterly, 1977: Ont. Geol. Surv., MP 70, p. 420).

31 D/16 Uranophane and kasolite occur in marble exposed in an open-cut on a ridge which parallels the Gibson Road at Tory Hill. The showing is north of McCue Lake 1.1 km by road west of the junction of Gibson Road and Highway 121. Thorite and uraninite are present (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 254).

31 D/16 Uranophane is reported at the East pegmatite showing of Saranac Uranium Mines Limited on lots 23-24, conc. IV, Monmouth Township. It has also been noted at the Crystal Lake property of Silver Crater Mines, on lots 23-25, conc. X, Galway Township (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept. 65, Pt. 6, pp. 103, 173).

31 E/1 A specimen of uranophane from the Richardson (Fission) Mine, lot 5, conc. XXI, Cardiff Township, is included in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 420).

31 F/4 Uranophane and beta-uranophane are found in fresh granitic rock underground at Faraday Uranium Mines Limited, conc. XI, lots 16 and 17, Faraday Township, Hastings County. They were

identified by the X-ray Laboratory, Geol. Surv. Can., Crystals of beta-uranophane suitable for single X-ray study have also been found at Faraday (D.H. Gorman and E.W. Nuffield, 1955: Am. Mineralogist, 40, p. 640).

31 F/4 Beta-uranophane has been identified at a property explored by Bonville Gold Mines Limited on lot 22, conc. A, Faraday Township. Uranophane has been noted at the Baumhaur-Campbell property of Silver Crater Mines in Faraday Township, lot 29, conc. XV (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept. 65, pt. 6, pp. 108-133).

41 H/8 Uranophane was found with uraninite at the Ascot occurrence, lot 12, conc. A, McDougall Township. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly 1977: Ont. Geol. surv., MP70, p. 420).

41 H/15 Uranophane has been reported in the Besner pegmatite, lot 5, conc. B, Henvey Twonship, Parry Sound district (H.S. Spence, 1930: Am. Mineralogist, 15, p. 474).

41 N/2 Uranophane and beta-uranophane occur as fibrous crusts and aggregates associated with uraninite, at Theano Point on Lake Superior (C. Frondel, 1956: Am. Mineralogist, 41, p. 557).

52 A/10 Pitchblende and uranophane occur on the Christianson property on the west shore of Greenwich Lake, about 48 km northeast of Port Arthur (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 262).

52 E/16 Uranophane and beta-uranophane have been identified as secondary minerals in a pegmatite in the southwest corner of MacNicol Township. Uraninite and euxenite are the primary uranium minerals. The main showing is 240 m south of Highway 17 and 200 m east of the MacNicol-Jackman Townships boundary (A.P. Pryslak, 1976: Ont. Div. Mines, GR 130, p. 42).

52 F/13 Scaly beta-uranophane which fluoresces bright green occurs in MacNicol Township, Kenora district (D.H. Gorman and E.W. Nuffield, 1955: Am. Mineralogist, 40, p. 640).

52 F/13 The secondary minerals uranophane, beta-uranophane and kasolite have been found in pegmatite exposed to the west and north of Richard Lake in MacNicol Township. Uraninite, monazite, uranothorite and allanite have also been identified (A.P. Pryslak, 1976: Ont. Div. Mines, GR 130, p. 43).

Quebec

21 L/12
21 L/13 Uranophane is widespread as a yellow-green coating on joints and schistosity planes on the Goudry property, range III, lot 33, Portneuf Seigneury (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 48).

24 L/8 The uranium minerals uranophane and boltwoodite have been identified in pebbly arkose on mining concessions explored by Imperial Oil Limited in the Bérard Lake area, west of Fort Chimo (H.W. Little, 1974: Geol. Surv. Can., Paper 74-1A, p. 53).

31 F/15 Yellow uranophane is reported to be present in a pink calcite rock at Huddersfield Uranium Mines Limited, Huddersfield Township, Pontiac County. It is also found in the scapolite-diopside rocks at Yates Uranium Mines, lot 20, range IV, Huddersfield Township (D.M. Shaw, 1959: Que. Dept. Mines, Geol. Rept., 80, pp. 36, 40).

31 G/13 Uranophane is found associated with gummite, uraninite, tourmaline, apatite, and spessartite in a coarse pegmatite vein which traverses grey garnet gneiss in range I, lots 31, 32, Villeneuve Township, Papineau County (G.C. Hoffmann: Geol. Surv. Can., Ann. Rept., XII, p. 16R).

31 J/12 Minute needles of secondary uranophane occur on the Kelly property, range I, lot 57, Egan Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 26).

31 L/15 Uranophane occurs with uraninite and allanite in the Lake Kipawa area 1.6 km southeast of Hunter's Point, Atwater Township (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., p. 284).

Saskatchewan

64 D/9 Uranophane and kasolite have been identified with uraninite in pegmatite near Bleasdell Lake, east of Reindeer Lake (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed., p. 317).

64 L/4 Uranophane is abundant in weathered zones at the Rabbit Lake uranium deposit at 58°11'00"N, 103°42'36"W, west of Wollaston Lake (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1B, p. 235).

74 N/7 Uranophane is the principal supergene mineral, with some barite and gypsum on the property of Gunnar Mines Limited, on the south shore of Crackingstone Point, about 24 km southwest of Uranium City (J.A. Fraser and S.C. Robinson, 1954: Can. Mining J., 75, Pt. 2, pp. 59-62).

74 N/7 Uranophane, fourmarierite and pitchblende have been identified at the Dick claims of Big Jackpot Mines Limited on Crackingstone Point (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser., 16, 2nd ed. p. 299).

74 N/8 Uranophane occurs as clusters of tiny radiating yellow to greenish yellow needles lining crevices, and a yellow colloform crust filling cracks at the Nicholson Mine, on Lake Athabasca (D.D. Hogarth, 1951: Am. Mineralogist, 36, p. 412).

URANOPILITE

$$(UO_2)_6(SO_4)(OH)_{10}.12H_2O$$

Northwest Territories

86 D
86 L Uranopilite has been identified as an alteration product of pitchblende from the Hottah Lake district and the Great Bear Lake deposit (C. Frondel, 1958: U.S.G.S., Bull. 1064, p. 139).

Saskatchewan

74 N A bright yellow mineral coating pitchblende from the Goldfields area was identified as uranopilite on the basis of optical properties and X-ray diffraction pattern (R.J. Traill, 1952: Am. Mineralogist, 37, p. 403).

URANOSPINITE

$$Ca(UO_2)_2(AsO_4)_2.10H_2O$$

New Brunswick

21 G/11 Uranospinite occurs as small grains and crystals in kaolin-fluorite masses at a uranium prospect

on the east bank of the river southwest of the woolen mill at York Mills (G.A. Gross, 1957: Geol. Surv. Can., Paper 57-2, p. 15).

uranothorite

(see THORITE)

UVAROVITE

$Ca_3Cr_2(SiO_4)_3$

Uvarovite, the calcium-chromium garnet, is probably the rarest of the garnet species. The name has been loosely applied to chromian garnet, especially chromian grossular, and the Canadian minerals noted below are probably that species rather than uvarovite.

Quebec

21 L/3 Tiny euhedral bright green uvarovite crystals occur with chromian diopside in vugs in massive white diopside at the Normandie Mine, 4.8 km southwest of Black Lake village. Chemical analyses by T.H. Donnelly: SiO_2 35.0, Al_2O_3 8.76, Fe_2O_3 + FeO 5.26, MgO 0.77, CaO 37.50, Cr_2O_3 10.20, TiO_2 0.09 total 97.58. S.G. 3.79; a_0=11.855Å (P.L.C. Grubb, 1965: Can. Mineralogist, 8, p. 241-8).

22 B/5 Bright green uvarovite is found with chromite on lot 11, range IV, Awantijish Township, Matapedia County (E. Aubert de la Rue, 1941: Que. Dept. Mines, Geol. Rept., 9, p. 25).

31 G/12 Chemical analysis of uvarovite from lot 29, range IV, Wakefield Township, Gatineau County: SiO_2 37.50, Al_2O_3 18.65, Fe_2O_3 1.07, Cr_2O_3 4.95, CaO 36.13, MgO 0.52, loss on ignition 0.48, total 99.30; S.G. 3.542 (B.J. Harrington, 1881: Can. Nat., Ser. 2, IX, p. 305).

31 H/8 Granular masses and disseminated grains of beautiful green uvarovite occur on lot 6, range XII, Orford Township, Sherbrooke County. Chemical analysis by Hunt: SiO_2 36.65, Al_2O_3 17.50, FeO 4.97, Cr_2O_3 6.20, CaO 33.20, MgO 0.81, loss on ignition 0.30, total 99.63 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 497).

VALENTINITE

Sb_2O_3

Valentinite occurs as a secondary mineral resulting from the oxidation of stibnite, native antimony, kermesite, tetrahedrite and other antimony minerals. It is found as paramorphs after senarmontite, and is said to alter to native antimony.

New Brunswick

21 G/14 The secondary minerals, valentinite, kermesite and bindheimite occur with primary antimony and stibnite and an old antimony mine at Lake George (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 130).

Newfoundland

2 E/10 Valentinite and stibiconite have been identified on specimens from a deposit worked for antimony on the steep side of a hill at the south shore of Frost (Cross) Cove on the west side of Moreton's Harbour, New World Island, Notre Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., paper 75-36, p. 97).

Nova Scotia

11 E/4 A deposit near West Gore was worked for antimony beginning in 1883 and for gold about 20 years later. Valentinite and kermesite occur as coatings on and close to native antimony and stibnite (Ann P. Sabina, 1964: Geol. Surv. Can., Paper 64-10, p. 59).

Ontario

42 B/1 Valentinite and romeite form coatings and stains on antimony minerals at a deposit explored by Card Lake Copper Mines Limited in Sewell Township at about 48°12'N, 82°00.5'W. The occurrence is 6.7 km by road south of Highway 101 from a junction 19.3 km west of Little Star Lake road (Ann P. Sabina, 1974: Geol. Surv. Can., paper 73-13, p. 154).

Quebec

21 E/13 Valentinite is found with native antimony, stibnite, senarmontite, and kermesite in veins in argillite on conc. I, lot 56, South Ham Township, Wolfe County (R.W. Ells, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 80K).

VALLERIITE

$4(Fe,Cu)S.3(Mg,Al)(OH)_2$

Valleriite is a massive metallic mineral resembling pyrrhotite in colour, and graphite in physical properties. In polished section, it is cream white in colour and is strongly anisotropic. It occurs in high-temperature copper deposits.

Northwest Territories

86 J Valleriite and mackinawite have been identified in parts of the central layered series of the Muskox intrusion, Coppermine River area. The valleriite occurs in serpentine, where it may replace secondary magnetite, and less commonly, in contact with mackinawite and pentlandite (J.A. Chamberlain and R.N. Delabio, 1965: Am. Mineralogist, 50, p. 682).

Ontario

41 I/6 Valleriite is a very minor constituent of the Sudbury ores but it is not uncommon in copper-rich materials. Reflection pleochroism and double refraction are very strong. It occurs frequently, as long spindles less than 0.01 millimetre wide which in some cases are clearly aligned by the crystal structure of the enclosing chalcopyrite (J.E. Hawley and R.L. Stanton, 1962: Can. Mineralogist, 7, p. 85).

Quebec

32 D/8 Valleriite has been reported to occur at the Marbridge Mine, a former nickel producer in LaMotte Township about 8 km by road west of LaMotte (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

Yukon

105 D/11 In the Arctic Chief and Little Chief areas of the Whitehorse Copper Belt, the ore minerals are reported to be chalcopyrite, bornite, chalcocite

and valleriite, with minor native copper. D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 110).

VANDENDRIESSCHEITE

Hydrated oxide of Pb and U

Northwest Territories

86 L/1 Vandendriesscheite was originally described as 'mineral X' from Great Bear Lake, where it occurs as minute crystals associated with fourmarierite on altered pitchblende (C. Frondel, 1958: U.S.G.S., Bull. 1064, p. 86).

VEENITE

$2PbS.(Sb,As)_2S_3$

Ontario

31 C/6 Veenite, the antimony analogue of dufrenoysite, is the most abundant of the eight new minerals found in a small prospect pit on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed Taylor of Madoc. Electron probe microanalysis (average of 3 grains) by G.R. Lachance: Pb 52.5, Sb 19.7, As 6.8, S 21.2, total 100.2. Chemical analyses (Sb by diffraction) by S. Abbey: Pb 50.3, 50.4; Sb 21.2, 20.5; As 7.6, 8.4; S 20.0, 20.3; $CaCO_3$ 0.9, 0.4; total 100.0 (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 7-24).

VERMICULITE

$(Mg,Fe,Al)_{6-7}(Si,Al)_8O_{20}(OH)_4.8H_2O$

Vermiculite is a hydrous mica-like mineral whose commercial importance is due to its property of rapid expansion or exfoliation when heated to high temperatures. The expanded product is valued for insulation and as a lightweight aggregate.

British Columbia

83 D/6 Vermiculite admixed with biotite occurs in crystalline limestone interbanded with gneiss at the Verity property near Blue River in the Kamloops mining division (J.W. McCammon, 1950: British Columbia, Minister of Mines Rept., A229-230).

Ontario

31 C/7 Light tan to silvery vermiculite is present on lot 1, conc. XI, Loughborough Township, Frontenac County. The showing is on the open slope of a southerly facing hillside, some 60 m east of the road and 2.1 km north of the Village of Holleford (J.W. Hoadley, 1960: Geol. Surv. Can., Econ. Geol. Ser., 19, p. 99).

31 C/16 Vermiculite admixed with phlogopite has been exploited commercially in the Stanleyville area. The product varies in colour from light silver tan through several shades of brown to almost black. The main showings are located on the north half of lot 17, conc. VIII, and on lot 14, conc. IX, North Burgess Township, Lanark County (J.W. Hoadley, 1960: Geol. Surv. Can., Econ. Geol. Ser., 19, p. 96).

31 D/9 A band of crystalline limestone carrying vermiculite is exposed near Mississagua Lake on lots 13, 14, conc. II, Cavendish Township, Peterborough County (J.W. Hoadley, 1960: Geol. Surv. Can., Econ. Geol. Ser., 19, p. 98).

41 I/12 An occurrence of vermiculite in carbonate rock cut by metadiorite dikes is reported about 1.6 km north of the north end of Macauley Lake in the northeast part of Venturi Township. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 423).

Quebec

31 G/13 A discovery of vermiculite-rich soil in the hills northwest of Rodgers Lake in Range A, Low Township, Gatineau County, has been explored by Venosta Minerals Limited (Brochure issued by Venosta Minerals Limited).

VESIGNIEITE

$Cu_3Ba(VO_4)_2(OH)_2$

Prince Edward Island

21 I/16 Sparse yellowish grains of vesigniéite were identified in sandstone near its contact with mudstone in drill core at a depth of 30.3 m in a well drilled near the village of Kelly Cross (V.K. Prest, H.R. Steacy and T.J. Bottrill, 1969: Geol. Surv. Can., Paper 68-74, p. 9).

VESUVIANITE

$Ca_{10}(Mg,Fe)_2Al_4Si_9O_{34}(OH)_4$

Vesuvianite, also known as idocrase, is a contact metamorphic mineral found in impure limestone. It is commonly associated with calcite, wollastonite and grossular.

British Columbia

82 M/11 Beryllian vesuvianite has been found at two localities about 2.4 km north of Bischoff Lakes. It occurs in skarns with garnet and epidote. The locality is at 51°36'N, 119°02'W, in the Adams Lake area (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept. 23, p. 59).

92 F/10 Fine specimens have been found at Marble Bay, Texada Island (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 233)

92 I/4 Vesuvianite occurs on the Green Gold jade claims at the head of Kwoiek Creek on Antimony Mountain, Kamloops district (1958: Canadian Rockhound, vol. 2, No. 2).

Brown and green, opaque to translucent vesuvianite occurs as a fine-grained aggregate 3.2 km southwest of Skihist Mountain in the Ashcroft area (S. Duffell and K.C. McTaggart, 1952: Geol. Surv. Can., Mem. 262, p. 114).

104 O/7 Beryllium-bearing vesuvianite occurs in a skarn zone at 59°18'N, 130°31'W, in a pass 1.6 km north of Ash Mountain. It is associated with a small amount of scheelite (R. Mulligan, 1968: Geol. Surv. Can., Econ. Geol. Rept. 23, p. 56).

New Brunswick

21 G/2 Massive green idocrase is found at Charley Cove on Frye Island, Charlotte County (E. Coste, 1887: Geol. Surv. Can., Ann. Rept., III, p. 76S).

Northwest Territories

85 I/10 A small quantity of crystal groups of vesuvianite up to 12 x 12 x 8 cm and single crystals up to 2.5 cm in length, chocolate brown with a greenish tint, stout prismatic in habit,

occur in Precambrian sediments near a granite contact at Turnback Lake, 64 km north of Great Slave Lake.

Chemical analysis by V.B. Meen: SiO_2 36.68, TiO_2 0.81, Al_2O_3 15.62, BeO 1.07, Fe_2O_3 2.81, FeO 2.96, MgO 1.39, MnO 0.46, CaO 35.88, Na_2O 0.10, K_2O 0.03, H_2O^+ 0.84, H_2O^- 0.04, F_2 2.03, O for F_2 0.85, total 99.87 (V.B. Meen, 1939: Univ. Toronto Stud., Geol. Ser., 42, p. 69).

95 E/13
105 H/16 Vesuvianite is a prominent constituent of the pyroxene-garnet skarn that hosts the M.B. prospect and Canada Tungsten Mine. The Canada Tungsten Mine is on the southwest side of the Flat River valley at 61°58'N, 128°15'W; the M.B. showing is 29 km southeast of the Canada Tungsten Mine on the northeast side of the Flat River (S.L. Blusson, 1968: Geol. Surv. Can., Paper 67-22, p. 28-35).

Ontario

31 C/10 Dark brown vesuvianite is reported from the Kingston (Bedford) mica mine located about 3.2 km east of Highway 38 and about 800 m southeast of the Godfrey-Westport Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 14).

31 C/10 A specimen of vesuvianite from the Long Lake Zinc Mine, lot 3, conc. V, Olden Township is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 424).

31 C/12 A specimen of vesuvianite in the mineral collection at the Royal Ontario Museum was obtained from the W.F. Bonter quarry, lots 16-17, conc. XI, near Malone, Marmona Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 424).

31 F/4 Tabular crystals of vesuvianite with a maximum thickness of 8 millimetres and a width of 20 millimetres are associated with a pyroxenitic band, immediately below a layer of pink sodalite near Bancroft in Dungannon Township, Hastings County. Chemical analysis by H.C. Rickaby gave: SiO_2 35.76, TiO_2 4.11, Al_2O_3 17.56, Fe_2O_3 2.64, FeO 2.05, CaO 34.34, MgO 1.50, MnO 0.13, Na_2O 0.89, K_2O 0.45, H_2O 0.58, F 0.47, total 100.48, S.G. 3.337 (T.L. Walker and A.L. Parsons, 1925: Univ. Toronto Stud., Geo. Ser., 20, p. 9.

31 F/4 Electron microprobe analysis of vesuvianite from the Davis pegmatite in Dungannon Township, lot 9, conc. XIV: SiO_2 36.4, Al_2O_3 14.1, TiO_2 4.59, Fe_2O_3 5.54, MnO_2 0.26, MgO 0.81, CaO 33.6, Na_2O 1.17, H_2O 2.38, total 99.6 (J.C. Rucklidge, V. Kocman, S.H. Whitlow and E.J. Gabe, 1975: Can. Mineralogist, 13, p. 15).

31 F/4 Vesuvianite specimens from Dungannon Township in the mineral collection at the Royal Ontario Museum include: lot 11, conc. XI; and York River, lot 12, conc. XI (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 424).

41 I/4 A specimen of vesuvianite with associated scheelite in the mineral collection at the Royal Ontario Museum is from Leonard Lake, lot 8, conc. III, Foster Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 424).

Quebec

21 E/13 Transparent vesuvianite, pink garnet, grass-green diopside, white to greenish white prehnite and white wollastonite occur at the Jeffrey Mine, Asbestos, at the contact of periodotite with granitic rock (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 26).

Electron microprobe analyses of vesuvianites from the Jeffrey Mine: (1) green; SiO_2 36.00, TiO_2 0.06, Al_2O_3 17.78, Cr_2O_3 0.00, FeO 0.86, MnO 0.57, MgO 2.46, CaO 36.58, H_2O 2.69, total 97.00; (2) brown; SiO_2 37.90, Al_2O_3 17.56, FeO 3.24, MnO 0.06, MgO 1.62, CaO 35.96, H_2O 1.87, total 98.21. The mine is at 45°46'25"N, 71°57'12"W, lot 9-10, range II-III, Shipton Township, Richmond County (J.D. Grice and R. Williams, 1979: Mineralogical Record, 10, p. 69).

21 L/3 Several varieties of vesuvianite have been described from the Montreal Chrome pit, lot 25, range II, Coleraine Township, Megantic County. Pale yellow crystals of vesuvianite are found with colourless diopside near the walls of dykes cutting serpentine and massive chromite. Chemical analysis by Graham: SiO_2 36.62, Al_2O_3 15.96, Fe_2O_3 4.30, FeO 0.54, MgO 1.25, CaO 38.66, H_2O^+ 3.11, H_2O^- 0.07, MnO tr., total 100.51. Vesuvianite also forms compact fine-grained crystalline masses having a deep lilac tint. The colour fades after exposure to light. Chemical analysis by Graham: SiO_2 36.88, Al_2O_3 20.03, Fe_2O_3 0.85, MgO 2.17, CaO 37.61, MnO 0.23, H_2O^+ 3.06, H_2O^- 0.03, total 100.86; S.G. 3.32. Brilliant emerald green crystals of vesuvianite have also been found associated with white, compact diopside (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Museum Bull., 27, p. 60).

21 L/3 Clove brown and reddish brown crystals of vesuvianite occur at the Southwark and Caribou Chrome pits (range B, lot 28, east half; and Block B; Coleraine Township) (E. Poitevin and R.P.D. Graham, 1918: Geol. Surv. Can., Museum Bull., 27, p. 57). Chemical analysis of vesuvianite from the Southwark pit, by R.J.C. Fabry: SiO_2 36.69, Al_2O_3 18.95, Fe_2O_3 1.76, FeO 1.89, MgO 2.97, CaO 36.61, Na_2O 0.17, K_2O 0.12, TiO_2 0.25, MnO 0.36, F 1.25, H_2O 0.37, total 101.39, less O for F 0.53, total 100.86 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 342).

21 L/3 Vesuvianite occurs as compact masses of pale yellow colour at the American Chrome pit, range IV, lot 25, Coleraine Township. Chemical analysis by R.J.C. Fabry: SiO_2 36.96, Al_2O_3 18.05, Fe_2O_3 2.24, FeO 0.97, MgO 2.10, CaO 36.76, Na_2O 0.19, K_2O 0.13, TiO_2 0.18, MnO 0.13, H_2O 0.39, CO_2 0.10, F 2.61, total 100.81, less O for F 1.10, total 99.71 (J.A. Maxwell et al., 1965: Geol. Surv. Can., Bull. 115, p. 343).

21 L/3 Vesuvianite occurs in masses and minute crystals of bright pink colour at the Montreal Chromite pit at Black Lake in Megantic County. Chemical analysis gave: SiO_2 36.77, Al_2O_3 20.05, CaO 37.47, FeO 0.65, MnO 0.20, MgO 2.69, Na_2O 2.88, K_2O 0.21, total 100.92 (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 233).

31 F/9 Hard, prismatic, brown vesuvianite is found in a metamorphic pyroxenite consisting chiefly of diopside with some pink calcite at the Quebec Metallurgical Industries property, range XII, lot 5, and range XIII, lot 3, in Clarendon Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 24).

31 F/10 Good specimens of vesuvianite have been found with tourmaline at Calumet Falls, Litchfield

Township, Pontiac County (G.C. Hoffmann 1888-89: Geol. Surv. Can., Ann. Rept. IV. p. 64T).

31 G/5 Vesuvianite occurs at the Headley Mine north of Aylmer (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 13).

31 G/10 Vesuvianite occurs as yellow crystals with garnet, pyroxene and zircon in calcite, in Grenville Township, Argenteuil County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 64T).

31 G/12 Idocrase from range XII, lot 16, in Templeton Township, Papineau County, was donated to the National Mineral Collection by C.W. Willimott (1894).

31 G/12 Vesuvianite occurs as small green prisms at lot 1, range XIV, Wakefield Township, Gatineau County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 64T).

31 G/12 Vesuvianite occurs in quartzose rock at range XII, lot 16, 17, in Templeton Township, Papineau County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 64T).

31 G/12 Electron microprobe analysis of vesuvianite from Wakefield, National Mineral Collection No. 4-555: SiO_2 37.0, Al_2O_3 17.0, TiO_2 0.95, Fe_2O_3 4.05, MgO 1.79, CaO 37.5, H_2O 2.46, total 100.8 (J.C. Rucklidge, V. Kocman, S.H. Whitlow and E.J. Gabe, 1975: Can. Mineralogist, 13, p. 15).

31 G/12 Vesuvianite has been reported from the deposit at the Breckin Mine near St-Pierre-de-Wakefield (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 27).

31 G/15 Vesuvianite occurs at the Miller (Keystone) Mine (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 75).

31 G/15 Vesuvianite occurs at range IV, lot 4, Harrington Township, Argenteuil County (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 102A). A specimen was donated to the National Mineral Collection by C.W. Willimott (1894).

31 G/16 Vesuvianite occurs as scattered crystals with mica and apatite in a dyke of white granite on range VII, lot 23, Wentworth Township, Argenteuil County (R.W. Ells, 1899: Geol. Surv. Can., Ann. Rept., XII, p. 23J).

Idocrase of gem quality has been found at Laurel in Argenteuil County (A.L. Parsons, 1938: Univ. Toronto Stud., Geol. Ser., 41, p. 47).

31 H/11 At the Mont St-Hilaire Quarry, also known as the Desourdy Quarry, on the north side of Mont St-Hilaire, vesuvianite is present as green, yellow or brown prismatic crystals (up to 1 cm long) and massive (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 57).

Yellow to amber vesuvianite is exposed in roadcuts on Highway 11 at distances of 2.6, 4.3 and 4.8 km east of St-Jovite (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 65).

Yukon

105 O/4 Veinlets of vesuvianite, prehnite and carbonate traverse an aggregate of garnet and epidote found at the contact of an inclusion of aphanitic rock and a serpentinite body, west of Lake Laberge (J.O. Wheeler, 1961: Geol. Surv. Can., Mem. 312, p. 91).

VILLIAUMITE

NaF

Quebec

31 H/11 Villiaumite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

VINOGRADOVITE

$(Na,Ca,K)_4Ti_4AlSi_6O_{23}(OH).2H_2O$

Quebec

31 H/11 Vinogradovite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

VIOLARITE

Ni_2FeS_4

Violarite is a relatively rare, violet-grey mineral which has been classified as a member of the linnaeite series.

Manitoba

52 L/6 Solid masses and stringers of pyrrhotite, chalcopyrite, pyrite, cubanite, magnetite, pentlandite and violarite are exposed on the Martin-Devlin, Chance and Wento claims on the north side of the Bird River, about 4.4 km north of the Bernic Lake Mine (Ann P. Sabina, 1963: Geol. Surv. Can., Paper 63-18, p. 58).

52 L/6 Violarite has been identified in ore samples from the Ore Fault claims of Bird River Mines, Township 17, Range 15E, in the Lac du Bonnet area. Pyrrhotite, chalcopyrite, pyrite, sphalerite, pentlandite, smythite and marcasite are present (E.H. Nickel, 1972: Can. Mineralogist, 11, pp. 514-9).

62 P/1 At English Lake, 32 km west-northwest of the town of Bissett, alteration of a pentlandite-chalcopyrite-pyrite assemblage has resulted in the formation of violarite (S. Karup-Moller, 1969: Can. Mineralogist, 9, p. 629-643).

63 J/10
63 O/1
64 C/14 Violarite has been identified as small inclusions in pentlandite in specimens from the Soab, Manibridge and Lynn Lake mines (R.G. Arnold and O.P. Malik, 1974: Can. Mineralogist, 12, p. 320).

Newfoundland

2 E/13 Tilt Cove Mines, Newfoundland's oldest producers, are located at Tilt Cove on the northeast shore of Notre Dame Bay. The West Mine also contained nickel ore consisting of an intimate mixture of maucherite, nickeline, chloanthite, gersdorffite, violarite, arsenopyrite, rammelsbergite, millerite, annabergite and erythrite (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 123).

Ontario

41 I/6
41 I/11 Violarite has rather limited development in the nickel ores of the Sudbury camp where it is associated with pentlandite, pyrrhotite, millerite and chalcopyrite. The species was

originally described from the Vermilion Mine in Denison Township, and later from the Worthington Mine, Drury Township, and the Levack Mine, Levack Township. Chemical analysis : Co 1.50, Ni 38.68, Fe 17.01, Cu 1.12, S 41.68, insol. 0.40, total 99.94 (M.N. Short and E.V. Shannon, 1930: Am. Mineralogist, 15, pp. 1-22).

42 A/3 Minor amounts of violarite, heazlewoodite and chalcopyrite are associated with nickel ore at the Texmont (Fatima) Mine. The mine is 50.2 km by road south of Timmins (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 151).

42 D/14 Small amounts of violarite and smythite are present in pyrrhotite-pyrite-magnetite ore at the Nicopor Mine 12.8 km north of Schreiber on the Canadian Pacific Railway (E.H. Nickel, 1972: Can. Mineralogist, 11, pp. 514-9).

52 B/9 The Shebandowan Mine is at the southwest end of Shebandowan Lake. Major sulphide minerals are pyrrhotite, pentlandite, chalcopyrite and pyrite. Minor amounts of polydymite, bravoite, violarite and millerite and present (J.A. Morin, 1973: Ont. Div. Mines, GR 110. p. 21).

52 L/7 Violarite has been identified in a specimen of massive sulphide ore from the Marpax Nickel Mines property, 88 km northwest of Kenora, Werner Lake district (D.A. Moddle, 1960: private communication).

Quebec

21 L/9 Violarite has been identified in a specimen from Eastern Metals Corporation, Panet Township, Montmagny County (E.W. Nuffield and D.H. Gorman, 1960: private communication).

31 M/6 Ore samples from the Lorraine Mine on lot 51, range III, Gaboury Township, are mainly pyrrhotite and chalcopyrite and lesser amounts of smythite, pyrite, pentlandite, violarite, marcasite and magnetite (E.H. Nickel, 1972: Can. Mineralogist, 11, pp. 514-9).

32 D/8 Three varieties of violarite have been described at the Marbridge Mine No. 2 about 22.5 km north of Malartic on lots 9-13, range V, LaMotte Township. The varieties are: (a) lavender-coloured cobaltian violarite which occurs as discrete grains with millerite, Ni 46.2, Fe 7.5, Co 6.7, S 39.6, total 100.0; (b) grey-coloured, replacing pentlandite, Ni 49.48, Fe 9.38, Co 0.24, S 40.74, total 99.84; (c) pink-coloured, crosscutting pentlandite and grey violarite, Ni 37.38, Fe 21.03, Co 0.43, S 41.28, total 100.12. Electron microprobe analyses by J.C. Rucklidge (R. Buchan and J.H. Blowes, 1968: C.I.M. Bull., 61, p. 532).

Saskatchewan

74 A/7 Violarite, pyrrhotite and chalcopyrite are the most common metallic minerals in the Rottenstone Mine orebody. The mine is on the southeast shore of Rottenstone Lake at about 56°20'N, 104°49'W (Ann P. Sabina, 1972: Geol. Surv. Can., Paper 71-27, p. 10).

Yukon

115 G/5 Massive to heavily disseminated lenses of pyrrhotite containing chalcopyrite, pentlandite and violarite occur within a gabbro zone on the Wellgreen property (61°28'N, 139°32'W) near the head of Nickel Creek, west of Burwash Flats (D.B. Craig and P. Laporte, 1972: Mineral Industry Report 1969 and 1970, Vol. 1, Dept. Indian Affairs and Northern Development, p. 100).

VIVIANITE

$Fe_3(PO_4)_2.8H_2O$

Vivianite is a hydrated ferrous phosphate but it generally contains some ferric iron. Oxidation can extend over a wide range without apparent change in crystal structure.

Manitoba

62 G/1 Blue encrustation of vivianite has been noted along a creek bed 800 m east of the bridge across Pembina River south of Kaleida (Can. Inst. Mining Met., Bull., vol. 49, No. 441, 1949, pp. 11-16).

New Brunswick

21 O/1 Vivianite is found in small quantities in heavy beds of clay on the banks of the St. John River, 6 km above Grand River in Queen's County (L.W. Bailey, 1897: Geol. Surv. Can., Ann. Rept., X, p. 18M).

Nova Scotia

11 F/12 Vivianite occurs in small amounts at Antigonish, Antigonish County (H. Fletcher, 1886: Geol. Surv. Can., Ann. Rept., II, p. 114P).

Ontario

30 M/1 Vivianite from Don Valley, Toronto, has been identified by X-ray powder diffraction pattern (E.W. Nuffield and D.H. Gorman, 1960: private communication).

Quebec

21 E/5 A bright blue, earthy vivianite occurs in a bed of laminated clay on range II, lot 25, Hatley Township, Stanstead County (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 17R).

31 G/8 A bright blue vivianite has been found underlying a bed of bog-iron ore in Cote St. Charles Seignory, Vaudreuil County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 64T).

31 I/9 Vivianite occurs as a clear blue powder accompanying masses of fossil wood buried in a bed of rusty sand a few cm thick beneath about 30 m of post glacial clays at Deschaillons in Lotbinière County (Mrs. J. S. Stevenson, 1960: private communication).

Yukon

116 B/4 Vivanite occurs about 64 km above Forty Mile River in the Yukon River valley (G.M. Dawson, 1894: Geol. Surv. Can., Ann. Rept., VII, p. 100A).

116 N/5 Earthy forms of vivianite can be found near the Ramparts of the Porcupine River (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 64T).

117 A/9 Vivianite is one of a suite of phosphate minerals found at a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Minerals found at the locality include, kulanite, lazulite, wardite, childrenite, ludlamite, metavivianite, arrojadite, augelite and brazilianite (J.A. Mandarino and B.D. Sturman, 1979: Can. Mineralogist, 14, p. 127).

VLASOVITE

$Na_2Zr\ Si_4O_{11}$

Quebec

31 L/16 The third known and possibly the most abundant occurrence of vlasovite in the world is in an alkalic rock complex in Villedieu Township at 46°47'49"N, 78°29'31"W. It occurs as sub-rounded grains up to 2 cm across surrounded by eudialyte, and as crystals up to 15 cm long in potash feldspar and eudialyte. The average of 4 electron microprobe analyses gave: SiO_2 55.1, FeO 0.1, MgO 0.1, Na_2O 14.6, ZrO_2 30.4, total 100.3, A classical chemical analyses gave: SiO_2 55.67, Fe_2O_3 0.60, CaO 0.50, Na_2O 14.07, ZrO_2 29.40, total 100.24 (J. Gittins, E.L. Gasparrini and S.G. Fleet, 1973: Can. Mineralogist, 12, p. 211).

VOLBORTHITE

$Cu_3(VO_4)_2.3H_2O$

British Columbia

92 K/3 Volborthite is present as a weathering product of a thin interlava sedimentary rock which oucrops west of Menzies Bay on Vancounver Island and north of Gowland Harbour on Quadra Island. It displays a wide range of colours in shades of yellow, green and brown. Chalcopyrite is a major consituent of the sedimentary rock. Associated minerals are malachite, brochantite, cuprite, tenorite, azurite, calcite, cyanotrichite and connellite (J.L. Jambor, 1960: Am. Mineralogist, 45, pp. 1307-1309).

WAIRAKITE

$CaAl_2(SiO_3)_4.2H_2O$

Quebec

31 G/8
31 G/9 This rare calcium analogue of analcime was identified by its X-ray diffractometer pattern from an aggregate of cream and pale coloured crystals in altered nepheline okaite from the Oka Complex, located about 32 km west of Montreal on the north shore of the Lake of Two Mountains (D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

WAIRAUITE

CoFe

Northwest Territories

86 J/14
86 O/3 Wairauite has been identified as isolated grains in serpentine in dunite and peridotite rocks of the Muskox intrusion. Electron microprobe analyses of two grains: Fe 50.2, 48.6; Co 49.7, 49.5; Ni 0.4, 0.4; total 100.3, 98.5 (J.A. Chamberlain, C.R. McLeod, R.J. Traill and G.R. Lachance, 1965: Can. Jour. Earth Sci., 2, p. 188).

WAKEFIELDITE

YVO_4

Quebec

31 G/12 Wakefieldite was originally found at the Evans-Lou Mine near St-Pierre-de-Wakefield. It occurs as tan, amber, brown, pinkish, greenish, bluish and grey, fine-grained encrustations on pegmatite (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-10, p. 35).

WARDITE

$NaAl_3(PO_4)_2(OH)_4.2H_2O$

Yukon

117 A/9 Wardite crystals of very fine quality have been collected from a rock exposure at 68°34'N, 136°50'W, on a small stream called Cross-Cut Creek which flows into Rapid Creek. The exposure is about 1.5 km upstream from the juncture of the two streams. Kulanite, lazulite, vivianite, childrenite, ludlamite, metavivianite, arrojadite, augelite and brazilianite were collected at the same locality (J.A. Mandarino and B.D. Sturman, 1976: Can. Mineralogist, 14, p. 127).

WARWICKITE

$(Mg,Ti,Fe,Al)_2(BO_3)O$

Ontario

31 E/1 The rare borate minerals warwickite, sinhalite and szajbelyite have been found in crystalline limestone in a road-cut on the north side of the South Baptiste Lake road at a point 12 km west of its junction with Highway 62, 6.7 km north of Bancroft. The warwickite is black, with a dull submetallic or pearly lustre, a grey or red tint on the surfaces, and a reddish black streak. It is disseminated as small, finely granular masses up to 5 mm in diameter and as slender prisms averaging 2 mm long (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 339).

WEDDELLITE

$CaC_2O_4.2H_2O$

Northwest Territories

45 O/5 This rare oxalate mineral previously described from bottom muds of the Weddell Sea, Antarctica, has been identified as colourless crystals in sponge spicules from Fisher Strait, Hudson Bay area (X-ray Laboratory, Geol. Surv. Can.).

Ontario

31 D/15 Weddellite in the mineral collection at the Royal Ontario Museum is reported to have been found at Moore Lake (east part), Lutterworth Township (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 427).

WEHRLITE

$Bi_{2+x}\ Te_{3-x}$

This mineral occurs in foliated masses with perfect cleavage resembling tetradymite. It is classed by Berry and Thompson as a variety of tellurbismuth deficient in tellurium.

British Columbia

82 L/4 Wehrlite with a bronze tarnish occurs in intimate association with foliated tetradymite in a quartz body at the White Elephant Mine, 24 km southwest of Vernon in the Vernon mining division (H.V. Warren, 1945: Univ. Toronto Stud., Geol. Ser., 50, p. 75).

92 F/10 Wehrlite occurs with hessite in chalcopyrite and bornite at Marble Bay and Little Billie mines on Texada Island near Vananda (H.V. Warren, 1946: Univ, Toronto Stud., Geol. Ser., 51, p. 76).

92 F/14 A minor amount of wehrlite occurs at the Mount Washington Copper deposit located near the

summit and on the northeast slope of Mount Washington about 24 km northwest of Courtenay (J.E. Muller and D.J.T. Carson, 1969: Geol. Surv. Can., Paper 68-50, p. 42).

92 H/5 Small amounts of wehrlite intimately associated with gold are occasionally seen embedded in quartz in samples from a property known variously as Laidlaw Group, Sovereign property and Telluride Gold property, located a short distance above the Jones Creek Bridge on the main highway about 19 km west of Hope (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 549).

92 O/1 Wehrlite has been found in weathered quartz veins and in stream beds at the Monty and Ajax claims near the head of the north fork of Watson Bar Creek, in the Clinton mining division (R.M. Thompson, 1953: Am. Mineralogist, 38, p. 549).

92 O/4 Wehrlite, associated with galena in quartz and containing inclusions of hessite, occurs at the Charlie Vein on the Tchaikazan River in the Taseko Lake district (H.V. Warren, 1947: Univ. Toronto Stud., Geol. Ser., 52, p. 83).

Ontario

42 A/9 Wehrlite was identified in several specimens of white quartz from the Treadwell property, Painkiller Lake, Beatty Township, Cochrane district (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 370).

Quebec

21 M/1 Wehrlite was identified as thin films on rather glassy quartz, associated with grains of petzite, gold and pyrite at Canadian Malartic Gold Mines Limited, Fournier Township, L'Islet County (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 370).

32 C/3 Wehrlite, disseminated with altaite, petzite and gold in massive white quartz, occurs at the Bevcourt Mine, Louvicourt Township (R.M. Thompson, 1949: Am. Mineralogist, 34, p. 370).

WELOGANITE

$Na_2Sr_3Zr(CO_3)_6 \cdot 3H_2O$

Quebec

31 H/12 The new mineral weloganite was discovered in an alkalic sill which intrudes Trenton limestone in a large quarry operated by Francon (1966) Limitée at St-Michel, Montreal, and named for Sir William E. Logan, first Director of the Geological Survey of Canada. The mineral is abundant and occurs well-crystallized in vugs. Chemical analysis: SrO 41.0, ZrO_2 19.4, CO_2 32.2, H_2O 6.6, total 99.2 (Ann P. Sabina, J.L. Jambor and A.G. Plant, 1968: Can. Mineralogist, 9, p. 468).

A detailed crystal structure analysis of weloganite from St-Michel, Montreal, has shown that the mineral is triclinic, pseudo-trigonal. Chemical analyses: (1) by Gait and Grice, 1971, SrO 34.5, CaO 1.49, ZrO_2 13.78, Na_2O 8.23, K_2O 0.04, CO_2 30.5, H_2O 9.66, SiO_2 0.83, Al_2O_3 0.08, Fe_2O_3 0.05, MgO 0.02, total 99.18, (2) by Grice and Perrault, 1975, SrO_2 36.18, CaO 1.14, ZrO_2 15.26, Na_2O 7.75, K_2O 0.02, CO_2 30.70, H_2O 7.85, SiO_2 0.25, Fe_2O_3 0.03, MgO <0.02, H_2O^- 0.11, total 99.20 (J.D. Grice and G. Perrault, 1975: Can. Mineralogist, 13, p. 209).

WESTERVELDITE

(Fe,Ni)As

Manitoba

63 P/12 Westerveldite has been discovered in an assemblage of disseminated arsenides in serpentinized peridotite from a borehole near the Birchtree Mine at Thompson. Nickeline, maucherite and rare cobaltite are associated. Average electron microprobe analyses of 12 grains gave: Fe 30.1, Ni 13.9, Co 0.5, As 55.1, Sb 0.5, total 100.1 (M.B. Sizgoric and C.M. Duesing, 1973: Can. Mineralogist, 12, p. 137).

WILLEMITE

Zn_2SiO_4

British Columbia

93 M/5 Willemite is reported to have been found at the Mohawk Mine on Four Mile Mountain 8 km east of Hazelton (H.W. Little, 1959: Geol. Surv. Can., Econ. Geol. Ser. 17, p. 59).

Quebec

31 H/11 Willemite has been identified as a constituent of vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109).

WILSONITE
(altered scapolite)

The name wilsonite was given to a mineral discovered in Bathurst Township, Lanark County, Ontario (31 C/16) by Dr. Wilson of Perth. Its form resembled scapolite, but its composition differed as noted in the following chemical analyses by T. Sterry Hunt.

	(1)	(2)	(3)	(4)	(5)
SiO_2	42.90	43.00	43.55	47.50	47.70
Al_2O_3	28.10	27.80	27.94	31.17	31.22
FeO		0.70	0.20		
MgO	3.99	3.83	3.81	4.25	4.14
CaO	6.94	6.72	6.50	1.51	0.39
Na_2O	0.95	0.95	1.45	0.82	0.95
K_2O	8.27	8.27	8.37	9.22	9.38
H_2O	9.00	9.40	8.61	5.50	5.35
Total	100.15	100.67	100.43	99.97	99.13

1, 2, 3 Lot 2, conc. IX, Bathurst Township. Massive with cleavages that indicate an oblique system of crystallization. Vitreous lustre, occasionally pearly on cleavage surfaces. Colour rose red to peach-blossom red. Subtranslucent (Geol. Surv. Can., Rept. Prog., 1852-53, p. 170).

4, 5 Bathurst Township. Rose red prismatic masses which have 2 parallel perfect cleavages and 2 distinct diagonal cleavages. Lustre vitreous to pearly. Translucent in thin fragments (Geol. Surv. Can., Geology of Canada, 1863, p. 483).

The X-ray pattern of a very old specimen of wilsonite from Bathurst Township, taken from the National Mineral Collection, resembles muscovite (Ann P. Sabina and R.J. Traill, 1960: G.S.C.

Paper 60-4, p. 113). This evidence coupled with the early analyses and morphology suggests that wilsonite is muscovite pseudomorphous after scapolite. The following occurrences have also been reported.

Ontario

31 C/7 Foxton Mine, lot 7, conc. VIII, Loughborough Township, Frontenac County (W.G. Miller, 1900: Ont. Bur. Mines, Ann. Rept. vol. 9, p. 212).

31 D/15 Lot 13, conc. XIV, Lutterworth Township, Haliburton County (F.O. Adams and A.E. Barlow, 1910: Geol. Surv. Can., Mem. 6. p. 216).

Quebec

31 F/10 Calumet Mines, lots 9-12, range IV, Calumet Township, Pontiac County (F. Fitz Osborne, 1944: Que. Dept. Mines, Geol. Rept., 18, p. 16).

31 F/16 Lot 35, range IX, Low Township, Gatineau County (J.F. Torrance, 1882-84: Geol. Surv. Can., Rept. Prog., p. 10J).

31 G/5 Mauve-coloured wilsonite occurs at the Headley Mine north of Aylmer. (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 13).

31 G/12 Wilsonite has been reported from some of the pits at the McGlashan Mine near St-Pierre-de-Wakefield. (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p.31).

31 G/12 Lot 2, range III, Portland Township, Papineau County. Lot 26, range VI, Wakefield Township, Gatineau County (H.S. de Schmid, 1912: Canada Dept. Mines, Mines Br., Pub. 118, p. 300).

31 G/12 Lot 23, range XIII, and lot 10, range IX, Templeton Township, Papineau County (B.J. Harrington, 1877-78: Geol. Surv. Can., Rept. prog., p. 33G).

31 G/12 Lilac colour. Wallingford Mine, lot 16, range VIII, Templeton Township, 2.4 km west of Perkins Mills, Papineau County (K.K. Landes, 1938: Am. Mineralogist, 23, p. 38).

31 G/13 Wilsonite was found during mining operations at the High Rock Mine near Notre-Dame-de-la-Salette. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 35).

31 G/13 Lilac-coloured wilsonite is found in roadcuts on Highway 35 near Notre-Dame-de-la-Salette. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 38).

31 I/16 Sporadic occurrence in the Montauban ore zone in Montauban and Chavigny townships, Portneuf County (J.R. Smith, 1956: Que. Dept. Mines Geol. Rept., 65).

31 J/7 Blue to lilac-coloured wilsonite has been reported from the deposits at the Canada Marble and Lime Quarry near L'Annonciation. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 60).

31 J/11 Mauve colour. Near Clement Station, lot 19, range I, Campbell Township, Labelle County (E. Aubert de la Rue, 1948: Que. Dept. Mines, Geol. Rept., 23, p. 65).

31 J/12 Patches up to 12 mm across of transparent mauve wilsonite occur sparingly in scapolite in roadcuts on both sides of Highway 35, north of St-Aimé. (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 55).

WINKWORTHITE

(borosilicate and sulphate of calcium)

Nova Scotia

21 A/16 Said to occur as embedded nodules in gypsum at Winkworth (now Wentworth?) Creek, Hants County. Named by How on the basis of the following chemical analysis: SiO_2 4.98, Be_2O_3 14.37, SO_3 31.51, CaO 31.14, H_2O 18.00, total 100.00 (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 65T). It has not been established as a valid species and probably represents a mixture of howlite and gypsum.

WITHERITE

$BaCO_3$

Witherite is a member of the aragonite group and is isostructural with aragonite, strontianite and cerussite. Only a minor amount of substitutional solid solution takes place within the group. Although ranked as the second most common barium mineral, witherite is nevertheless of rather infrequent occurrence.

British Columbia

94 M/8 Witherite occurs with fluorite and minor barite in limestone at a deposit about 11.2 km north of the Alaska Highway. The deposit is accessible 3.2 km north of Liard River Hot Springs (S. Leaming, 1973: Geol. Surv. Can., Paper 72-53, p. 105).

Ontario

31 G/5 Crystallized specimens of witherite have been found in Nepean Township, Carleton County (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 238).

52 A/5 Witherite occurs with calcite, quartz and fluorite as a prominent constituent of a veinstone carrying native silver and argentite at the Porcupine Mine, north half of lot 3 conc. VI, Gillies Township, Thunder Bay district (E.D. Ingall, 1887-88: Geol. Surv. Can., Ann. Rept., III, p. 71H).

Yukon

105 J Witherite is associated with pellyite, barite, quartz, hedenbergite, andradite, taramellite, gillespite, sanbornite and chalcopyrite at a contact metasomatic deposit near the headwaters of the Ross and Pelly rivers, 3.2 km southwest of Gillespite Lake (J.H. Montgomery, R.M. Thompson and E.P. Meagher, 1972: Can. Mineralogist, 11, p. 444).

WITTICHENITE

Cu_3BiS_3

British Columbia

114 P/10 Wittichenite occurs as minute stringers and blebs with bornite, chalcopyrite at the Maid of Erin Mine, near the head of Klehini River, in the Rainy Hollow district (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 455).

New Brunswick

21 G/7 Wittichenite has been identified as a constituent of sulphide ore at the Brunswick Tin Mines property at Mount Pleasant. (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept. 28, p. 120).

Ontario

31 M/5 Wittichenite was identifies by X-ray diffraction in a sample from the O'Brien Mine at Cobalt (W. Petruk et al., 1971: Can. Mineralogist, 11, p. 207).

Yukon

105 D/11 Microscopic examination of polished sections from pyrometasomatic deposits at Best Chance, Carlisle, Copper Cliff and Rabbit Foot claims in the Whitehorse copper belt showed minute stringers and blebs of wittichenite in intimate association with bornite, chalcocite and chalcopyrite (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 455).

WODGINITE

$Mn(Sn,Ta,Ti,Fe)(Ta,Nb)_2O_8$

Manitoba

52 L/5 Wodginite is a new (1962) tantalate mineral found at Wodgina, Australia, and Bernic Lake, Manitoba. In the Montgary pegmatite, Bernic Lake, it is found in coarse perthitic microcline and in fine-grained albite. Chemical analysis by McAdam: Ta_2O_5 70.05, Nb_2O_5 1.35, SnO_2 13.20, MnO 9.04, FeO 1.87, TiO_2 2.39, SiO_2 0.60, total 98.50 (E.H. Nickel, J.F. Rowland and R.C. McAdam, 1962: Can. Mineralogist, 7, p. 390).

52 L/6 Electron microprobe analyses of wodginite from the Tanco pegmatite by S. Jones, Pinawa:

MnO	FeO	SnO_2	TiO_2	Ta_2O_5	Nb_2O_5	Total
10.4	1.0	15.7	3.8	71.8	1.0	103.7
8.9	3.3	14.7	3.2	66.9	5.5	102.5
10.0	1.2	13.9	3.8	72.9	1.0	102.8
9.2	3.0	15.5	1.3	73.3	1.0	103.3
9.4	2.7	14.0	2.5	75.3	0.2	104.1
8.3	5.2	17.0	0.2	69.1	2.7	102.5
9.8	2.1	15.4	4.0	70.2	1.5	103.0
9.2	2.8	18.9	1.2	69.4	2.0	103.5
9.1	2.9	15.2	4.0	69.3	2.0	102.5
12.0	3.2	15.1	4.0	68.7	0.5	103.5
12.0	3.8	14.5	4.8	64.0	5.0	104.1
9.7	4.9	15.8	0.7	68.2	3.3	102.6
9.8	5.2	10.1	3.0	72.7	3.6	104.4

(J.D. Grice, P. Černý and R.B. Ferguson, 1972: Can. Mineralogist, 11, p. 614)

WÖHLERITE

$NaCa_2(Zr,Nb)Si_2O_8(O,OH,F)$

Quebec

31 H/11 Wöhlerite has been identified in vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

WOLFRAMITE

$(Fe,Mn)WO_4$

The wolframite minerals form a complete series between ferberite ($FeWO_4$) and huebnerite ($MnWO_4$) and constitute the principal ore minerals of tungsten.

British Columbia

82 F/3 Wolframite occurs with tungsite and scheelite at the Kootenay Belle Mine on Sheep Creek in the Nelson mining division. Analysis yielded: WO_2 74.90, FeO 17.75, MnO 2.75, CaO 1.52, MgO 2.66, SiO_2 1.02, total 100.60; S.G. 7.137 (T.L. Walker, 1908: J. Can. Min. Inst., XI, p. 368) (T.L. Walker, 1909: Canada Dept. Mines, Mines Br. Pub, 25, p. 38).

82 G/12 Wolframite occurs north of Cranbrook on the St. Mary River, in the Fort Steele mining division (T.L. Walker, 1908: J. Can. Mining Inst., XI, p. 369).

93 L/14 Wolframite occurs with molybdenite, scheelite-powellite and chalcopyrite in quartz vein sheetings and stockworks cutting volcanic rocks in Glacier Gulch at 900 to 1200 m elevation on the east side of Hudson Bay Mountain 8 km north- west of Smithers (B.C. Dept. Mines and Pet. Res., Geol. Exp. and Mining in B.C. 1972, p. 419).

93 M/4 Ferberite occurs in the Red Rose Mine near Hazelton with scheelite, arsenopyrite, pyrrhotite, chalcopyrite and pyrite. It occupies a shear zone in diorite (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 42).

104 N/11 Wolframite, originally derived from ultrabasic rocks in the upper region of Ruby Creek, is found in deep or buried type placer deposits 27 km east of Atlin (T.L. Gledhill, 1921: Univ. Toronto Stud., Geol. Ser., 12, p. 40).

104 N/11 Crystals of wolframite occur in quartz veins at the Black Diamond Mine with minor cassiterite. The mine is at 59°42'N, 133°24'W (R. Mulligan, 1975: Geol. Surv. Can., Econ. Geol. Rept., 28, p. 75).

104 N/11 Several wolframite showings have been explored at the head of Boulder Creek; on the west side of Boulder Creek 4 km upstream from its mouth; and on the west side of Boulder Creek extending northward from 1.6 km above its mouth (B.C. Dept. Mines and Pet. Res., Geol., Exp. and Mining in B.C., 1970, p. 30).

103 O/13 A small amount of wolframite was seen in a quartz vein in a granite plug at Logjam Creek at 59°59'30"N, 131°36'W, in the Jennings River area (R. Mulligan, 1968: Geol. Surv. Can., Econ, Geol. Rept., 23, p. 55).

New Brunswick

21 G/7 The tin deposits at Mount Pleasant in Charlotte County contain some wolframite (A.A. Ruitenberg, 1963: M.Sc. thesis, Univ. of New Brunswick).

21 G/8 Wolframite occurs in quartz veins at Square Lake in Queen's County (W.J. Wright, 1940: New Brunswick, Mines Br. Paper 40-3).

21 J/10 Large crystals of wolframite are found at the Burnt Hill Brook molybdenite deposit at the confluence of the S.W. Miramichi River in York County. The crystals occur in bunches with topaz near the centre or along the borders of quartz veins cutting slate. Analysis of wolframite: WO_3 75.45, SiO_2 0.23, FeO 15.75, MnO 8.31, total 99.74; S.G. 7.10 (W.L. Swanson, 1925: Univ. Toronto Stud., Geol. Ser., 20, p. 28).

Wolframite occurs in quartz veins at McKiel Lake and Sisters Brook in York County (W.H. Poole, 1960: Geol. Surv. Can., Paper 60-15).

Wolframite occurs in quartz veins at Burnt Hill Brook and Todd Mountain; and as a detrital mineral at Fall Brook in York County (W.J. Wright, 1940: New Brunswick, Mines Br. Paper 40-2).

21 P/12 Wolframite occurs in a contact zone on the Sturgeon River property at Nicholas Denys in Gloucester County (M. Tauchid, 1964: Geol. Surv. Can., Paper 64-31).

Northwest Territories

85 H/10 Brownish black ferberite occurs at Slave Lake on the Outpost Islands in the east arm of Great Slave Lake as nodules or crystals up to 12 mm across in quartz; as clusters of small grains with magnetite and andalusite; and as fine needles and plates in aggregates up to 3 millimetres across, disseminated throughout the older quartz in the gold-bearing zones. An iridescent bluish tarnish sometimes appears on the surface of the ferberite. Chemical analysis H.V. Ellsworth: FeO 23.03, MnO 0.49, WO_3 74.50, Al_2O_3 0.51, CaO 0.10, MgO 0.97, SiO_2 0.41, Ta + Sn oxides 0.10, total 100.10 (H.C. Cooke, 1936-37: Univ. Toronto Stud., Geol. Ser., 40, p. 79).

Nova Scotia

11 K/6 Huebnerite occurs with chalcopyrite and hydrous mica in quartz at Emerald on Tom Murphy's Brook, Inverness County. Analysis of wolframite by Johnston yielded: WO_3 74.28, MoO_3 tr., MnO 22.73, FeO 0.47, CaO 0.02, MgO 0.86, SiO_2 1.33, total 99.69; S.G. 6.975 (G.C. Hoffmann, 1898: Geol. Surv. Can., Ann. Rept., XI, p. 10R).

21 A/9
21 A/10 Wolframite occurs near Lake Ramsay, New Ross, in Lunenburg County (E.R. Faribault, 1907: Geol. Surv. can., Sum. Rept., p. 82).

Ontario

31 D/11 Analysis by Hunt of wolframite found in a boulder on the west side of Chief Island in Lake Couchiching, Ontario County: WO_3 73.45, Nb_2O_5 1.95, FeO 9.05, MnO 15.35, SiO_2 0.20, total 100.00; S.G. 6.938 (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 503).

42 A/8 Wolframite is a constituent of tin deposits in the vicinity of acid intrusions on the Bourkes Mines Limited property in the Black River area, conc. II, lot 7, Benoit Township (D.G.H. Wright, 1921: Ont. Dept. Mines, Ann. Rept., vol. 30, Pt. VI, p. 48).

Yukon

105 B/1 The Fiddler (Yukon Tungsten) property at 60°08'N, 130°26'W, is on a ridge north of Boulder Creek at an elevation of 1550 m and may be reached by a secondary road about 9 km long that leaves the Alaska Highway just west of the Boulder Creek bridge at km 1129. Coarse crystals of wolframite, several inches in size, occur with galena and minor scheelite, fluorite and cassiterite in vuggy quartz (L.H. Green, 1966: Geol. Surv. Can., Paper 66-31, p. 80).

106 D/4 Wolframite is a dominant constituent of near surface gold-bearing gravels near the head of Canadian Creek in the Klotassin area (H.S. Bostock, 1957: Geol. Surv. Can., Mem. 284, p. 443).

Wolframite occurs with scheelite in gold placer deposits at Dublin Gulch in the Mayo mining district (H.W. Little, 1959: Geol. Surv. Can., Geol. Ser., 17).

115 G/9 Wolframite has been identified in specimens taken from Alaskite Creek in the Kluane Lake area (X-ray Laboratory, Geol. Surv, Can., Specimens submitted by J.E. Muller, 1957).

WOLLASTONITE

$CaSiO_3$

Wollastonite has a formula analogous to the pyroxene group but does not crystallize with the pyroxene structure. It is a metamorphic mineral formed at fairly high temperatures.

British Columbia

82 F/3 At the Victory Tungsten property near Salmo, on the south side of Sheep Creek 4.8 km east of its confluence with the Salmo River, the ore occupies a contact metamorphic zone which includes pyrrhotite, pyrite, molybdenite, sphalerite, scheelite, garnet, actinolite, calcite, quartz and wollastonite (H.J. Greenwood, 1967: Am. Mineralogist, 52, p. 1669-1679).

92 E/10 Wollastonite occurs at Nootka Sound in the Clayoquot mining division (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 239).

92 F/9 Wollastonite occurs in skarn deposits on Texada Island, 120 km from Vancouver (--, 1960: Western Miner and Oil Review, vol. 33, No. 8, p. 30)

92 F/10 White splintery wollastonite, associated with diopside, garnet, epidote, chalcopyrite, bornite, native silver and molybdenite occurs at the Marble Bay Mine on Texada Island. A chemical analysis yielded: SiO_2 51.60, Al_2O_3 1.82, Fe_2O_3 0.32, FeO 0.13, MgO 0.28, CaO 44.50, MnO 0.08, Na_2O 0.52, K_2O 0.32, H_2O 0.31, CO_2 0.30, total 100.18; S.G. 2.924(T.L. Walker, 1930: Univ. Toronto Stud., Geol. Ser., 29, p. 6).

92 H/8 Wollastonite is found on the Oregon property between Sixteen Mile and Eighteen Mile creeks and 4.8 km east of Hedley in the Osoyoos mining division (R.M. Thompson, 1951: Am. Mineralogist, 36, p. 505).

Northwest Territories

26 K/8 Pale yellow lineated metacrysts of wollastonite occur in lime-silicate rock at Narrow Bay, Freshwater Lake, on Baffin Island (G.C. Riley, 1960: Geol. Surv. Can., Bull. 61, p. 40).

Ontario

31 C/8 Wollastonite occurs at Outlet Post in Lansdowne Township, Leeds County (National Mineral Collection, donated by J.H. Slack, 1913).

31 C/9
31 C/16 Wollastonite is found with mica, pyroxene, quartz and other minerals in crystalline limestone, Bastard Township, Leeds County, and North Burgess and North Elmsley townships, in Lanark County (G.C. Hoffmann, 1888-89; Geol. Surv. Can., Ann. Rept., IV, p. 66T).

31 C/16 A small amount of wollastonite is reported in limestone at the Silver Queen Mine located about 73 km (road log) north of Kingston along the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 29).

Quebec

21 E/13 White fibrous wollastonite, white to greenish white prehnite, pink garnet, transparent vesuvianite and grass-green diopside occur at

the Jeffrey Mine, Asbestos, at the contact of peridotite with granitic rock (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 26).

22 A/14 Wollastonite with fine-grained recrystallized quartz of a white to light blue colour, was found on Needle Mountain, Holland Township, Gaspe-North County (J.E. Riddell, 1952: Que. Dept. Mines, Prelim. Rept., 269, p. 7).

31 G/8
31 G/9 Silky green platy crystals of wollastonite up to 10 cm in length occur with nepheline, sodian augite and melanite garnet in ijolite rock within the Oka Complex, located 32 km west of Montreal on the north shore of the Lake of Two Mountains. Chemical analysis by H. Ulk of wollastonite from DDH G15, 330 feet: SiO_2 50.15, Al_2O_3 0.14, Fe_2O_3 0.04, FeO 0.60, MnO 0.96, CaO 46.97, Na_2O 0.35, K_2O 0.05, H_2O+ 0.38, CO_2 0.45, total 100.09, S.G. 2.859,(D.P. Gold, 1966: Min. Soc. India, I.M.A. Volume, p. 102-126).

31 G/10 Coarsely crystalline wollastonite is associated with massive graphite at the Miller (Keystone) Mine (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 69-51, p. 75).

31 G/10 The gangue material of a graphite deposit in lot 10, range V, Grenville Township, Argenteuil County, contains wollastonite (R.A.A. Johnston, 1915: Geol. Surv. Can., Mem. 74, p. 239). Chemical analysis of wollastonite from Grenville: SiO_2 53.05, CaO 45.74, FeO 1.20, total 99.99; S.G. 2.89-2.92 (T.S. Hunt, 1863: Geol. Surv. Can., Geology of Canada, p. 465).

31 G/12 An association of wollastonite with blue calcite is reported in range I, lot 7, of Wakefield Township, Gatineau County (C.W. Willimott, 1880-82: Geol. Surv. Can., Rept. Prog., p. 13GG).

31 G/13 Roadcuts on Highway 35 north of Notre-Dame-de-la-Salette contain wollastonite as white bladed aggregates (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 40).

31 G/16 Wollastonite occurs at St. Jerome, Morin, in Terrebonne County (W.E. Logan, 1863: Geol. Surv. Can., Geology of Canada, p. 465).

31 H/11 Wollastonite has been identified from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

31 J/12 Specimens of wollastonite have been collected from range VI, lot 17, and range II, lot 16, in Amherst Township, Papineau County (National Mineral Collection).

Yukon

105 D/10
105 D/11 Wollastonite is associated with andradite, pyroxene, calcite, quartz and bornite in a number of test pits and trenches between Cowley Creek and Dugdale Station at the southern end of the Whitehorse copper belt. Masses of snow white wollastonite up to 30 cm in diameter were noted (M.H. Frohberg, 1962: private communication).

105 D/11 Wollastonite-rich skarn occurs at the Anaconda, Rabbit-foot and War-Eagle copper deposits located 3 to 5 km northwest of Whitehorse. (E.D. Kindle, 1964: Geol. surv. Can., Paper 63-41, p. 14-18).

WOODHOUSEITE

$CaAl_3(SO_4)(PO_4)(OH)_6$

New Brunswick

21 P/5 Woodhouseite is one of the secondary minerals reported to have been found in the gossan at Brunswick No. 6 Mine, 26 km south of Bathurst (Ann P. Sabina, 1967: Geol. Surv. Can., Paper 66-51, p. 118).

WOODRUFFITE

$(Zn,Mn)Mn_3O_7.1\text{-}2H_2O$

British Columbia

82 K/2 Woodruffite, aurichalcite, gunningite and hydrozincite are associated with smithsonite at the Moonshine claims, formely worked by Willett Mines Limited near Lardeau, The woodruffite is black with lustre varying from greasy to submetallic (Ann P. Sabina, 1978: Geol. Surv. Can., Paper 78-1A, p. 257).

WULFENITE

$PbMoO_4$

Wulfenite occurs as a secondary mineral, formed in the oxidized zones of deposits of lead- and molybdenum-containing minerals. W may substitute for Mo, and for Pb, forming at least a partial series with the isomorphous minerals stolzite and powellite.

British Columbia

82 G/5 Wulfenite occurs sparingly as minute yellow tablets implanted on crystals of pyromorphite at the Society Girl Mine in Moyie at the headwaters of Farrell Creek, less than 3.2 km east of Moyie Lake (X-ray pattern identification by R.M. Thompson, 1960: private communication).

Quebec

31 H/7 Wulfenite was found as yellow prismatic microcrystals in an alteration rim around galena from Mont St-Hilaire (G.Y. Chao and J. Baker, 1979: Mineralogical Record, 10, p. 99).

32 D/8 Wulfenite was identified as a white coating on quartz on a specimen from the molybdenum deposit of Moly Hill Mining Corporation, 3.2 km by road west of Highway 61, 6.6 km from Rivière Héva (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-30, p. 79).

Saskatchewan

64 L/4 Wulfenite has been identified as a constituent of the oxidation zone at the Rabbit Lake uranium deposit west of Wollaston Lake at 58°11'00"N, 103°42'36"W (J. Rimsaite, 1977: Geol. Surv. Can., Paper 77-1C, p. 95)

WURTZITE

ZnS

Wurtzite is the hexagonal polymorph of ZnS. It is the rarer and unstable form, normally altering to the cubic form, sphalerite. Synthetic wurtzite crystallizes from acid solutions above 250°C.

British Columbia

82 E/4 Wurtzite occurs as very thin films and anhedral grains occupying small fractures in milky white quartz at the Fairview Mine, 8 km northwest of Oliver in the Osoyoos mining division (R.M. Thompson, 1950: Am. Mineralogist, 35, p. 455).

Newfoundland

2 E/12 Wurtzite is reported to occur in the ore of the Little Bay copper mine 0.8 km southeast of the village of Little Bay on the south slope of a ridge on the peninsula between Little Bay and Little Bay Arm in Notre Dame Bay (Ann P. Sabina, 1975: Geol. Surv. Can., Paper 75-36, p. 113).

Quebec

31 H/11 Wurtzite has been found in veins in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

XANTHOCONITE

Ag_3AsS_3

Ontario

31 M/4 A specimen of xanthoconite associated with proustite and stephanite in the mineral collection at the Royal Ontario Museum is from the Keeley Mine in the northeast part of South Lorrain Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 430).

31 M/5 Xanthoconite occurs as approximately hemispherical radiating aggregates of a buffy colour and as a few isolated crystals, at the La Rose Mine, near Cobalt. Well-formed crystals of proustite are found protruding from the hemispherical drusy aggregates of xanthoconite. Analysis by E.W. Todd: Ag 64.07, As 14.98, S 14.99, Fe tr., CaO tr., Sb tr., total 94.04 (A.L. Parsons, 1924: Univ. Toronto Stud., Geol. Ser., 17, p. 11).

31 M/5 Xanthoconite has been found in two samples from the Christopher Mine, near Cobalt. It is associated with sphalerite, arsenopyrite and cobaltite in one sample and with botroyoidal siderite in the other. Proustite crystals extend outward from the xanthoconite into open spaces. Both samples were taken from a fault zone (W. Petruk et al., 1972: Can. Mineralogist, 11, p. 213).

31 M/5 Xanthoconite occurs in calcite-quartz veins with native silver and cobalt-nickel-iron arsenides at the O'Brien Mine, south half of lot 4, conc. VI, Coleman Township. A specimen is in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 430).

41 P/10 Vugs containing xanthoconite have been reported in ore-bearing calcite veins at the Miller Lake O'Brien Mine in Nicol Township east of Gowganda (Ann P. Sabina, 1974: Geol. Surv. Can., Paper 73-13, p. 77).

41 P/10 The mineral collection at the Royal Ontario Museum includes xanthoconite from the Castle Trethewey Mine, Haultain Township, and the Castle Mine, Nicol Township (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 430).

XENOTIME

YPO_4

Xenotime is tetragonal and isostructural with zircon which it greatly resembles. Like zircon, it occurs as an accessory mineral in igneous rocks; as a pegmatite mineral; and as a detrital mineral.

New Brunswick

21 G/7 Rare grains of xenotime were found in a tungsten concentrate from the upper Fire Tower zone at the Mount Pleasant deposit of Brunswick Tin Mines (I.S. Parrish, 1977: Can. Mineralogist, 15, p. 121).

Ontario

31 L/7 Xenotime occurs in a coarse granite vein composed of quartz, feldspar, muscovite and biotite, cutting hornblendic gneiss near Mattawa in Calvin Township (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IX, pp. 13, 14R) (H.S. Spence, 1930: Am. Mineralogist, 15, p. 479).

41 H/15 Xenotime occurs in granite pegmatite, on Dokis Island, Key Harbour area, Parry Sound district (D.F. Hewitt, 1960: private communication).

41 H/16 Xenotime has been identified as black grains in a pegmatite on the south slope of the western narrows of Caribou Lake. The deposit is about 9.6 km west of Post Loring and is known as a source of peristerite for lapidary use (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 74).

Quebec

21 N/13 A yellow translucent mineral, xenotime, occurs as small grains in a hybrid granite in ranges II and III, lots 8 and 9, on the Brouillard property, Callieres Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 20). Xenotime also occurs on range I, lot 15, Callieres Township, Charlevoix County, 3.2 km east of St. Simeon along Highway 15, 150 m north of a house belonging to M. Lebret on the east side of the road, and also about 450 m away on the opposite side of the highway. Spectrographic analysis gave: Y_2O_3 49.9, ThO_2 1.73, UO_2 2.75, P_2O_5 38.6, SiO_2 1-5, Gd 1-5, Dy 1-5, (Nd, Sm, Fe, Pb, Zr) 0.1-1.0, Mg Al 0.01-0.1, (Ca,Ni,Cu,Sb,Bi) tr. (D.M. Shaw, 1957: Can. Mineralogist, 6, pp. 61-68).

31 G/12 Xenotime occurs at the Evans-Lou Mine near St-Pierre-de-Wakefield (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 35).

Saskatchewan

73 P/1 Xenotime has been identified as a major constituent, with uraninite, in hand specimens collected from the Jahala property, Lee Lake (X-ray Laboratory, Geol. Surv. Can.).

XONOTLITE

$6CaSiO_3.2H_2O$

Newfoundland

12 G/1 Both massive and fibrous forms of xonotlite are found in ultrabasic rock of the bay of Islands igneous complex. Fibrous xonotlite occurs in veins up to 7 cm in width and several metres

long at Winter House Brook and Shoal Brooks, Bonne Bay; and near First Trout River Pond. Xonotlite is also found filling joints in serpentine near the basal contact of the North Arm Mountain pluton and in the valley walls of a stream draining into North Arm, Bay of Islands (C.H. Smith, 1954: Am. Mineralogist, 39, p. 531).

Ontario

52 A/3 A specimen of xonotlite in the mineral collection at the Royal Ontario Museum is from the Prince location, Prince Bay, Lake Superior (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 431).

Quebec

21 E/13 Xonotlite occurs as white fibrous masses with pale pink translucency at the Jeffrey Mine, Asbestos. A small specimen, part of a fracture filling enclosing fragments of serpentinized host rock is on file in the National Mineral Collection.

31 G/12 A specimen of xonotlite collected at the Stephen Cross quarry has been donated to the National Mineral Collection by G. Chao. The quarry is along the Farm Point road 3.8 km from Highway 105. The xonotlite appears to be pseudomorphous after wollastonite.

YOFORTIERITE

$Mn_5Si_8O_{20}(OH)_2(OH_2)_4.4\text{-}5H_2O$

Quebec

31 H/11 A new mineral, the manganese analogue of palygorskite has been found at the Desourdy quarry on Mont St-Hilaire and named in honour of the Canadian geoscientist Y.O. Fortier. It occurs in nepheline syenite associated with analcime, serandite, eudialyte, polylithionite and aegirine. Chemical analysis: SiO_2 48.44, MnO 28.41, MgO 2.35, Al_2O_3 1.49, ZnO 1.10, CaO 0.90, TiO_2 0.09, K_2O 0.05, Cr_2O_3 0.007, H_2O 17.22, total 100.06 (G. Perrault, Y. Harvey and R. Pertsowsky, 1975: Can. Mineralogist, 13, p. 68).

YUKONITE

$Ca_6Fe_{16}(AsO_4)_{10}(OH)_{30}.23H_2O)$

Yukon

105 D/2 Yukonite was found on the west side of Windy Arm in Tagish Lake. Analysis by R.P.D Graham: (1) CaO 10.00, Fe_2O_3 35.72, As_2O_5 34.06, H_2O 20.28, total 100.06; (2) CaO 10.14, Fe_2O_3 36.81, As_2O_5 33.85, H_2O 20.28; total 101.06 (J.B. Tyrrell and R.P.D. Graham, 1913: Trans. Roy. Soc. Can., Ser. 3, vol. VII, sec. 4, pp. 13-18). The relationship of this mineral to arseniosiderite is not clear. Re-examination of type material has confirmed the original analysis. Yukonite was found to give a weak X-ray powder pattern which differs from that of arseniosiderite most notably in the absence of the strongest line at 9.9Å (J.L. Jambor, 1966: Abstract in Technical Program, Min. Assoc. Can., Ann. Meeting, Halifax).

ZAVARITSKITE

BiOF

Quebec

31 G/13 The rare oxyhalide mineral zavaritskite has been identified as a secondary mineral at the Evans-Lou Mine near Wakefield Lake about 40 km north of Ottawa (N. M. Miles, D.D. Hogarth and D.S. Russell, 1971: Am. Mineralogist, 56, p. 395).

ZEUNERITE

$Cu(UO_2)_2(AsO_4)_2.10\text{-}16H_2O$

British Columbia

104 N/12 Zeunerite is reported to occur in some weathered outcrops of mineralized alaskite in the Boulder Creek-Ruby Creek area, Atlin district (J.D. Aitken, 1959: Geol. Surv. Can., Mem. 307, p. 72).

ZINC

Zn

Yukon

105 M/14 Whiskers and tiny stacked crystals of native zinc have been found associated with native silver in the oxidized zone of the Elsa Mine, in the Galena Hills area of the Mayo mining district (X-ray Laboratory, Geol. Surv. Can., submitted by R.W. Boyle).

ZINCKENITE

$6PbS.7Sb_2S_3$

British Columbia

92 O/2 Zinckenite occurs intergrown with calcite, and associated with sphalerite and tetrahedrite, near Bonanza Creek in the Tyaughton Lake area, Bridge River district. Chemical analysis by J.P. Beley yeilded: Pb 33.3, Sb 40.8, S 20.9, As tr., total 95.0; S.G. 5.15. Chemical analysis by J.R. Williams and Son: Pb 34.58, Sb 42.30, S 21.84, Fe 0.50, As 0.48, total 99.70 (H.V. Warren and R.M. Thompson, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 83).

Northwest Territories

85 J/8 Zinckenite is found in association with stibnite, in the gold ores of the Yellowknife Bay area (L.C. Coleman, 1953: Am. Mineralogist, 38, p. 516).

Ontario

31 C/6 Zinckenite is a rare constituent in the suite of sulphosalt minerals found on lot 12, concession XIV, Huntingdon Township, on the farm of Mr. Ed Taylor of Madoc (J.L. Jambor, 1967: Can. Mineralogist, 9, p. 212).

ZINNWALDITE

$K_2(Li,Fe^{++},Al)_6(Si,Al)_8O_{20}(F,OH)_2$

Zinnwaldite is one of the less common trioctahedral micas, and resembles biotite in its properties. It occurs mainly in granite pegmatites and in cassiterite-bearing veins.

Manitoba

52 L/5 Zinnwaldite occurs in the Bear pegmatites at Pointe du Bois (E.W. Heinrich and A.A. Levinson, 1953: Am. Mineralogist, 38, p. 35).

Nova Scotia

21 A/9 Zinnwaldite occurs in albite at Reeves Farm, New Ross County, in the form of irregular masses

devoid of crystal outline. Analysis by E.W Todd: SiO_2 46.58, Al_2O_3 24.10, K_2O 10.81, MnO 1.34, Fe_2O_3 0.69, FeO 4.28, CaO 0.68, MgO 0.49, Na_2O 0.84, Li O 3.56, H_2O 1.50, F 7.90, less O for F 3.33, total 99.44; S.G. 2.916 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11 p. 256).

ZIPPEITE

$$A_x(UO_2)_6(SO_4)_3(OH)_{10}.yH_2O$$
where A=K or Na with x=4, y=4
or A=Co,Ni,Mg or Zn with x=2,y=16

The ill-defined mineral zippeite and several zippeite-like minerals previously supposed to be hydrated uranyl sulphates have been found to form a group of related minerals containing one or another of several monovalent or divalent cations in addition to uranium (C. Frondel, J. Ito, R.M. Honea, and A.M. Weeks, 1976: Can. Mineralogist, 14, p. 429).

Northwest Territories

86 L Zippeite occurs occasionally as golden yellow crusts on massive pitchblende at Great Bear Lake (C. Frondel, 1952: Am. Mineralogist, 37, p. 927).

Ontario

41 J/7 The mineral collection at the Royal Ontario Museum includes a specimen of zippeite from the Stanrock Mine, Quirke Lake section, Buckles Township (J. Satterly, 1977: Ont. Geol. Surv. MP70. p. 432)

Saskatchewan

74 N/8 Secondary uranium minerals identified at the No. 4 zone of Consolidated Nicholson Mines Limited include zippeite, leibigite and cuprosklodowkite. The deposit is about 450 m north of the head of Nicholson Bay, Lake Athabasca (S.C. Robinson, 1955: Geol. Surv. Can., Bull 31, p. 18).

74 N/10 Zippeite was identified as one of the secondary minerals present on the ABC group claims of Nesbitt-LaBine Uranium Mines Limited at the northwest corner of Beaverlodge Lake (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 75). Zippeite and uranophane are reported at the Cayzor Athabasca Mine on the east shore of Jean Lake (A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ, Geol. Ser. 16, 2nd ed., p. 295).

ZIRCON

$ZrSiO_4$

Zircon is a widely distributed accessory mineral in igneous rocks, it is a fairly common detrital mineral in some sediments and it is also found in metamorphic rocks. Well-crystallized varieties, both clear and coloured have long been used as gem stones. The name cyrtolite is used for radioactive zircon that commonly contains some calcium and rare-earth elements in addition to uranium and thorium, and is usually hydrated.

Manitoba

52 E/13 Cyrtolite, thorite, uraninite, and doubtful allanite and uranothorite occur together in rocks composed of pegmatite interbanded with biotite schists and gneisses on the East Found Group, 6.6 km west of Star lake (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 116).

Nova Scotia

10 N/16
10 O/13 Zircon crystals are found in the sand of Sable Island. The fluorescent zircon has been identified by X-ray diffraction (E.W. Nuffield and D.H. Gorman, 1960: private communication).

11 E/16 Blocky cyrtolite crystals up to 2.5 cm in size occur with minor uranothorite in a pegmatite exposed at low tide on the seashore about 800 m northwest of the church at Georgeville and about 300 m southwest of the mouth of McInnis Brook (G.A. Gross, 1957: Geol. Surv. Can., Paper 57-2, p. 22).

Ontario

Zircon has been identified in specimens from radioactive deposits at the following localities:

	Township	lot	conc.	Name
31 C/16	Bathurst	22	IX	C. Innes
31 D/9	Anstruther	26-27	I	Newkirk Mining
31 D/9	Burleigh	23-25	XI-XII	Newkirk Mining
31 D/9	Cavendish	3	III	Silanco Mining
31 D/9	Cavendish	16,21	III	Drude U.M.L.
31 D/9	Cavendish	14	V	Cromwell U.
31 D/9	Cavendish	13	VI	Cromwell U.
31 D/9	Cavendish	14	VII	Cavendish Mine
31 D/9	Harvey	18	XII	Cavendish U.M.L.
31 D/10	Harvey	26	XVI	Big Nell Mines
31 D/16	Anstruther	2-3	IX	Gray Wolfe Expl.
31 D/16	Anstruther	29-35	IX-XI	El Sol Gold Mines
31 D/16	Anstruther	2	X	Higgins U.M.L.
31 D/16	Anstruther	3	XII	Higgins U.M.L.
31 D/16	Anstruther	5-6	XVII	Garland Mining
31 D/16	Ansturther	4-9	XVIII	Garland Mining
31 D/16	Cardiff	9	VII	J. Gilbert
31 D/16	Cardiff	12	VIII	Dyno Mine
31 D/16	Cardiff	1-13	X	Pickering Metal
31 D/16	Cardiff	11	XI	Climax Molybdenum
31 D/16	Cavendish	16	IX	Drude U.M.L.
31 D/16	Cavendish	14	IX	Drude U.M.L.
31 D/16	Cavendish	21	XI	Silanco Mining
31 D/16	Cavendish	24-25	XIV	Kelbee Rare Metals
31 D/16	Galway	23,25	X	Silver Crater Mines
31 D/16	Galway	23-24	XI-XII	Kenmac Chibougameau
31 D/16	Glamorgan	19	II	Nu-World U.M.L.
31 D/16	Glamorgan	26-28	II	Nu-World U.M.L.
31 D/16	Monmouth	19	VI	Blue Rock Cerium
31 D/16	Monmouth	20	VIII	Amalgamated R.E.
31 E/1	Cardiff	27-28	XI	Bicroft U.M.L.
31 E/1	Cardiff	20	XV	D.E. Foster
31 E/1	Cardiff	4-6,7	XXI	Richardson (Fission)
31 E/1	Monmouth	29-30	XVI	T. Cudney
31 F/4	Faraday	9-11	XII	Greyhawk Mine
31 F/4	Monteagle	3	III	B.C. Robson

(A.H. Lang, J.W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ. Geol. Ser. 16, 2nd ed., pp. 247-273)

31 C/7 Fairly large zircon crystals (12 mm across and 3.5 cm long) have been found at the Lacey mica mine. Two other closely associated minerals which were mined are mica and apatite. Mica is reported to have attained the size of 3 m in diameter and apatite about 25 cm across. The mine is located about 27 km north of Kingston and 7 km west of the Kingston-Westport-Perth Road (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 25).

31 C/10 Brownsish pink, turbid grains and tiny crystals of zircon occur sparingly in calcite and

feldspar in crystalline limestone at a roadcut along the Westport Road about 11 km east of Godfrey. (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 16).

31 C/15 Zircon is reported to be a constituent of granite pegmatite on the Orser-Kraft property, conc. V, lot 13, South Sherbrooke Township, Lanark County (D.F. Hewitt, 1960: private communication).

31 C/16 Museum specimens of zircon have been obtained and studied from near Otty Lake, North Burgress Township, about 6 km directly South of Perth. The best crystals were obtained from a pit known as the Sand Pit on lot 4, conc. VIII. Chemical analysis by H.V. Ellsworth yielded: SiO_2 32.51, ZrO_2 67.02, BeO 0.21, CaO 0.22, Fe_2O_3 0.08, $(Ce,La,Di)_2O_3$ 0.04, MgO 0.01, loss on ignition 0.03, total 100.12; S.G. 4.659 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 237) (C. Palache and H.V. Ellsworth, 1928: Am. Mineralogist, 13, p. 384).

31 D/16 Zircon crystals were found in granite pegmatite in conc. VII, lot 20 Monmouth Township, Haliburton County (D.F. Hewitt, 1960: private communication).

Chemical analysis of well-crystallized pure zircon from zircon-thorite leucogranite on the Saranac property, conc. X, lot 24, Monmouth Township, Haliburton County, in the Bancroft area, by the Provincial Assay Office: ZrO_2 61.0, SiO_2 35.4, U_3O_8 0.75, H_2O 5.5, total 102.65 (J. Satterly, 1956: Ont. Dept. Mines, Ann. Rept., vol, 65, Pt. VI, p. 24).

31 E/4 Thucholite nodules found in Conger Township, conc. IX, lots 9 and 10, contain cyrtolite embedded in their outer surfaces. The cyrtolite occasionally shows a development of typical zircon-like square prisms with curved faces characteristic of cyrtolite. Chemical analysis by H.V. Ellsworth: ZrO_2 43.03, U_3O_8 1.46, ThO_2 0.66, $(Ce,La,Di)_2O_3$ 0.34, $(Yt,Er)_2O_3$ 6.76, Fe_2O_3 4.16, Al_2O_3 3.12, MnO 0.02, TiO_2 0.06, V_2O_5 not detected, CaO 1.58, MgO 0.18, SiO_2 22.86, P_2O_5 3.53, loss at 110° 1.64, loss above 110° 10.90, total 100.30 (H.V. Ellsworth 1928: Am. Mineralogist, 13, p. 439).

31 E/9 Granite pegmatite containing zircon, uraninite, allanite and columbite occurs on the J.G. Gale property, conc. IV, lot 14, Murchison Township, in the Nipissing district (D.F. Hewitt, 1960: private communication).

31 F/4 Cyrtolite is found in the abandoned workings of the Woodcox feldspar mine in lot 17, conc. VII, Monteagle Township. It occurs with calciosamarskite and hatchettolite. Chemical analysis by E.W. Todd: SiO_2 26.14, Fe_2O_3 2.06, FeO 1.72, CaO 1.16, ZrO_2 62.16, Nb_2O_5 0.72, UO_3 1.26, H_2O 4.21, total 99.43; S.G. 4.102 (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 211).

31 F/4 Cyrtolite was reported to have been found in Faraday Township, on a property located on lots 14 and 16, north of Monck raod (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 138).

31 F/4 Cyrtolite, lyndochite and monazite occur together in a pegmatite dyke in lot 23, conc. XXIII, Lyndoch Township. The dyke is over 60 m long and was formerly worked for beryl (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 146).

31 F/4 Cyrtolite is present in a pegmatite dyke on conc. XV, lot 23, Lyndoch Township. Among the associated minerals are beryl, columbite, lyndochite and monazite. The crytolite forms fist-sized masses which are grey or yellowish in colour (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 230).

31 F/4 Zircon was found in granite pegmatite at the Faraday Uranium Mines property, conc. XI, lots 16 and 17, Faraday Township, Hastings County (D.F. Hewitt, 1960: private communication).

31 F/4 The abandoned MacDonald Feldspar Mine in conc. VII, lots 18 and 19, Monteagle Township, contains cyrtolite with uranothorite, allanite, ellsworthite and a variety of other minerals (A.H. Lang, 1952: Geol. Surv. Can., Econ. Geol. Ser., 16, p. 147).

31 F/4 Pink zircon is present in the York River tactite zone, a cliff-side exposure on the York River 320 m north of Highway 500 at a point 11 km east of Bancroft (Ann P. Sabina, 1977: Geol. Surv. Can., Paper 77-1A, p. 335).

31 F/6 Red, prismatic crystals of zircon, some twinned, occur on conc. X, lot 31, Sebastopol Township, Renfrew County (National Mineral Collection).

31 F/6 Large zircon crystals, many of them reaching 30 cm in length and 30 to 40 cm in girth, have been collected at Lake Clear, conc. V, lot 2, Brudenell Township. Facetted gems cut from these giant crystal are of the hyacinth variety, being bright red colour and quite transparent (D.S.M. Field, 1952: Can. Mining J., 73, Pt. 1, map, pp. 78-80). Also see: A.L. Parsons, 1931: Univ. Toronto Stud., Geol. Ser., 30, p. 21, C. Palache, 1932: Am. Mineralogist, 17, p. 363: and G.C. Waite, 1944: Univ. Toronto Stud., Geol. Ser., 49, p. 78).

31 F/6 Zircon specimens in the mineral collection at the Royal Ontario Museum are from the following localities: Kuehl Lake, lot 1, conc. V, Brudenell Township; Renfrew Minerals, lot 30, conc. XV, Lyndoch Township; roadcut on Highway 41 about 3.2 km west of its junction with Highway 132 near Dacre, Gratton Township (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 437).

31 F/6 Hyacinth-red zircon crystals are present in syenite pegmatite exposed in road-cuts on Highway 512 near its intersection with Highway 515 (Ann P. Sabina, 1971: Geol. Surv. Can., Paper 70-50, p. 32).

31 F/7 Crystals of cyrtolite are found in the nepheline rocks occurring along the York River (L. Moyd, 1949: Am. Mineralogist, 34, p. 747).

31 F/10 Large brown prismatic crystals of zircon were collected from the east end of Muskrat Lake, conc. I, lot 13, Westmeath Township, Renfrew County (National Mineral Collection).

31 L/2 A specimen of zircon in the mineral collection at the Royal Ontario Museum was collected at the portage between Mink and Cauchon Lakes, Algonquin Park, Pentland Township (J. Satterly, 1977: Ont. Geol. Surv., MP70, p. 436).

41 H/15 Cyrtolite has been found at the Besner Mine, an abandoned pegmatite in lot 5 conc. B, Henvey Township. Minerals occurring with the cyrtolite are uraninite, allanite and thucholite (H.V. Ellsworth, 1932: Geol. Surv. Can., Econ. Geol. Ser., 11, p. 171).

42 D/9 Specimens of zircon with parisite, bastnaesite and calcite from a road-cut on Highway 17, 1.6 km south of the Marathon turnoff, Pic Township are in the mineral collection at the Royal Ontario Museum (J. Satterly, 1977: Ont. Geol. Surv. MP70, p. 437).

52 F/15 Zircon appears as tiny inclusions in quartz in a schist of mixed argillaceous and arenaceous rocks in the vicinity of the pulp mill in the Dryden gold area (E. Thomson, 1917: Ont. Dept. Mines, Ann. Rept., vol. 25, p. 174).

Quebec

Zircon has been reported to be present at the following radioactive deposits:

	Township	lot	range	Name
31 F/16	Clapham	38-39,42-49	II-III	M. Adams
31 F/16	Low	30-31	XI	R. and F. Wilkie
31 J/12	Sicotte	20-22	I-II	Alta Mines
31 K/8	Egan	1	I	E. McSheffrey
31 K/9	Lytton	37-38	III	J. Lavoie

(A.H. Lang, J. W. Griffith and H.R. Steacy, 1962: Geol. Surv. Can., Econ, Ser. 16, 2nd ed., 285-289)

21 M/16 At the Lac du Pied-des-Monts Mine, crystals of dark brown zircon about 6 mm long occur in a pegmatite dyke (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 97).

31 G/10
31 G/15 Cherry red, transparent crystals of zircon occur in crystalline limestone range V, lot 10, Grenville Township, Argenteuil County (G.C. Hoffmann, 1888-89: Geol. Surv. Can., Ann. Rept., IV, p. 39T).

31 G/11 Greyish mauve zircon occurs at the Back (Wallingford) Mine near Glen Almond (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 24).

31 G/12 Small pink zircons have been noted at the Horseshoe and McGlashan mines near St-Pierre-de-Wakefield. Zircon has also been reported from the Breckin and Gemmill mines in the same area (Ann P. Sabina, 1970: Geol. Surv. Can., Paper 69-50, p. 23,27,29,31).

31 G/12 Zircon crystals occur at the Little Rapids Mine, range I, lot 7, at Portland East, Papineau County (National Mineral Collection: donated by B. Winning, 1912).

31 G/13 Small crystals of pale green cyrtolite are fairly abundant in the fine textured pegmatite exposed in a quarry on lot 2, range V, of West Portland township. The crystals tend to occur as single individuals ranging up to 3 millimetres in diameter (H.S. Spence, 1935: Am. Mineralogist, 20, p. 728).

31 G/13 Pale red crystals of zircon were found during mining operations at the High Rock Mine near Notre-Dame-de-la-Salette. Zircon has also been reported at the Villeneuve Mine (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 35, 40).

31 H/11 Zircon occurs in veins and vugs in nepheline syenite at the Desourdy quarry on the northeast slope of Mont St-Hilaire (G.Y. Chao, D.C. Harris, A.W. Hounslow, J.A. Mandarino and G. Perrault, 1967: Can. Mineralogist, 9, p. 109-123).

31 H/12 Zircon occurs as tiny crystals and grains of amber yellow to light brown at the Francon quarry, Montreal Island (Ann P. Sabina, 1968: Geol. Surv. Can., Paper 67-51, p. 67).

31 J/4
31 J/5 Pinkish brown zircon crystals occur with biotite in hornblende-syenite that is exposed for a distance of 800 m along the west shore of the southern tip of Lac du Cerf. The crystals average about 6 mm in size (Ann P. Sabina, 1969: Geol. Surv. Can., Paper 68-51, p. 53).

31 J/12 Zircon crystals occur in a zone of pyroxene granites and syenites as dark brown euhedral crystals up to 2.5 cm long at the property of Duvex Oils and Mines Limited, in Mitchell Township (D.M. Shaw, 1958: Que. Dept. Mines, Geol. Rept., 80, p. 45).

zoisite

(see EPIDOTE)

NTS INDEX TO MINERAL LOCALITIES

ALBERTA

72 E/13	gypsum
72 E/16	quartz (agate)
72 L/1	quartz (agate)
72 L/2	quartz (agate)
72 L/13	opal, quartz
72 M/8	gypsum
73 E	gold
73 E/15	halite
74 D/11	anhydrite, enargite, gypsum, halite
74 D/14	sulphur
74 L/14	uraninite
74 L/15	uraninite
74 M/1	uraninite
74 M/6	gypsum
74 M/10	uraninite
82 G/7	halite
82 G/9	aegirine-augite, analcime, andradite, magnetite
82 G/10	potassium feldspar
82 H/4	magnetite
82 H/5	bornite, covellite
82 J/7	anhydrite
82 J/15	epsomite, fibroferrite
82 O/1	copiapite
82 O/4	azurite, bornite, enargite, malachite
82 O/11	bornite
82 P/7	quartz
82 P/15	quartz (silicified wood)
82 A/6	gold
83 C/3	sulphur
83 E/7	gypsum
83 E/8	gypsum
83 F/4	sulphur, topaz
83 F/5	gypsum
83 G/8	iron
83 G/12	gold
83 H	gold
83 H/11	platinum
83 H/12	platinum
83 I/3	thenardite
83 K	sulphur
83 L	sulphur
83 M	sulphur
83 N	sulphur
83 N/11	halloysite
83 N/12	pickeringite
84 C	sulphur
84 C/3	sal-ammoniac
84 I/10	monazite
84 I/14	monazite
84 P/1	gypsum
84 P/2	gypsum

BRITISH COLUMBIA

82 E	bornite, platinum, tulameenite
82 E/1	barite, boulangerite, fluorite, gersdorffite, gold, malachite, uraninite, uranophane
82 E/2	acanthite, altaite, analcime, azurite, bismuthinite, bornite, boulangerite, cuprite, hematite, hessite, malachite, nickel hydroxide mineral (unnamed), opal, petzite, pyrargyrite, talc, tellurium, tetradymite
82 E/3	bismuthinite, gold, pentlandite, platinum
82 E/4	acanthite, chlorargyrite, epsomite, hessite, petzite, proustite, pyrargyrite, rhodonite, silver, tetrahedrite, wurtzite
82 E/5	altaite, analcime, braunite, brewsterite, gold, hessite, heulandite, laumontite, mordenite, natrolite, petzite, potassium feldspar, rhodochrosite, rhodonite, silver, tellurbismuth, thomsonite
82 E/6	acanthite, aikinite, aragonite, galena, polybasite, pyrargyrite, sphalerite, tetrahedrite
82 E/9	pyrargyrite
82 E/11	uraninite
82 E/14	fergusonite, gold
82 E/15	boulangerite, stephanite
82 E/16	boulangerite, sphalerite
82 F	chalcopyrite
82 F/1	thorite
82 F/2	erythrite, hessite, kyanite, magnetite, petzite, tetrahedrite
82 F/3	aragonite, caledonite, hemimorphite, kobellite, meneghinite, powellite, robinsonite, scheelite, tungstite, uraninite, wolframite, wollastonite
82 F/4	apophyllite, arsenopyrite, bismuthinite, boulangerite, chalcopyrite, cinnabar, cobaltite, corundum, erythrite, galena, gmelinite, heulandite, laumontite, magnetite, meneghinite, molybdenite, natrolite, owyheeite, prehnite, pyrrhotite, scheelite, sphalerite, tetradymite, tintinaite, uraninite
82 F/5	fergusonite, monazite, samarskite, scheelite, tenorite, thorite, uraninite
82 F/6	acanthite, azurite, bornite, cerussite, gold, magnesite, magnetite, malachite, scheelite, spencerite, stromeyerite, tarbuttite, tetrahedrite, uraninite
82 F/7	beryl
82 F/8	gold, scheelite
82 F/9	beryl, calcite, cerussite, columbite, galena, jamesonite, scheelite, sphalerite, stolzite
82 F/10	arsenopyrite, bournonite, fibroferrite, galena, hemimorphite, minnesotaite, olivine, pyrite, pyrrhotite, rhodochrosite, silver, sphalerite
82 F/11	allanite, arsenic, bornite, chrysocolla, fergusonite, fluorite, pyrolusite, siderite
82 F/12	biotite
82 F/13	bastnaesite, boulangerite
82 F/14	acanthite, anglesite, aragonite, azurite, barite, bastnaesite, bornite, boulangerite, bournonite, cerussite, covellite, galena, gersdorffite, heulandite, jamesonite, opal, owyheeite, proustite, pyrargyrite, scheelite, siderite, silver, staurolite, stephanite, tetrahedrite
82 F/15	calcite, galena, rhodonite, stannite, tenorite
82 F/16	beryl, biotite, cassiterite, scheelite
82 G/4	barite
82 G/5	altaite, cerussite, galena, pyromorphite, wulfenite
82 G/6	barite, limonite
82 G/9	heulandite
82 G/11	chalcopyrite, scheelite, tetrahedrite
82 G/12	azurite, bismuthinite, boulangerite, cassiterite, copper, scheelite, silver, wolframite
82 G/13	cinnabar, tetrahedrite
82 J/4	gypsum
82 J/5	gypsum
82 J/13	magnesite
82 K/1	boulangerite
82 K/2	aurichalcite, barite, biotite, calcite, gunningite, hydrozincite, margarite, muscovite, smithsonite, woodruffite
82 K/3	acanthite, altaite, anglesite, cerussite, copper, jamesonite, kermesite, pyrargyrite, sphalerite, staurolite, stibnite, tetradymite, tetrahedrite
82 K/4	acanthite, bornite, tetrahedrite
82 K/7	clinohumite, galena
82 K/8	barite, bournonite, hydrozincite, scheelite, tennantite, tetrahedrite
82 K/9	pyrochlore, tennantite, tetrahedrite
82 K/10	scheelite, smithsonite
82 K/11	aragonite, nagyagite, platinum, tetrahedrite

82 K/12	scheelite, tetrahedrite
82 K/13	boulangerite, cassiterite, rhodochrosite, staurolite
82 K/15	jamesonite, pyrochlore, thorite, uraninite
82 K/16	barite
82 L/1	jamesonite, polybasite
82 L/3	chalcanthite, fluorite
82 L/4	joseite, quartz, tetradymite, wehrlite
82 L/5	analcime, anhydrite, chabazite, cowlesite, ferrierite, levyne, offretite, quartz, stilbite, thomsonite
82 L/6	andalusite, uraninite
82 L/7	uraninite
82 L/11	bornite, gypsum, kyanite
82 L/12	alunogen
82 L/13	mercury
82 L/14	bismuthinite, stannite
82 L/15	pyrrhotite, tetrahedrite
82 L/16	beryl, boulangerite, lepidolite, tourmaline
82 M/1	bournonite, galena, gersdorffite, meneghinite, molybdenite, sphalerite
82 M/3	galena, sphalerite
82 M/4	acanthite, barite, copiapite, galena, proustite, silver, sphalerite, tetrahedrite
82 M/6	copiapite
82 M/7	galena, sphalerite
82 M/8	chalcopyrite, galena, molybdenite, sphalerite
82 M/9	chalcopyrite, gold
82 M/11	vesuvianite
82 M/12	bastnaesite, celestine, fluorite, thorite, uraninite
82 M/13	scheelite
82 M/15	galena, sphalerite
82 M/16	beryl, galena, kyanite, sphalerite
82 N/1	andradite, caledonite, hydronephelite, ilmenite, knopite, lamprophyllite, lavenite, nepheline, perovskite, ramsayite, sodalite, talc
82 N/2	barite, nepheline
82 N/3	linarite
82 N/4	beryl, bornite, canfieldite, cassiterite, kesterite, scheelite, stannite
82 N/5	anglesite, azurite, cerussite, jamesonite, lepidolite, malachite, smithsonite, tetrahedrite
82 N/7	cinnabar, muscovite, szomolnokite
82 N/8	cookeite, sphalerite
82 N/10	muscovite
82 N/11	muscovite, siderite
83 D/1	beryl, kyanite
83 D/6	pyrochlore, uraninite, vermiculite
83 D/11	kyanite
83 D/14	beryl, kyanite, topaz
83 D/15	alunogen
92 A	osmiridium
92 A/6	quartz
92 B	osmiridium
92 B/5	analcime, chabazite, chalcopyrite, laumontite, magnetite, prehnite, pumpellyite, pyrrhotite, quartz (agate, jasper) stilbite, talc
92 B/6	pyrrhotite, quartz
92 B/12	arsenic
92 B/13	barite, bornite, quartz
92 C/8	chalcopyrite, cubanite
92 C/9	magnetite, rhodonite
92 C/13	gold
92 C/14	cinnabar, magnetite, mercury
92 C/15	ilvaite, magnetite
92 C/16	bornite, ilvaite, rhodonite
92 E/8	bornite, magnetite
92 E/9	chalcopyrite, gold
92 E/10	wollastonite
92 E/15	chalcopyrite, gold, magnetite
92 E/16	magnetite
92 F/2	arsenic, gold, magnetite
92 F/3	chalcopyrite, magnetite
92 F/4	bornite
92 F/5	chalcopyrite, gold, owyheeite, pyrargyrite, tetrahedrite
92 F/6	stibnite
92 F/7	stibnite
92 F/9	bornite, calcite, limonite, magnetite, wollasonite
92 F/10	andradite, calcite, grossular, hessite, limonite, magnetite, vesuvianite, wehrlite, wollasonite
92 F/11	copper
92 F/12	chalcopyrite, galena, magnetite, owyheeite, prehnite, pumpellyite, pyrargyrite, sphalerite
92 F/13	magnetite
92 F/14	arsenic, arsenolite, chalcostibite, hessite, orpiment, realgar, scorodite, wehrlite
92 F/15	bornite, calcite, erythrite, gold, limonite, tellurium
92 G/2	quartz (jasper)
92 G/4	copper, halite, quartz
92 G/6	sphalerite
92 G/10	tetradymite
92 G/11	anhydrite, bornite, chalcopyrite, cuprite, pyrite, tellurbismuth
92 G/16	altaite
92 H	actinolite, isoferroplatinum, platinum, serpentine, tulameenite
92 H/1	wolframite
92 H/3	berthierite, jamesonite, stibnite
92 H/5	epidote, wehrlite
92 H/6	actinolite, chalcopyrite, chrysocolla, copper, cyanochroite, enargite, gold, hexahydrite, lazulite, mercury, pentlandite, pyrrhotite, stibnite, tetrahedrite, uraninite
92 H/7	ankerite, corundum, gold, iridium, iridosmine, magnetite, osmiridium, platiniridium, platinum, pyrophyllite, quartz, ruthenirídosmine, tetrahedrite
92 H/8	axinite, bismuth, boulangerite, chalcanthite, cobaltite, erythrite, hedenbergite, hedleyite, joseite, opal, osmiridium, quartz, safflorite, tetradymite, wollastonite
92 H/9	malachite, tetrahedrite
92 H/10	bornite, chalcopyrite, diamond, millerite, platinum, sperrylite
92 H/11	tetrahedrite
92 H/12	epidote
92 H/13	actinolite, talc
92 H/14	cinnabar
92 H/15	bornite, chalcocite, copper, malachite, quartz (chalcedony)
92 H/16	chalcopyrite, molybdenite, tetrahedrite
92 I	ankerite, actinolite, platinum
92 I/1	mesolite, szajbelyite
92 I/2	azurite, barite, bornite, chalcocite, chalcopyrite, chrysocolla, harmotome, malachite, montmorillonite
92 I/3	cinnabar, mesolite, quartz, stilbite
92 I/4	magnetite, metazeunerite, platinum, quartz, scheelite, sperrylite, stibnite, thorianite, uraninite, vesuvianite
92 I/5	magnetite
92 I/6	bornite, chalcocite, chalcopyrite, magnetite, molybdenite, powellite, quartz, tourmaline
92 I/7	ankerite, chalcocite, chalcopyrite, scheelite
92 I/8	gold, opal, scheelite
92 I/9	bornite, chalcocite, chalcopyrite, columbite, hydromagnesite, magnetite, quartz (chalcedony)
92 I/10	ankerite, bornite, chalcocite, chalcopyrite, cinnabar, copper, erionite, heulandite, magnetite, opal, quartz, tetrahedrite
92 I/11	alunogen, brochantite, chalcoaluminite, chromite, chrysocolla, copiapite, coquimbite, epsomite, halotrichite, hematite, hexahydrite, romerite, rozenite, souesite, sphalerite, tourmaline
92 I/12	alunogen, andradite, hornblende, molybdenite, nickel-iron, stibnite, tetrahedrite, uraninite
92 I/14	chalcanthite, chromite, diamond, epsomite, hexahydrite, magnesiochromite, poitevinite, prehnite, pyrophyllite, sphalerite, stibnite, tennantite
92 I/15	alunogen, analcime, ankerite, antimony, arsenic, cinnabar, copper, ferrierite, gold, heulandite, mesolite, natrolite, oligoclase, potassium feldspar, prehnite, stibnite
92 I/16	oligoclase, quartz
92 J	actinolite
92 J/7	chalcocite
92 J/9	powellite, scheelite, talc

92 J/10	stibnite
92 J/15	actinolite, allanite, arsenopyrite, chromite, cinnabar, gold, magnesite, nickel-iron, prehnite, stibnite, sylvanite, tetrahedrite, uraninite
92 J/16	actinolite, powellite, scheelite, serpentine
92 K/3	brochantite, carnotite, chalcocite, langite, metacinnabarite, prehnite, pumpellyite, quartz, tellurbismuth, volborthite
92 K/6	bornite, carnotite
92 K/7	magnetite
92 K/11	magnetite
92 K/13	hornblende
92 K/15	bornite, cinnabar
92 L	pyrophyllite
92 L/2	chalcopyrite, gold, magnetite, realgar
92 L/3	natroalunite, pyrophyllite, tellurbismuth
92 L/5	magnetite
92 L/6	bornite, chalcopyrite, magnetite
92 L/7	magnetite
92 L/8	bornite, chalcopyrite
92 L/11	chalcopyrite, dumortierite
92 L/12	chalcopyrite, dumortierite, fibroferrite, sphalerite
92 M/2	magnetite
92 N/8	stibnite
92 N/9	jamesonite
92 O	platinum
92 O/1	arsenic, arsenolite, nitre, quartz (agate, jasper), realgar, stibnite, wehrlite
92 O/2	chromite, cinnabar, jamesonite, mercury, scheelite, stibnite, zinckenite
92 O/3	muscovite, tetradymite, tetrahedrite
92 O/4	altaite, antimony, gold, hessite, wehrlite
92 O/5	gold, hessite
92 O/8	opal, quartz
92 O/15	hydromagnesite, melanterite
92 O/16	rhodonite
92 P/2	gold
92 P/3	chabazite, opal, sphalerite
92 P/4	epsomite, gold, gypsum, hydromagnesite, manganite, natron, psilomelane, pyrolusite, sphalerite
92 P/5	hydromagnesite, natron, quartz
92 P/6	bornite
92 P/8	fluorite, gold, joseite, magnetite, rhodonite, stibnite
92 P/9	fluorite, galena, molybdenite, muscovite, rhodonite
92 P/11	cookeite, hydromagnesite
92 P/14	olivine (periodot), tourmaline
93 A	gold
93 A/1	topaz
93 A/2	molybdenite
93 A/3	scheelite, siderite
93 A/6	analcime, aragonite, barite, copper, leucite, opal, platinum, strontianite
93 A/10	fluorite
93 A/11	muscovite, platinum
93 A/12	chrysocolla, covellite, cuprite, malachite, osmiridium, platinum
93 A/13	ankerite, muscovite
93 A/14	scheelite, stolzite, tungstite
93 B	platinum
93 B/1	millerite
93 B/9	chalcopyrite, osmiridium, platinum
93 B/13	nitre
93 B/14	halite
93 B/15	psilomelane
93 B/16	leucophosphite, osmiridium, platinum
93 C/9	magnetite
93 C/11	psilomelane
93 C/14	magnetite, psilomelane
93 D/4	magnetite
93 D/11	magnetite
93 E	altaite
93 E/6	cosalite, frohbergite, hessite, meneghinite, scheelite, stutzite, sylvanite, tetradymite
93 E/10	meneghinite
93 E/11	galena
93 E/15	quartz (agate, chalcedony)
93 F/6	frohbergite
93 F/12	quartz (agate, chalcedony)
93 F/15	sabugalite
93 G	platinum, serpentine
93 G/1	olivine (peridot)
93 G/11	pyrite
93 H	gold
93 H/3	scheelite
93 H/4	cosalite, siderite, scheelite, galenobismutite
93 H/6	mercury
93 J/15	gold
93 K/1	psilomelane, pyrolusite
93 K/2	pyrolusite
93 K/3	molybdenite
93 K/4	collinsite, ferrierite, heulandite, natrolite, opal, phillipsite, quercyite, thomsonite
93 K/8	cinnabar, stibnite
93 K/9	cinnabar
93 K/13	rhodonite
93 K/14	actinolite
93 L/1	lazulite
93 L/2	aikinite, berryite, gold, matildite, rhodochrosite, tennantite
93 L/10	chalcopyrite, sphalerite, tetrahedrite
93 L/11	bismuthinite, bornite
93 L/13	tennantite
93 L/14	bornite, calaverite, joseite, matildite, molybdenite, scheelite, stibnite, wolframite
93 L/15	bornite, boulangerite, chalcopyrite, galena, sphalerite, tetrahedrite
93 L/16	chalcopyrite
93 M/1	chalcopyrite
93 M/3	boulangerite
93 M/4	allanite, brochantite, chalcopyrite, chrysocolla, cobaltite, erythrite, glaucodot, posnjakite, pyrite, safflorite, scheelite, skutterudite, uraninite, wolframite
93 M/5	cosalite, galena, gold, jamesonite, meneghinite, polybasite, pyrargyrite, scheelite, stibnite, willemite
93 M/6	jamesonite, tetrahedrite
93 M/11	magnetite
93 M/16	bornite
93 N/1	jamesonite, powellite, scheelite
93 N/6	braunite, psilomelane
93 N/7	gold
93 N/9	barite, gold, pyrochlore, scheelite
93 N/10	gold
93 N/11	andorite, cinnabar, jamesonite, silver, stibnite, tetrahedrite, uraninite
93 N/13	actinolite
93 N/15	gold, silver
93 O/5	uraninite
93 O/16	platinum
93 P/15	quartz
94 A/2	epsomite, mirabilite
94 A/4	calcite
94 C/7	beryl, cassiterite
94 C/10	pyrargyrite, sphalerite
94 C/11	galena, pyrargyrite
94 C/12	linnaeite
94 C/13	bournonite
94 D/8	beryl
94 D/9	gold
94 D/10	bornite, chalcocite, chalcopyrite, copper
94 D/16	gold
94 E/6	electrum, gold, silver
94 F/4	pyrrhotite
94 F/13	sylvanite
94 K/2	sulvanite
94 K/4	sylvanite
94 K/6	chalcopyrite
94 K/10	barite
94 K/11	chalcopyrite, dolomite, malachite, quartz
94 M/8	barite, barytocalcite, copiapite, fluorite, witherite
94 M/9	alunogen, jarosite
94 M/10	gold
94 M/11	gold
94 N/4	barite
103 B/5	magnetite
103 B/6	arsenic, magnetite
103 B/12	bornite, magnetite
103 B/13	magnetite
103 C/16	chalcopyrite, gold, magnetite
103 F	quartz, hydrocarbons
103 G	quartz (agate, chalcedony)
103 G/4	gold, magnetite, stibnite
103 G/5	gold
103 G/12	gold
103 G/13	gold
103 G/16	magnetite
103 H/1	tellurbismuth
103 H/2	tellurbismuth
103 H/12	magnetite
103 H/13	laumontite, pyrite
103 H/14	bornite, chalcocite, gold, silver
103 I/2	magnetite
103 I/6	halite
103 I/8	gold
103 I/9	bornite, covellite, empressite, galena, gold, malachite, rickardite, scheelite, tellurium
103 I/15	tetrahedrite
103 I/16	gold
103 J	quartz, hydrocarbons
103 J/1	magnetite
103 J/4	gold
103 J/8	staurolite
103 K	quartz, hydrocarbons

103 K/2	manganite, pyrolusite
103 P/5	chalcopyrite, pyrargyrite, scheelite
103 P/6	aikinite, cosalite, molybdenite, neyite, nuffieldite, pyrargyrite
103 P/11	allophane, marcasite
103 P/12	acanthite, argyrodite, marcasite, polybasite, pyrargyrite, silver, tetrahedrite
103 P/13	jamesonite, pyrite, scheelite, tetrahedrite
103 P/14	berthierite
104 A/4	pyrite, scheelite, tetrahedrite
104 B/1	brochantite, chalcopyrite, electrum, gold, linarite, tetrahedrite
104 B/8	electrum, gold
104 B/9	sphalerite, tetrahedrite
104 G/3	bornite, chalcopyrite, cuprite
104 G/7	chalcopyrite, molybdenite
104 G/10	aenigmatite
104 G/12	azurite, malachite
104 G/14	bornite
104 I/1	bornite, chalcopyrite, sphalerite
104 I/6	millerite, serpentine
104 I/7	actinolite, pentlandite, serpentine
104 I/9	scheelite
104 J/6	aenigmatite
104 J/8	iridosmine
104 J/9	gold
104 J/15	platinum
104 J/16	actinolite, gold, platinum
104 K/7	molybdenite
104 K/10	chalcopyrite, enargite, stibnite, tetrahedrite
104 K/11	galena, graphite, sphalerite, stibnite, tetrahedrite
104 K/12	arsenopyrite, boulangerite, chalcopyrite, galena, gold, jamesonite, muscovite, pyrite, sphalerite, stibnite, tennantite
104 M/1	cobaltite, erythrite
104 M/8	allemontite, antimony, calaverite, gold, roscoelite
104 M/9	bismuth
104 M/15	stibnite
104 N	quartz (jasper)
104 N/4	stibnite
104 N/5	copper
104 N/11	cassiterite, gold, iridosmine, lansfordite, magnesiochromite, molybdenite, osmiridium, osmium, powellite, rutheniridosmine, uraninite, wolframite
104 N/12	ankerite, galena, gold, hydromagnesite, iridosmine, lansfordite, linarite, metazeunerite, osmiridium, osmium, quartz, rutheniridosmine, sphalerite, uraninite, zeunerite
104 O/3	aegirine, riebeckite
104 O/6	riebeckite
104 O/7	andradite, epidote, vesuvianite
104 O/9	beryl, chromite, fluorite, scheelite
104 O/13	beryl, cosalite, gold, wolframite
104 O/16	galena, stannite, tetrahedrite
104 P/3	azurite, barite, chalcopyrite, galena, gold, hydrozincite, malachite, scheelite, sphalerite
104 P/4	beryl, bismuth, danalite, gold, pentlandite, scheelite
104 P/5	actinolite, alabandite, antimony, bismuthinite, cassiterite, cordierite, cosalite, dyscrasite, gold, magnesite, marcasite, rhodonite, serpentine, silver
104 P/6	actinolite, gold, rhodonite
104 P/7	beryl
104 P/11	gold
104 P/12	gold, heazlewoodite, nickeline
114 P/10	azurite, bornite, chalcocite, chalcopyrite, covellite, gahnite, galena, malachite, monticellite, sphalerite

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52 E/11	amblygonite, beryl, molybdenite, scheelite, spodumene
52 E/12	molybdenite
52 E/13	zircon
52 E/14	thorite, uraninite
52 G/1	vivianite
52 J/13	spodumene
52 L	almandine, quartz
52 L/5	albite, chromite, columbite, lepidolite, molybdenite, monazite, pentlandite, petalite, pollucite, rhodochrosite, sicklerite, tantalite, tapiolite, tourmaline, wodginite, zinnwaldite
52 L/6	albite, allanite, allemontite, amblygonite, analcime, antimony, apatite, bastnaesite, bavenite, beryl, bismuth, bismuthinite, bityite, cassiterite, chalcopyrite, columbite, cordierite, cosalite, cubanite, eucryptite, euxenite, fersmite, fuchsite, gadolinite, gahnite, gladite, gustavite, jamesonite, lepidolite, lithiophillite, lithiophosphate, manganotantalite, monazite, muscovite, pekoite, pentlandite, petalite, pollucite, pyrochlore, quartz, rutile, sicklerite, sklodowskite, smythite, spodumene, stannite, stibiotantalite, stibnite, synchysite, tantalite, tapiolite, topaz, tourmaline, triphylite, uraninite, violarite, wodginite
52 L/11	beryl, gold, spodumene
52 L/12	gold, pentlandite, pollucite
52 L/13	gold, hessite, stibnite, tellurbismuth
52 L/14	gold
52 M/4	gold, petzite
52 P/9	spodumene
53 K/4	cassiterite
53 L/13	stibnite
53 N/2	amblygonite, muscovite, tourmaline
53 O/13	sillimanite
54 L/9	lazulite
62 C/14	melanterite
62 G/1	vivianite
62 G/8	psilomelane
62 G/9	anhydrite
62 H/3	gypsum
62 H/14	gypsum
62 I	quartz
62 J/3	halite
62 J/8	gypsum
62 J/10	anhydrite, gypsum, quartz
62 J/12	pyrolusite
62 N/12	pyrrhotite
62 O/9	copper
62 O/10	anhydrite
62 O/15	gypsum
62 P/1	gold, violarite
62 P/7	barite
62 P/12	gold
63 B/13	marcasite
63 F/8	hydrocarbons
63 I/6	galena, gold, sphalerite
63 I/7	boulangerite, sphalerite
63 I/12	beryl, magnetite, spodumene
63 J/10	calcite, lepidolite, pentlandite, pyrite, pyrrhotite, violarite
63 J/13	arsenopyrite, beryl, chalcopyrite, chamosite, cordierite, gahnite, gold, kyanite, labradorite, leonhardtite, pyrite, pyrrhotite, sphalerite, sphene, sulphur, tetrahedrite, tourmaline
63 K/3	beryl
63 K/6	marcasite
63 K/9	calcite, pyrite, pyrrhotite
63 K/10	gold
63 K/11	altaite, gold
63 K/12	brochantite, chalcanthite, devilline, gypsum, jarosite, malachite, melanterite, pyrite, rutile, sphalerite
63 K/13	almandine, altaite, bournonite, brochantite, chalcopyrite, cubanite, electrum, enargite, gold, greenockite, jarosite, leonhardtite, pentlandite, posnjakite, pyrite, rozenite, sillimanite, sphalerite, sylvanite, tetradymite, tetrahedrite
63 K/14	altaite, sphalerite
63 K/15	gold
63 K/16	anhydrite, anthophyllite, arsenopyrite, axinite, bournonite, calcite, chalcopyrite, cordierite, gahnite, gold, gudmundite, jarosite, kyanite, leonhardtite, meneghinite, pyrite, pyrrhotite, scheelite, sphalerite, sphene, staurolite, tetrahedrite, tourmaline

63 L/9 tetradymite, tetrahedrite
63 N/2 anthopyllite, cordierite
63 N/3 almandine, analcime, calcite, chabazite, chalcopyrite, cubanite, devilline, jarosite, marcasite, natrolite, pyrite, pyrrhotite
63 O/1 pentlandite, pyrite, pyrrhotite, violarite
63 O/8 pentlandite, pyrite, pyrrhotite
63 O/13 pentlandite
63 P/12 chalcopyrite, gersdorffite, marcasite, pentlandite, pyrite, pyrrhotite, sphene, westerveldite
63 P/13 pentlandite, pyrite, pyrrhotite
64 A/2 pyrrhotite
64 B/3 cordierite
64 C/4 pyrrhotite, violarite
64 C/7 beryl
64 C/14 gold, natrolite
64 I/7 jamesonite, tetrahedrite

NEW BRUNSWICK

21 B/1 quartz
21 B/10 analcime, chalcocite, copper, epistilbite, heulandite, natrolite, quartz, scolecite, stilbite, thomsonite
21 B/15 analcime, barite, chalcocite, epistilbite, heulandite, natrolite, quartz, scolecite, stilbite, thomsonite
21 G/1 azurite, gold, graphite, hematite, molybdenite, sphalerite, tetrahedrite
21 G/2 barite, bismuth, bornite, copper, fluorite, gold, magnetite, molybdenite, pyrrhotite, vesuvianite
21 G/3 andalusite, arsenopyrite, chromite, pentlandite, pyrite, pyrrhotite
21 G/6 andalusite, gold, graphite, molybdenite, pyrrhotite, staurolite
21 G/7 aikinite, arsenobismite, arsenopyrite, bismuth, bismuthinite, bornite, cassiterite, chalcopyrite, cosalite, covellite, dickite, dzhalindite, ferrimolybdite, fluorite, galena, galenobismutite, glaucodot, gold, indium, kesterite, lollingite, marcasite, mawsonite, molybdenite, monazite, pyrargyrite, roquesite, rutile, scheelite, scorodite, sphalerite, stannite, stannoidite, stibnite, tennantite, tetrahedrite, topaz, wittichenite, wolframite, xenotime
21 G/8 arsenopyrite, beryl, bismuth, calcite, cassiterite, fluorite, graphite, hematite, molybdenite, tetrahedrite, wolframite
21 G/9 arsenopyrite, fluorite, pyrargyrite, quartz, stibnite, tetrahedrite
21 G/10 uraninite
21 G/11 fluorite, kermesite, stibnite, uranospinite
21 G/12 uraninite
21 G/14 antimony, berthierite, bindheimite, kermesite, molybdenite, stibnite, valentinite
21 G/15 azurite, limonite
21 G/16 gold, limonite
21 H/4 azurite, chrysocolla, hematite, quartz
21 H/5 barite, graphite, gypsum, jarosite, manganite, psilomelane, pyrolusite, quartz
21 H/6 bornite, gypsum
21 H/7 chabazite
21 H/8 chabazite
21 H/10 alunite, azurite, barite, bornite, chalcocite, covellite, gold, gypsum, manganite, psilomelane, pyrolusite, tennantite
21 H/11 barite, bornite, braunite, calcite, graphite, gypsum, hausmannite, ilmenite, manganite, psilomelane, pyrolusite
21 H/12 gypsum, magnetite, quartz, stibnite, tetrahedrite
21 H/13 gypsum, quartz, stibnite
21 H/14 graphite, gypsum, manganite, psilomelane, pyrolusite
21 H/15 anhydrite, azurite, graphite, gypsum, halite, hydrocarbons, inyoite, manganite, psilomelane, pyrolusite, tennantite, ulexite
21 H/16 chalcocite, covellite, fluorite
21 I/2 barite, chalcocite, fluorite
21 I/4 gold, hematite, limonite
21 I/7 limonite
21 I/14 marcasite
21 J/1 marcasite
21 J/2 beryl
21 J/3 calcite, gold, limonite, molybdenite, stibnite
21 J/4 barite, braunite, gold, jarosite, psilomelane, rhodochrosite, rhodonite, sursassite
21 J/5 stibnite
21 J/6 gold, hematite, pentlandite, pyrrhotite, stibnite
21 J/7 cassiterite, magnetite, rhodochrosite, siderite
21 J/10 apatite, arsenopyrite, barite, beryl, bismuth, cassiterite, fluorite, jarosite, molybdenite, pyrrhotite, rhodochrosite, rhodonite, rozenite, topaz, wolframite
21 J/13 quartz
21 J/14 gypsum, quartz
21 J/16 bornite, chrysocolla, cinnabar, gold, mercury
21 O sphalerite
21 O/1 galena, gold, pyrite, sphalerite, vivianite
21 O/2 gold
21 O/3 bornite, gold
21 O/7 arsenopyrite, galena, pyrite, sphalerite
21 O/8 aikinite, anglesite, arsenopyrite, bismuth, bismuthinite, bismutite, boulangerite, bournonite, chalcocite, cobaltite, covellite, galena, gold, jarosite, marcasite, pentlandite, pyrite, pyrrhotite, sphalerite, tennantite, tetrahedrite
21 O/9 arsenopyrite, covellite, galena, gold, pyrite, sphalerite, tetrahedrite
21 O/10 arsenopyrite, galena, pyrite, quartz, sphalerite
21 O/15 gold, heulandite, uraninite
21 O/16 apatite, barite, calcite, uraninite
21 P beudantite, sphalerite
21 P/3 limonite
21 P/4 cobaltite
21 P/5 anglesite, antlerite, arsenopyrite, barite, bismuth, boulangerite, bournonite, cassiterite, chalcanthite, chalcocite, chalcopyrite, copiapite, copper, covellite, cubanite, domeykite, enargite, galena, galenobismutite, gold, hematite, jamesonite, jarosite, krennerite, lepidocrocite, linnaeite, magnetite, marcasite, molybdenite, petzite, plumbojarosite, pyrite, pyromorphite, pyrrhotite, romerite, scorodite, siderite, siderotil, sphalerite, stannite, szomolnokite, tetrahedrite, woodhouseite
21 P/10 uraninite
21 P/11 barite, calcite
21 P/12 arsenopyrite, beryl, calcite, canfieldite, galena, goethite, gold, magnetite, manganite, marcasite, molybdenite, psilomelane, pyrite, pyrolusite, pyrrhotite, rhodonite, rozenite, scheelite, sphalerite, stibnite, tetrahedrite, wolframite
21 P/13 analcime, arsenopyrite, bornite, calcite, covellite, galena, jamesonite, molybdenite, pyrite, quartz, sphalerite
21 P/15 connellite, malachite, rozenite
22 B/1 calcite, heulandite, laumontite, prehnite, quartz, stilbite, thomsonite

NEWFOUNDLAND

1 L/14 azurite, barite, chrysocolla, fluorite
1 L/16 barite
1 M proustite
1 M/6 spinel
1 M/10 barite, hematite, malachite, pyrite, quartz, riebeckite

1 M/16	alunite
1 N/5	galena
1 N/6	bornite, brochantite, chalcocite, chalcopyrite, posnjakite, pumpellyite
1 N/7	bornite, chalcocite, chalcopyrite, diaspore, tetrahedrite
1 N/10	birnessite, chamosite, hematite, prehnite, pyrite, pyrophyllite, quartz, rhodochrosite, siderite
1 N/11	bornite, hematite
1 N/12	barite, covellite, galena, malachite
1 N/14	quartz
2 C/3	hematite
2 C/4	goethite, hematite
2 C/5	magnesite
2 C/13	quartz
2 D/8	chalcopyrite
2 D/10	cordierite, riebeckite
2 D/16	andalusite
2 E/5	quartz
2 E/8	scheelite, tungstite
2 E/10	arsenopyrite, kermesite, quartz, realgar, scorodite, stibiconite, stibnite, valentinite
2 E/12	anglesite, cerrussite, chalcopyrite, covellite, jarosite, pyrite, quartz, tetrahedrite, wurtzite
2 E/13	annabergite, chalcopyrite, chloanthite, copper, erythrite, gersdorffite, maucherite, millerite, nickeline, rammelsbergite, silver, violarite
2 F/4	beryl, chalcopyrite, chrysoberyl, tourmaline
2 M/5	chalcopyrite
3 E/4	labradorite
11 B/9	beryl
11 O/4	gypsum, pyrite
11 O/9	beryl, gold
11 O/10	beryl, sillimanite
11 O/11	sillimanite
11 O/14	anhydrite, gypsum
11 O/16	sphalerite
12 A/13	calcite
12 A/15	acanthite, barite, bornite, chalcopyrite, covellite, galena, prehnite, sphalerite, silver, tennantite
12 B	marcasite
12 B/2	anhydrite, enstatite, gypsum
12 B/3	anhydrite, gypsum
12 B/7	anhydrite, gypsum, howlite, ulexite
12 B/8	magnetite
12 B/9	beryl, magnetite, uraninite
12 B/10	aragonite, barite, calcite, celestine, galena, hematite, labradorite, marcasite
12 B/11	gypsum
12 B/15	chromite, copper, cuprite, serpentine
12 B/16	chromite
12 G/1	chalcopyrite, chromite, epidote, hornblende, pectolite, prehnite, pumpellyite, serpentine, sphalerite, xonotlite
12 G/8	pectolite, serpentine
12 H/1	andalusite, anthophyllite, chalcopyrite, cordierite
12 H/4	pumpellyite
12 H/5	pectolite, pumpellyite
12 H/9	arsenic, chalcopyrite, covellite, cubanite, epidote, mackinawite, marcasite, pyrite, pyrrhotite
12 H/15	calcite, gold, rutile
12 H/16	chalcopyrite, copper, cuprospinel, leonhardtite, prehnite, rozenite, rutile, serpentine, siderotil
12 I/1	epidote, rutile
12 I/5	sphalerite
12 I/6	marcasite
12 I/9	calcite
12 L/15	muscovite
13 E/7	sapphirine
13 E/15	arfvedsonite
13 G/11	labradorite
13 K/5	aegirine, aegirine-augite, arfvedsonite, barylite, copper, eudialyte, eudidymite, neptunite, niobophyllite, riebeckite, uraninite
13 O/2	potassium feldspar, topaz
13 O/3	uraninite
14 C/3	labradorite
14 C/5	labradorite
14 C/11	hypersthene
14 C/12	graphite, hypersthene
14 C/13	cordierite, sapphirine
14 D/8	cordierite, hypersthene, osumilite
14 E/2	olivine
14 L/7	graphite
14 L/14	galena
23 B	cummingtonite
23 B/15	cummingtonite, grunerite, hematite
23 G	cummingtonite
23 G/2	anthophyllite, hematite
23 H/9	anhydrite
23 J/1	chamosite
23 J/7	quartz
23 J/8	quartz
25 A/7	graphite

NORTHWEST TERRITORIES

25 K/13	graphite, lazurite
26 B/15	sillimanite
26 G	graphite
26 G/6	spinel
26 K/8	wollastonite
27 C	calcite
33 M/15	magnetite
34 C	ankerite
34 C/2	quartz, siderite
34 D/2	magnetite
34 F	ankerite
35 P/10	diopside
35 P/16	talc
36 A/6	talc
36 B/8	magnetite
36 B/9	magnetite
37 C/9	hematite, magnetite
37 C/15	hematite
37 D	calcite
37 E	calcite
38 B/10	copper
44 A/1	riebeckite
45 O/4	weddellite
46 K/2	cordierite
46 K/14	serendibite
46 O/4	szájbelyite
47 A/4	magnetite
47 A/5	magnetite
47 A/6	magnetite
47 B/2	magnetite
47 B/7	magnetite
48 A/2	galena
48 A/6	galena
48 A/7	galena
48 A/11	chalcocite, chalcopyrite, galena
48 A/13	galena
48 B/15	prehnite, stilbite
48 B/16	prehnite
48 C/1	galena, pyrite, sphalerite
48 C/2	pyrite
48 C/3	quartz
55 K/2	chalcopyrite, molybdenite
55 K/6	chalcocite, chalcopyrite, galena, molybdenite
55 K/7	arsenopyrite
55 K/16	pentlandite, pyrrhotite
55 L/6	chalcopyrite, galena
55 M/12	uraninite
56 D/2	athabascaite, berzelianite, bornite, clausthalite, umangite, uraninite
56 D/11	molybdenite
58 B/15	azurite, malachite
58 C/3	pyrope
58 D/11	monticellite
58 G/6	galena
59 B/14	quartz
59 G/8	baddeleyite
65 C/14	biotite
65 D/16	gold
65 G/6	gold
65 K	quartz
65 N/7	phlogopite
66 A/1	fluorite
68 H/8	galena, smithsonite, sphalerite
68 H/9	galena, smithsonite, sphalerite
69 E/12	anhydrite, gypsum
69 F/1	anhydrite, gypsum
69 F/2	anhydrite, gypsum
69 F/7	anhydrite, gypsum
69 F/9	anhydrite, gypsum
69 F/10	anhydrite, danburite, gypsum
69 F/16	anhydrite, gypsum
75 B/13	biotite
75 C/13	uraninite
75 D/8	biotite
75 E/13	hydrocarbons
75 K/11	chalcopyrite
75 K/12	chalcopyrite
75 L	emplectite, quartz, uraninite
75 L/4	muscovite
75 L/5	bismuth
75 L/6	uraninite
75 L/7	barite, chalcopyrite
75 L/8	bornite, chalcocite, chalcopyrite, domeykite, erythrite, monazite, uraninite
75 L/11	chalcopyrite
75 L/12	nickeline, rammelsbergite
75 L/16	erythrite, uraninite
75 M/2	alloclasite, beryl, columbite, galena, sphalerite
75 N/12	beryl
75 N/15	beryl
76 B/13	gold, tellurbismuth
76 D/3	gold
76 D/14	monazite
76 E/11	gold
76 M/11	gold
76 M/12	gold

76 N/2	gold
76 O/9	beryl
77 A/3	boulangerite, bournonite
78 B/6	tenorite
78 B/7	malachite
78 B/11	chrysocolla, copper
85 B/16	galena, marcasite, sphalerite, sulphur
85 F/11	scheelite
85 G/1	marcasite
85 G/15	gypsum
85 H/10	wolframite
85 H/11	andalusite, corundum, covellite, marcasite, powellite, scheelite
85 H/12	marcasite, powellite
85 H/16	hydrocarbons
85 I	molybdenite, spodumene
85 I/1	amblygonite, beryl, cassiterite, columbite, huhnerkobelite, spodumene, triphylite
85 I/2	cassiterite, nickeline, parkerite, rammelsbergite
85 I/5	nickeline
85 I/6	spodumene
85 I/7	amblygonite, beryl, columbite, nickeline, scheelite, spodumene
85 I/8	beryl, scheelite, spodumene
85 I/10	vesuvianite
85 I/11	amblygonite, beryl, cassiterite, columbite, gold, scheelite, spodumene, tantalite, tapiolite
85 I/12	anthophyllite, beryl, columbite, scheelite
85 I/13	beryl, columbite, huhnerkobelite, spodumene, triphylite
85 I/14	bismuth, gold, scheelite, tellurbismuth
85 J	spodumene
85 J/8	antimony, arsenopyrite, berthierite, boulangerite, bournonite, cassiterite, chalcostibite, freieslebenite, gersdorffite, gold, gudmundite, jamesonite, jordanite, malachite, marcasite, meneghinite, molybdenite, scheelite, semseyite, stannite, stibnite, tetrahedrite, zinckenite
85 J/9	aurostibite, beryl, chalcopyrite, jamesonite, spodumene
85 J/16	gold, jamesonite
85 M/12	andalusite, cordierite
85 N/1	fergusonite
85 N/7	biotite, uraninite
85 N/8	gold
85 N/10	uraninite
85 O/1	gold
85 O/4	cordierite
85 O/13	fluorite
85 O/14	amblygonite
85 P	andalusite
85 P/3	scheelite
85 P/4	gold
86 B/3	beryl, gold
86 B/5	gold
86 B/6	gold
86 B/12	cummingtonite
86 B/13	biotite
86 C/1	tantalite, tapiolite, uraninite
86 D	schoepite, uranopilite, vandendriesscheite
86 D/9	torbernite, uraninite
86 D/16	torbernite, uraninite
86 E	schoepite, vandendriesscheite
86 E/1	erythrite, schoepite, uraninite
86 E/2	erythrite
86 E/7	erythrite
86 E/8	safflorite, schoepite
86 E/9	benjaminite, bismuth, cobaltite, gersdorffite, gustavite, matildite, nickeline, pararammelsbergite, rammelsbergite, safflorite, silver, skutterudite
86 F	vandendriesscheite
86 F/3	uraninite
86 F/4	uraninite
86 F/12	acanthite, benjaminite, bismuth, bismuthinite, dolomite, gustavite, matildite, nickeline
86 F/13	bismuth, bismuthinite, bornite, breithauptite, chalcocite, chalcopyrite, chalcostibite, cobaltite, famatinite, gersdorffite, glaucodot, nickeline, pearceite, rammelsbergite, safflorite, silver, stromeyerite, tetrahedrite
86 I	erythrite
86 J	mackinawite, valleriite
86 J/5	uraninite
86 J/7	cubanite
86 J/14	copper, iron, mackinawite, nickel-iron, pentlandite, wairauite
86 K/4	acanthite, bismuth, chloanthite, covellite, gersdorffite, glaucodot, hessite, mckinstryite, nickeline, polydymite, psilomelane, silver, skutterudite, stromeyerite, tetrahedrite, uraninite
86 K/5	uraninite
86 K/6	bornite, uraninite
86 K/12	braunite
86 L/1	acanthite, cobaltite, curite, fourmarierite, johannite, kasolite, rammelsbergite, skutterudite, uraninite, uranophane, uranopilite, vandendriesscheite, zippeite
86 L/11	hydromagnesite
86 L/12	hydromagnesite
86 L/14	hydromagnesite
86 N	copper
86 N/7	chalcocite
86 N/8	chalcocite, copper, prehnite
86 N/9	chalcocite, copper
86 N/10	bornite, chalcocite
86 N/11	chalcocite
86 O/3	coalingite, copper, iron, mackinawite, muskoxite, nickel-iron, wairauite
86 O/4	chalcocite
86 O/5	chalcocite, copper, prehnite, silver
86 O/6	chalcocite, copper
86 O/7	chalcocite, copper
86 O/10	chalcocite, copper
86 O/11	chalcocite
86 O/12	chalcocite, copper
86 O/13	actinolite
87 E	copper
87 H/2	celadonite, prehnite
87 K	copper
88 H/16	copiapite
95 E/13	scheelite, vesuvianite
95 F/7	hydrocarbons
95 G/3	geocronite
95 J/8	gypsum
96 F/2	gypsum
105 H/16	scheelite, vesuvianite
106 A/12	galena, sphalerite
120 C/13	leonhardtite, szomolnokite, thenardite
120 C/14	szomolnokite, thenardite
120 F/3	szomolnokite, thenardite
120 F/11	gypsum
340 D/16	szomolnokite, thenardite
340 E/14	gypsum

NOVA SCOTIA

10 N/16	zircon
10 O/13	zircon
11 D	pickeringite
11 D/4	galena
11 D/10	gold
11 D/11	gold
11 D/12	andalusite, arsenopyrite, cordierite, gold, quartz
11 D/13	gold, scheelite
11 D/14	chrysocolla, gold, malachite, tridymite
11 D/15	andalusite, arsenopyrite, cassiterite, gold, rutile, scheelite, tungstite
11 D/16	arsenopyrite, gold
11 E	gypsum, malachite, mesolite, pickeringite
11 E/1	arsenopyrite, gold, pyrophanite, rhodochrosite, rhodonite, spessartine, staurolite
11 E/2	gold
11 E/3	anhydrite, barite, gold, howlite, sphalerite, ulexite
11 E/4	anhydrite, antimony, gold, kermesite, psilomelane, stibnite, valentinite
11 E/5	ankerite, aragonite, barite, calcite, goethite, hematite, howlite, limonite, manganite, psilomelane, pyrite, pyrolusite, siderite, turgite
11 E/6	anhydrite, azurite, barite, calcite, centrallasite cyanolite, galena, gypsum, hausmannite, hematite, manganite, prehnite, psilomelane, pyrolusite, sphalerite, sulphur
11 E/7	anhydrite, ankerite, goethite, limonite, manganite, ramsdellite
11 E/8	brochantite, ramsdellite
11 E/9	halite, hematite, paratacamite
11 E/10	ramsdellite, siderite, sphalerite
11 E/11	covellite
11 E/12	barite, chalcocite, opal
11 E/13	calcite, celestine, halite
11 E/14	halite, magnesite, sylvite

11 E/15	barite
11 E/16	hematite, thorite, zircon
11 F	gypsum
11 F/4	anatase, andalusite, cassiterite, gold
11 F/5	arsenopyrite, beryl, cordierite, gold, hematite, pyrolusite, siderite, staurolite
11 F/6	bornite
11 F/9	sphalerite
11 F/10	anhydrite, barite
11 F/11	anhydrite, barite, bornite, marcasite
11 F/12	bornite, halite, vivianite
11 F/13	bornite
11 F/14	barite, magnesite, montmorillonite
11 F/15	anhydrite, barite, calcite, danburite, galena, hausmannite, howlite, manganite, pyrolusite
11 F/16	bismuthinite, hematite, molybdenite, pyrolusite
11 J/4	aluminocopiapite, epsomite, halotrichite, melanterite, pickeringite, rozenite, sideronatrite
11 K	gypsum
11 K/1	brochantite, calcite, celestine, posnjakite
11 K/2	anhydrite, gold, muscovite
11 K/3	barite, fluorite, gypsum, halite, lepidocrocite
11 K/6	tungstite, wolframite
11 K/7	anhydrite, bismuth
11 K/8	calcite, fibroferrite, melanterite, rozenite
11 K/9	anhydrite
11 K/10	gold, sphalerite
11 K/15	anhydrite
11 K/16	anhydrite, howlite, ulexite
11 L/2	calcite
11 N/2	brucite, sphalerite
20 O/16	andalusite, chloritoid, gold, ilmenite, sillimanite, spessartine, spodumene, staurolite
20 P	ilmenite
20 P/6	staurolite
20 P/11	andalusite, beryl, staurolite
20 P/12	andalusite, staurolite
20 P/14	andalusite, beryl, molybdenite, staurolite
20 P/15	andalusite, beryl
21 A	analcime, apophyllite, ilmenite, pickeringite, stilbite, thomsonite
21 A/2	gold, scheelite, sillimanite
21 A/4	gold
21 A/6	calcite, gold, ulexite
21 A/7	gold, scheelite
21 A/8	gold, scheelite
21 A/9	cassiterite, durangite, eosphorite, gold, lepidolite, manganite, opal, psilomelane, pyrolusite, quartz, scheelite, triphylite, wolframite, zinnwaldite
21 A/10	albite, amblygonite, beryl, opal, wolframite
21 A/11	columbite
21 A/12	analcime, chabazite, chalcocite, epistilbite, hematite, heulandite, ilmenite, jamesonite, laumontite, mesolite, mordenite, quartz, scolecite, stilbite
21 A/13	analcime, laumontite, mesolite, mordenite, quartz
21 A/14	analcime, apophyllite, heulandite, laumontite, mesolite, mordenite, natrolite, opal, quartz, stilbite, thomsonite, tourmaline
21 A/15	psilomelane, pyrolusite
21 A/16	anhydrite, calcite, ginorite, howlite, manganite, mirabilite, scheelite, ulexite, winkworthite
21 B/8	analcime, copper, hematite, heulandite, ilmenite, laumontite, mesolite, scolecite, stilbite, thomsonite
21 B/9	hematite, heulandite, ilmenite, laumontite, mesolite, quartz, stilbite
21 B/10	quartz
21 B/15	quartz
21 H	analcime, apophyllite, gypsum, pickeringite, stilbite, thomsonite
21 H/1	acanthite, analcime, andalusite, anhydrite, aplowite, azurite, barite, calcite, celestine, chalcocite, danburite, epsomite, galena, gersdorffite, groutite, heulandite, howlite, laumontite, malachite, manganite, mesolite, mirabilite, moorhouseite, mordenite, pickeringite, proustite, psilomelane, pyrolusite, quartz, ramsdellite, sphalerite, stilbite, tennantite, thomsonite, ulexite
21 H/2	analcime, apophyllite, cerinite, gyrolite, heulandite, laumontite, mesolite, mordenite, okenite, prehnite, quartz, stilbite, thomsonite
21 H/3	analcime, apophyllite, copper, epistilbite, gyrolite, heulandite, laumontite, mesolite, mordenite, natrolite, scolecite, stilbite, thomsonite
21 H/7	analcime, apophyllite, barite, chabazite, copper, cuprite, heulandite, laumontite, mesolite, natrolite, quartz, scolecite, stilbite, thomsonite
21 H/8	analcime, ankerite, apophyllite, barite, calcite, celadonite, chabazite, copper, cuprite, gismondite, gmelinite, hematite, heulandite, laumontite, malachite, manganite, mesolite, mordenite, natrolite, opal, prehnite, psilomelane, pyrite, pyrolusite, quartz, ramsdellite, rutile, scolecite, siderite, stilbite, stilpnomelane, thomsonite
21 H/9	alunogen, barite, siderite
21 H/16	bassanite, hyalite, opal

ONTARIO

30 L/13	gypsum
30 M/1	vivianite
30 M/3	barite, calcite, epsomite, marcasite
30 M/4	anhydrite, gypsum
30 M/5	celestine, epsomite, fluorite, gunningite, marcasite, rozenite, smithsonite, strontianite, sulphur
30 M/11	petalite
30 M/12	celestine
30 M/13	celestine
31 B/12	cacoxenite, calcite, marcasite, pyrallolite, pyrite, pyrrhotite, sphene
31 B/13	pyrite
31 B/14	calcite, celestine, strontianite
31 C/1	celestine
31 C/3	buetschliite, fairchildite
31 C/4	potassium feldspar
31 C/5	actinolite, augite, axinite, corundum, erythrite, labradorite, magnetite, meneghinite, pyrallolite, silver, smaltite, stibnite, talc
31 C/6	barite, baumhauerite, boulangerite, buetschliite, calcite, celestine, chalcopyrite, erythrite, fluorite, franklinite, geocronite, guettardite, hematite, jamesonite, launayite, limonite, madocite, marcasite, playfairite, pyrallolite, quartz, robinsonite, rutile, scapolite, semseyite, sorbyite, sterryite, tetrahedrite, tourmaline, twinnite, veenite, zinckenite
31 C/7	albite, anhydrite, apatite, barite, calcite, celestine, cerussite, chondrodite, datolite, diopside, euxenite, fergusonite, gadolinite, galena, gypsum, hornblende, hydrocarbons, hydrocerussite, marcasite, molybdenite, potassium feldspar, quartz, sphalerite, sphene, tourmaline, vermiculite, wilsonite, zircon
31 C/8	apatite, barite, calcite, celestine, diopside, gypsum, phlogopite, quartz, scapolite, tourmaline, wollastonite,
31 C/9	almandine, apatite, barite, celestine, chondrodite, clinohumite, cordierite, diopside, graphite, hornblende, hydrotalcite, magnetite, phlogopite, pyrallolite, quartz, scapolite,

sillimanite, sphene, spinel, talc, tourmaline, vesuvianite, wollastonite

31 C/10 allanite, apatite, barite, brucite, calcite, celestine, chlorapatite, chondrodite, cookeite, copiapite, corundum, datolite, diopside, fibroferrite, fluorite, galena, graphite, hexahydrite, hornblende, hydrocerussite, hydrozincite, jarosite, magnetite, phlogopite, potassium feldspar, powellite, quartz, rozenite, scapolite, sphalerite, sphene, talc, tourmaline, tremolite, vesuvianite, zircon

31 C/11 actinolite, barite, baumhauerite, bismuth, bismuthinite, calcite, chalcopyrite, fluorite, gold, jamesonite, kainosite, kyanite, meneghinite, sillimanite, stibnite, talc, tourmaline, uranophane

31 C/12 ankerite, antimony, arsenolite, arsenopyrite, azurite, barite, biotite, bismuth, bismuthinite, bismutite, bournonite, brannerite, brucite, cancrinite, corundum, dufrenite, epsomite, erythrite, ferrimolybdite, fluorite, galena, gold, hematite, labradorite, lepidomelane, magnetite, meneghinite, muscovite, natrolite, nepheline, potassium feldspar, pyrite, riebeckite, stibnite, stilpnomelane, talc, tourmaline, uraninite, vesuvianite

31 C/13 actinolite, andradite, annabergite, epidote, magnetite, melanocerite, pyrochlore, scapolite, sodalite, thorite, tremolite, uraninite

31 C/14 actinolite, bismuthinite, boulangerite, bournonite, fluorite, jamesonite, kyanite, meneghinite, pyrochlore, staurolite, stibnite, talc, tennantite, vesuvianite

31 C/15 actinolite, apatite, barite, boulangerite, calcite, euxenite, gold, hornblende, jamesonite, labradorite, magnetite, oligoclase, scapolite, serpentine, staurolite, tourmaline, tremolite, uraninite, vesuvianite, zircon

31 C/16 albite, anhydrite, apatite, barite, brannerite, calcite, celestine, corundum, diopside, euxenite, fergusonite, graphite, hematite, hornblende, kainosite, magnetite, oligoclase, phlogopite, potassium feldspar, quartz, scapolite, sphene, spinel, spodumene, sulphur, tourmaline, tremolite, vermiculite, wilsonite, wollastonite, zircon

31 D/5 augite

31 D/8 barite

31 D/9 albite, allanite, corundum, fergusonite, fluoborite, melanocerite, prehnite, pyrochlore, scapolite, thorite, uraninite, vermiculite, zircon

31 D/10 actinolite, barite, potassium feldspar, scapolite, thorite, zircon

31 D/11 hematite, serpentine, wolframite

31 D/12 hematite, serpentine

31 D/13 serpentine, sphene

31 D/15 andradite, corundum, fluoborite, lollingite, magnetite, rutile, scapolite, thorite, uraninite, weddellite, wilsonite

31 D/16 actinolite, allanite, analcime, anatase, apatite, augite, bastnaesite, calcite, cancrinite, chabazite, curite, fergusonite, fluorite, gahnite, hornblende, kainosite, kasolite, lepidomelane, magnetite, marcasite, melanocerite, nepheline, norbergite, phlogopite, potassium feldspar, pyrochlore, scapolite, sepiolite, sodalite, sphene, thorianite, thorite, uraninite, uranophane, zircon

31 E/1 actinolite, aeschynite, albite, allanite, almandine, ancylite, anthophyllite, apatite, augite, bastnaesite, biotite, chamosite, chondrodite, clinohumite, cordierite, dolomite, euxenite, fluoborite, fluorite, graphite, hornblende, hydroxyl-bastnaesite, jarosite, kasolite, lepidomelane, magnetite, marcasite, melanocerite, monazite, norbergite, perrierite, phlogopite, pyrochlore, scapolite, scorodite, sepiolite, sinhalite, spencite, sphene, stillwellite, sulphur, szajbelyite, thorianite, thorite, torbernite, tourmaline, tremolite, uraninite, uranophane, warwickite, zircon

31 E/2 apatite, prehnite, scapolite, tremolite

31 E/3 allanite

31 E/4 allanite, coffinite, columbite, euxenite, graphite, hydrocarbons, monazite, samarskite, sphene, uraninite, zircon

31 E/5 actinolite, allanite, scapolite

31 E/6 pyrochlore

31 E/7 pyrochlore

31 E/8 euxenite, hematite, oligoclase, quartz

31 E/9 albite, allanite, anatase, euxenite, fergusonite, hornblende, potassium feldspar, sphene, uraninite, zircon

31 E/10 uraninite

31 E/11 allanite, euxenite, fergusonite, humite, jarosite, pyrochlore, rutile, uraninite

31 E/12 allanite, bastnaesite, euxenite, pyrochlore

31 E/13 allanite, magnetite

31 E/14 albite, beryl, pyrochlore

31 F/1 barite, chondrodite, diopside, graphite, pyrallolite

31 F/2 barite, berthierite, bournonite, cinnabar, diopside, graphite, jamesonite, magnetite, muscovite, rozenite, rutile, scapolite, sphene, stibnite, tetrahedrite

31 F/3 actinolite, almandine, bismuthinite, dumortierite, muscovite, pyrochlore, quartz, sphene, sulphur, tourmaline

31 F/4 albite, allanite, andradite, apatite, augite, bastnaesite, biotite, boehmite, brucite, brugnatellite, calciosamarskite, calcite, cancrinite, celestine, cenosite, chabazite, chalcopyrite, clinohumite, columbite, corundum, davidite, dawsonite, diopside, euxenite, fergusonite, fluorite, graphite, grossular, hastingsite, hornblende, hydromagnesite, ilmenite, kainosite, kasolite, lepidomelane, magnesite, magnetite, marcasite, melanocerite, monticellite, muscovite, natrolite, nepheline, nordstrandite, oligoclase, phlogopite, potassium feldspar, pyrochlore, realgar, samarskite, scapolite, scorodite, sillimanite, sodalite, spencite, sphene, spinel, taramite, thorianite, thorite, uraninite, uranophane, vesuvianite, zircon

31 F/5 actinolite, albite, allanite, corundum, epidote, euxenite, gahnite, jarosite, kyanite, matildite, nepheline, potassium feldspar, rutile, scapolite, sillimanite, sphene, uraninite

31 F/6 albite, allanite, anatase, apatite, bastnaesite, beryl, bismite, bismuthinite, bismutite, calcite, cancrinite, columbite, corundum, cubanite, dolomite, euxenite, fergusonite, fluorite, hornblende, jarosite, magnetite, microcline, molybdenite, monazite, nepheline, potassium feldspar, quartz, riebeckite, rozenite, rutile, samarskite, scapolite, sillimanite, sodalite, sphene, thorite, tourmaline, tremolite, zircon

31 F/7 actinolite, boulangerite, bournonite, celestine, chlorite, corundum, diopside, jarosite, magnetite, potassium feldspar, rozenite, scapolite, serpentine, sphalerite, sphene, stilbite, thorite, tourmaline, tremolite, uraninite, zircon

31 F/8 barite, celestine, coffinite, galena, marcasite, parisite

31 F/9 barite, pyrallolite

31 F/10 allanite, apatite, chondrodite, diopside, dolomite, fluorite, hornblende, pyrallolite, rutile, scapolite, serpentine, sphene, spinel, tochilinite, tourmaline, tremolite, wilsonite, zircon

31 F/11 allanite, apatite, bastnaesite, buetschliite, chondrodite, fairchildite, jarosite, perrierite, potassium feldspar, rozenite, scapolite, tochilinite

31 F/12 allanite, euxenite, fluorite, monazite, pyrochlore, quartz, sphene

31 F/14 apatite, euxenite

31 F/15 actinolite, bismuthinite, calcite, zircon

31 F/16 wilsonite

31 G/4 quartz

31 G/5 barite, bytownite, calcite, celestine, marcasite, potassium feldspar, strontianite, tourmaline, uraninite, witherite

31 G/7 labradorite

31 G/8 britholite, labradorite

31 G/10 calcite, celestine, pyrallolite

31 G/12 phlogopite, rutile, sphene, stilbite, wilsonite

31 G/13 fergusonite, phlogopite, spinel

31 G/15 phlogopite, pyrallolite, serpentine

31 H/12 epsomite

31 I/4 spinel

31 I/5 spinel

31 I/16 wilsonite

31 J/4 brugnatellite, spinel

31 J/5 phlogopite

31 J/11 wilsonite

31 J/12 phlogopite

31 K/1 spinel

31 K/4 albite, anatase, bastnaesite, euxenite, rutile, thorite

31 K/8 phlogopite

31 L/1 allanite, fluorite, potassium feldspar

31 L/2 allanite, beryl, magnetite, muscovite, potassium feldspar, zircon

31 L/3 barite, sodalite

31 L/5 aegirine, barite, fluorite, magnetite, pyrochlore, uraninite

31 L/6 brucite, hydromagnesite, pyroaurite, quartz

31 L/7 allanite, beryl, brucite, calcite, euxenite, fergusonite, hedenbergite, iron, potassium feldspar, pyroaurite, pyrochlore, tourmaline, uraninite, xenotime

31 L/8 potassium feldspar

31 L/11 kyanite

31 L/13 chabazite, erythrite

31 M acanthite, annabergite, aragonite, argyropyrite, arsenolite

31 M/4 allanite, anthophyllite, arsenopyrite, bismuth, bismuthinite, breithauptite, brochantite, calcite, chalcopyrite, chapmanite, chloanthite, cobaltite, covellite, dolomite, erythrite, gersdorffite, glaucodot, gold, jamesonite, jarosite, lollingite, marcasite, matildite, michenerite, mimetite, molybdenite, nickeline, pararammelsbergite, pentlandite, polybasite, proustite, pyrargyrite, pyrrhotite, quartz, realgar, safflorite, silver, skutterudite, sperrylite, sphalerite, stephanite, stilpnomelane, stromeyerite, tetrahedrite, xanthoconite

31 M/5 aikinite, allanite, allargentum, alloclasite, aragonite, argyropyrite, arsenic, arsenolite, arsenopyrite, axinite, benjaminite, bismuth, bismuthinite, bornite, bravoite, breithauptite, brochantite, calcite, chabazite, chalcocite, chalcopyrite, chapmanite, clinosafflorite, chloanthite, chlorargyrite, cobaltite, copper, cosalite, covellite, danaite, djurleite, dolomite, dyscrasite, erythrite, ferrisymplesite, freieslebenite, galena, gersdorffite, glaucodot, gold, heterogenite, heulandite, larosite, lindstromite, lollingite, marcasite, matildite, maucherite, mckinstryite, mercury, millerite, mimetite, mohawkite, nickeline, pararammelsbergite, paratacamite, pearceite, polybasite, posnjakite, proustite, pyrargyrite, rammelsbergite, safflorite, samsonite, scorodite, silver, skutterudite, smaltite, smythite, sphaerocobaltite, sphalerite, stephanite, stromeyerite, symplesite, tetrahedrite, ullmannite, wittichenite, xanthoconite

31 M/8 bornite, emplectite, erythrite

31 M/12 allanite, allargentum, alloclasite, arsenopyrite, bismuthinite, bornite, bravoite, breithauptite, chalcopyrite, cobaltite, cobalt pentlandite, dolomite, erythrite, gersdorffite, glaucodot, langisite, linnaeite, marcasite, maucherite, nickeline, pararammelsbergite, parkerite, pyrargyrite, rammelsbergite, safflorite, skutterudite, sphalerite, stephanite, tetrahedrite

31 M/13 calaverite, gold, petzite, tetradymite

32 C/12 brucite

32 D/4 altaite, aurostibite, azurite, bismuth, bismuthinite, calaverite, chalcocite, chalcopyrite, coloradoite, cosalite, galena, galenobismutite, gold, graphite, hessite, magnetite, malachite, marcasite, millerite, molybdenite, muscovite, petzite, quartz, scheelite, serpentine, tennantite, tetradymite, tourmaline, ullmannite

32 D/5 epidote, gold, muscovite

32 D/6 gunningite, spinel

32 D/11 serpentine

32 D/12 gold, serpentine

32 D/13 chromite, pollucite, serpentine, spodumene

32 E/4 altaite, beryl, pollucite, spodumene

32 E/9 fergusonite

40 I/16 anhydrite, gypsum, sulphur

40 J/1 marcasite

40 J/3 calcite, celestine

40 J/5 iron

40 O/1 humboltine

40 P/2 gypsum, rhodochrosite

40 P/12 halite

41 A sphalerite

41 A/4 halite, hydrozincite

41 A/9 bornite

41 A/10 celestine

41 A/11 sphalerite

41 A/14 sphalerite

41 G/15 celestine

41 H/1 bornite, calciosamarskite, chalcopyrite, hisingerite

41 H/3 erythrite
41 H/8 bornite, pyrochlore, thorite, uraninite, uranophane
41 H/12 celestine
41 H/14 monazite, sillimanite
41 H/15 aeschynite, anatase, beryl, coffinite, euxenite, hydrocarbons, uraninite, uranophane, xenotime, zircon
41 H/16 albite, allanite, thorite, xenotime
41 I/1 magnetite, thorite
41 I/2 aegirine, cancrinite, corundum, diaspore, euxenite, graphite, lepidomelane, nepheline
41 I/3 gold
41 I/4 cobaltite, gold, kyanite, magnetite, morenosite, rozenite, scheelite, serpentine, siderite, talc, vesuvianite
41 I/5 huttonite, staurolite
41 I/6 actinolite, annabergite, bismuth, cassiterite, chalcanthite, chalcopyrite, copper, cubanite, cuprite, froodite, gersdorffite, gold, hessite, hauchecornite, lepidomelane, marcasite, maucherite, melanterite, michenerite, millerite, morenosite, nickeline, parkerite, pentlandite, polydymite, pyrite, pyrrhotite, scheelite, silver, smaltite, sperrylite, stannite, sudburyite, talc, tetradymite, valleriite, violarite
41 I/7 chalcopyrite, columbite, cubanite, euxenite, fergusonite, froodite, gersdorffite, gold, hauchecornite, kyanite, millerite, oligoclase, parkerite, pentlandite, pyrochlore, pyrrhotite, sillimanite, smaltite
41 I/9 almandine, natrolite, uraninite
41 I/10 anthophyllite, chalcopyrite, cosalite, gersdorffite, gold, hornblende, magnesite, marcasite, melonite, michenerite, pentlandite, pyrrhotite, silver, staurolite, violarite
41 I/11 hydrocarbons, melonite, michenerite, millerite, morenosite, pentlandite, pyrrhotite, silver, sperrylite, sphalerite, staurolite, violarite
41 I/12 erythrite, vermiculite
41 I/14 gypsum, uraninite
41 I/15 anatase, beryl, zircon
41 I/16 altaite, chalcopyrite, gersdorffite, gold, hessite, linnaeite, maucherite, merenskyite, millerite, parkerite, pyrite, sperrylite, stutzite, tellurium, temagamite
41 J quartz
41 J/1 cobaltite, erythrite, muscovite, scapolite
41 J/2 brannerite, chalcopyrite, coffinite, marcasite, stilpnomelane, uraninite
41 J/4 bornite, chalcopyrite
41 J/5 ankerite, bornite, chalcocite, chalcopyrite, diaspore, erythrite, iron, malachite, uraninite
41 J/6 bornite, chalcopyrite, gold, siderite
41 J/7 anatase, bornite, pyrrhotite, uraninite, zippeite
41 J/8 gold
41 J/10 bornite, chalcopyrite, diaspore, hydrocarbons, monazite, pyrrhotite, uraninite
41 J/11 bismuth, chalcopyrite
41 J/12 bismuth, erythrite, stibnite
41 K quartz
41 K/9 galena, manganite, stibnite
41 K/15 bornite, hematite, quartz
41 K/16 chalcopyrite, fluorite, manganite, psilomelane, quartz
41 L/16 altaite
41 N copper, cuprite
41 N/2 chalcocite, chalcomenite, clausthalite, copper, klockmannite, laumontite, mesolite, molybdomenite, parsonite, prehnite, scheelite, selenium, stibnite, uraninite, uranophane
41 N/7 pyrochlore, uraninite
41 N/11 copper
41 N/12 analcime, copper, domeykite, nickeline, pumpellyite, quartz, thomsonite
41 N/13 analcime, nickeline, pumpellyite, thomsonite
41 N/14 powellite, scheelite
41 N/15 anatase, gold, limonite, riebeckite, siderite
41 O/9 gold
41 O/10 chalcopyrite
41 O/11 riebeckite
41 O/14 cerianite
41 O/15 gold, quartz
41 O/16 chalcopyrite
41 P acanthite, annabergite, augite
41 P/5 azurite
41 P/7 iron
41 P/8 lollingite
41 P/9 allanite, allargentum, alloclasite, arsenopyrite, azurite, barite, bismuth, bismuthinite, bornite, breithauptite, chalcopyrite, cobaltite, covellite, dolomite, erythrite, gersdorffite, glaucodot, malachite, marcasite, maucherite, nickeline, pararammelsbergite, pyrargyrite, rammelsbergite, safflorite, silver, skutterudite, sphalerite, stephanite, tetrahedrite, uraninite
41 P/10 allanite, allargentum, alloclasite, arsenopyrite, axinite, bismuth, bismuthinite, bornite, breithauptite, cerite, chalcocite, chalcopyrite, chloanthite, cobaltite, dolomite, erythrite, galenobismutite, gersdorffite, glaucodot, lollingite, marcasite, maucherite, millerite, nickeline, pararammelsbergite, pearceite, polybasite, proustite, pyrargyrite, rammelsbergite, safflorite, serpentine, silver, skutterudite, smaltite, sphalerite, stephanite, stromeyerite, tetrahedrite, xanthoconite
41 P/11 gold
41 P/12 bornite, covellite, malachite, tetradymite
41 P/14 limonite, marcasite, muscovite, serpentine, tetrahedrite
41 P/15 allanite, allargentum, alloclasite, altaite, arsenopyrite, barite, bismuthinite, bornite, breithauptite, chalcopyrite, cobaltite, covellite, dolomite, erythrite, fluorite, gersdorffite, glaucodot, gold, hematite, malachite, marcasite, molybdenite, muscovite, nickeline, pararammelsbergite, pyrargyrite, quartz, rammelsbergite, safflorite, serpentine, silver, skutterudite, smaltite, sphalerite, stephanite, tetrahedrite
41 P/16 allanite, allargentum, alloclasite, arsenopyrite, bismuthinite, breithauptite, chalcopyrite, cobaltite, dolomite, gersdorffite, glaucodot, marcasite, millerite, nickeline, pararammelsbergite, pyrargyrite, quartz, rammelsbergite, safflorite, silver, skutterudite, sphalerite, stephanite, tetrahedrite
42 A acanthite, gold
42 A/1 altaite, barite, calaverite, celestine, coloradoite, dyscrasite, gold, hessite, melonite, muscovite, petzite, platinum, quartz, sylvanite, talc, tetradymite, tetrahedrite, tungstenite
42 A/2 altaite, barite, covellite, erythrite, fluorite, gold, krennerite
42 A/3 altaite, brochantite, godlevskite, heazlewoodite, millerite, pentlandite, pyrrhotite, violarite
42 A/5 chalcopyrite, pyrrhotite, sphalerite

42 A/6	acanthite, altaite, anhydrite, ankerite, axinite, barite, bornite, calaverite, chalcopyrite, chloritoid, chromite, coloradoite, copper, epidote, gold, hessite, magnesite, millerite, muscovite, pentlandite, petzite, scheelite, serpentine, stichtite, sylvanite, tennantite, tetradymnite, tetrahedrite, tourmaline, tremolite
42 A/7	bismuth, gold, muscovite, talc
42 A/8	acanthite, copper, cuprite, epidote, gold, pearceite, petzite, proustite, rhodochrosite, tennantite, wolframite
42 A/9	andalusite, brochantite, calaverite, chalcopyrite, cordierite, epidote, gold, hematite, labradorite, muscovite, nickeline, pyrrhotite, serpentine, siderotil, tetradymite, wehrlite
42 A/10	axinite, chromite, gold, hexahydrite, morenosite, muscovite, pentlandite, platinum, pyrrhotite, serpentine
42 A/11	acanthite, bismuth, bismuthinite, bohdanowiczite, bornite, cadmoselite, carrollite, cassiterite, cattierite, chalcopyrite, clausthalite, cobaltite, colusite, covellite, eucairite, gold, heazlewoodite, kesterite, klockmannite, mawsonite, muscovite, naumannite, pearceite, pyrargyrite, silver, sphalerite, stannoidite, stephanite, stromeyerite, sylvanite, tellurbismuth, tennantite, tetradymite
42 A/14	chromite, diamond, platinum
42 A/15	prehnite
42 A/16	tetradymite
42 B/1	antimony, barite, brucite, magnesite, pyroaurite, romeite, scorodite, serpentine, talc, ullmannite, valentinite
42 B/5	serpentine
42 B/7	bytownite
42 B/13	gold
42 C/2	chloritoid, cordierite, gold, hematite, muscovite, scheelite, siderite, wehrlite
42 C/4	melonite, muscovite
42 C/7	gold, muscovite, pyrite, riebeckite
42 C/8	bytownite, gold, pigeonite, riebeckite, siderite
42 D	copper, cuprite
42 D/9	bastnaesite, parisite, thorite, zircon
42 D/10	coloradoite, fluorite, nepheline, riebeckite, talc
42 D/11	chalcocite, pumpellyite
42 D/12	pumpellyite
42 D/13	barite, copper, fluorite, prehnite, quartz, sphalerite
42 D/14	altaite, barite, fluorite, galena, gold, pentlandite, prehnite, quartz, serpentine, smythite, sphalerite, tetradymite, violarite
42 D/15	natrolite, sodalite
42 D/16	augite
42 E	spodumene
42 E/1	quartz
42 E/4	quartz, spodumene
42 E/5	muscovite, spodumene
42 E/10	analcime, antimony, berthierite, bournonite, gold, krennerite, lollingite, pyrite, scheelite, stibnite
42 E/11	analcime, gold, stibnite, tetrahedrite
42 E/12	halite, scheelite
42 E/13	barite, gold
42 E/14	barite, gold
42 E/15	cubanite, gold, pentlandite
42 F/4	anthophyllite, barite, cassiterite, chabazite, chalcopyrite, cordierite, gahnite, pyrite, pyrrhotite, sphalerite, thaumasite
42 F/16	staurolite
42 G/7	clinohumite
42 I/4	monazite, natrolite, thomsonite
42 I/11	gypsum
42 I/14	anhydrite, gypsum
42 L/2	eucryptite, spodumene
42 L/3	dumortierite
42 L/4	bismuthinite, chloritoid
42 L/5	staurolite
42 L/6	dumortierite, marcasite, serpentine, staurolite
42 L/7	marcasite, polybasite, serpentine, staurolite, tetrahedrite
42 L/10	beryl, spodumene
42 M/12	biotite, scheelite
42 N/2	klockmannite, uraninite
42 N/12	quartz
42 P/3	gypsum
43 D/2	magnetite
52 A	aragonite, copper, cuprite
52 A/3	acanthite, apophyllite, azurite, barite, bornite, chalcocite, erythrite, fluorite, kalinite, mackinawite, maucherite, pectolite, rhodochrosite, xonotlite
52 A/4	calcite, fluorite, pyrrhotite, mackinawite, marcasite, witherite
52 A/5	barite, copper, fluorite, harmotome, lead, marcasite, quartz, saponite, stephanite, witherite
52 A/6	acanthite, annabergite, barite, calcite, chamosite, hydrocarbons, kalinite, marcasite, prehnite, quartz
52 A/7	acanthite, arsenic, calcite, chlorargyrite, cobaltite, copper, domeykite, erythrite, fluorite, marcasite, nickeline, quartz, rhodochrosite, silver, smaltite
52 A/8	fluorite
52 A/9	fluorite
52 A/10	barite, braunite, datolite, fluorite, galena, molybdenite, pectolite, psilomelane, quartz, uranophane
52 A/11	gold, quartz
52 A/12	gold, quartz
52 A/15	uraninite
52 B/1	quartz
52 B/2	quartz
52 B/3	hematite, quartz, siderite
52 B/5	beryl
52 B/6	beryl
52 B/8	marcasite
52 B/9	bravoite, chalcopyrite, erythrite, millerite, pentlandite, polydymite, pyrrhotite, violarite
52 B/10	altaite, chalcopyrite, coloradoite, gold, hessite, nagyagite, petzite, sylvanite, tellurbismuth
52 B/12	uraninite
52 B/13	beryl, epidote, goethite, gold, hematite, manganite, melanterite, pyrite, pyrolusite, quartz
52 B/14	gold, pentlandite, smythite
52 C/8	spodumene
52 C/9	quartz
52 C/10	augite, bismuthinite, gold, quartz
52 C/11	sphene
52 C/13	bismuthinite, tetradymite
52 C/15	azurite, chalcopyrite
52 C/16	quartz
52 E/7	talc
52 E/8	gold
52 E/9	acanthite, calaverite, copper, covellite, epidote, gold, hessite, petzite, pyrolusite, tellurbismuth, tetradymite
52 E/10	gold, silver
52 E/11	gold
52 E/13	tetradymite
52 E/16	euxenite, gold, kasolite, monazite, uraninite, uranophane
52 F/3	stibnite, tetradymite
52 F/4	gold
52 F/5	gold, pentlandite
52 F/7	bismuthinite, gold
52 F/9	covellite, gold
52 F/10	bismuthinite, gold, talc
52 F/11	almandine, cordierite, gold, tourmaline
52 F/12	pentlandite
52 F/13	allanite, apatite, beryl, boltwoodite, kasolite, monazite, pentlandite, pyrrhotite, tantalite, thorite, uraninite, uranophane
52 F/15	almandine, azurite, beryl, columbite, sillimanite, spodumene, tourmaline, zircon
52 F/16	altaite, bismuthinite, ferrimolybdite, gold, grunerite, molybdenite, pollucite, pyrite, quartz, scheelite, spodumene, uraninite

52 G/9	sphene
52 G/13	gold, muscovite
52 G/14	gold
52 G/15	boulangerite, bournonite, carbocernaite, chalcopyrite, chloritoid, copper, galena, sphalerite, tetrahedrite, topaz
52 H	spodumene
52 H/1	amblygonite, beryl, huhnerkobelite
52 H/2	chalcocite
52 H/4	beryl
52 H/7	hematite, scapolite
52 H/8	analcime, pectolite, prehnite, spodumene
52 H/9	analcime, bournonite, gold, molybdenite, prehnite, scheelite, tremolite
52 H/16	magnetite
52 I/8	beryl, spodumene
52 I/10	beryl, cassiterite
52 J/2	topaz
52 J/4	gold, melanterite
52 J/13	spodumene
52 K/1	uraninite
52 K/13	gold, realgar
52 K/14	quartz
52 L/2	allanite, bastnaesite, jarosite
52 L/3	hydroromarchite, romarchite
52 L/7	beryl, cobaltite, hollingworthite, irarsite, linnaeite, merenskyite, violarite
52 L/16	allargentum, breithauptite, cassiterite, chalcopyrite, cobaltite, gudmundite, marcasite, nisbite, paracostibite, pyrargyrite, silver, sphalerite, stannite
52 M/1	gold, serpentine
52 N/1	scheelite
52 N/2	cassiterite, gold
52 N/4	altaite, andalusite, berthierite, boulangerite, gold, hydrocarbons, jamesonite, kermesite, krennerite, scheelite, senarmontite, serpentine, stibnite, tetradymite, tetrahedrite
52 N/8	scheelite
52 N/9	gold
52 O/1	sillimanite
52 O/4	azurite, tetrahedrite
52 O/8	scheelite
52 P/3	tourmaline
52 P/5	gold
52 P/9	andalusite, lepidolite, scheelite, spodumene, tourmaline
52 P/10	almandine
53 A/13	apatite
53 B/14	tetrahedrite
53 C/12	gold
53 C/13	ferrimolybdite, serpentine, tetradymite
53 C/14	andalusite, chalcocite
53 D/2	dyscrasite
53 J/11	gold

PRINCE EDWARD ISLAND

11 L/2	calcite
11 L/5	paratacamite
11 L/6	braunite
11 L/7	limonite
11 L/12	saponite
21 I/16	francevillite, rauvite, vesigniéite

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11 N/4	birnessite, gypsum
11 N/5	birnessite, calcite, gypsum, manganite, psilomelane, pyrite, pyrolusite, quartz
11 N/11	manganite
11 N/12	manganite
12 L/7	beryl, fluorite
12 L/8	sillimanite
12 L/11	ilmenite
12 L/14	actinolite, annabergite, anthophyllite
12 M/5	potassium feldspar, sillimanite
12 M/12	labradorite, potassium feldspar
12 O/2	biotite
21 E/4	andalusite
21 E/5	andalusite, barite, brochantite, chalcocite, devilline, magnesite, magnetite, osmiridium, posnjakite, pyrite, quartz, sphalerite, tennantite, tetrahedrite, uraninite, vivianite
21 E/6	andalusite, biotite
21 E/10	andalusite, jarosite, molybdenite, rozenite, sphene
21 E/11	anthophyllite, jarosite, pyrite, rozenite
21 E/12	kermesite, magnetite, senarmontite, serpentine
21 E/13	actinolite, andalusite, antimony, apophyllite, berthierite, bornite, brucite, chromite, diaspore, diopside, epidote, grossular, groutite, gudmundite, heazlewoodite, jarosite, magnetite, manganite, maucherite, nickel-iron, okenite, pectolite, prehnite, pumpellyite, pyrochroite, senarmontite, serpentine, stibiconite, stibnite, valentinite, vesuvianite, wollastonite, xonotlite
21 E/14	andalusite, anthophyllite, aragonite, calcite, chromite, diopside, heazlewoodite, hydromagnesite, magnetite, magnesiochromite, pyrite, pyroaurite, quartz, serpentine, siderotil, sjogrenite, tetrahedrite
21 E/15	molybdenite, osmiridium, platinum, quartz, scheelite, stibnite, tungstite
21 E/16	iridosmine, osmiridium, platinum
21 L	copper
21 L/1	osmiridium
21 L/2	actinolite, iridosmine, osmiridium, platinum, serpentine, talc
21 L/3	almandine, andradite, apatite, apophyllite, aragonite, artinite, bornite, calcite, chalcocite, chlorite, chloritoid, chromite, diopside, epidote, grossular, heazlewoodite, hydrotalcite, magnesiochromite, magnesite, magnetite, malachite, natrolite, nickel-iron, pectolite, prehnite, rutile, scolecite, serpentine, stichtite, talc, thomsonite, uvarovite, vesuvianite
21 L/4	bornite
21 L/6	bornite, brochantite, chalcocite, gold
21 L/7	beryl, magnetite, molybdenite, platinum, talc
21 L/8	chalcocite
21 L/9	chalcocite, copper, cyanotrichite, gersdorffite, hisingerite, linnaeite, millerite, retgersite, serpentine, siderite, violarite
21 L/11	bornite, copper, kaolinite
21 L/12	actinolite, azurite, hydrocarbons, hydrotalcite, magnetite, malachite, thorite, uraninite, uranophane
21 L/13	magnesiochromite, uranophane
21 L/14	andesine, epsomite, glauconite, hypersthene, ilmenite, labradorite, pyrite
21 L/15	glauconite, quartz
21 L/16	hydrocarbons
21 M/1	wehrlite
21 M/2	andesine, chondrodite
21 M/7	calcite, fluorite
21 M/8	fluorite, ilmenite
21 M/9	beryl, biotite, ilmenite
21 M/10	calcite, ilmenite, laumontite, mesolite, rutile, sapphirine
21 M/16	fergusonite, hydrocarbons, monazite, muscovite, samarskite, uraninite, zircon
21 N	galena
21 N/5	quartz
21 N/13	albite, allanite, fergusonite, uraninite, xenotime
22 A	quartz
22 A/2	calcite
22 A/3	barite, quartz
22 A/4	calcite, quartz
22 A/7	calcite, chalcocite, lollingite, malachite, quartz
22 A/8	quartz
22 A/9	calcite, quartz
22 A/13	azurite, bismuth, chalcocite, chalcopyrite, chrysocolla, cubanite, malachite, molybdenite, pigeonite, pyrrhotite, scheelite, tennantite, tenorite
22 A/14	wollastonite
22 A/16	calcite, cerussite, hydrocerussite, jarosite, quartz

22 B	quartz
22 B/2	calcite, galena, kasolite, mordenite, stilbite, uraninite
22 B/5	chromite, pectolite, serpentine, uvarovite
22 B/12	quartz
22 B/13	quartz
22 B/16	calcite, chromite, enstatite, epidote, gaspeite, hemimorphite, hydrozincite, olivine, quartz, serpentine, smithsonite
22 C	galena
22 C/3	calcite
22 C/4	muscovite
22 C/5	almandine, apatite, beryl, hydrocarbons, tourmaline
22 C/7	barite
22 C/9	quartz
22 C/14	muscovite
22 D	hypersthene
22 D/5	calcite
22 D/6	beryl, bismuthinite, calcite, hypersthene, labradorite, quartz
22 D/7	beryl
22 D/11	apatite, magnetite, olivine, spinel, topaz
22 D/12	albite, beryl, potassium feldspar, topaz
22 D/13	labradorite
22 F	hypersthene
22 G/1	anglesite, beudantite, bournonite, melanterite, siderite, tetrahedrite
22 G/2	calcite
22 H/1	quartz
22 H/2	quartz
22 I/7	ilmenite, labradorite
22 J/1	ilmenite
22 J/2	ilmenite
22 J/8	ilmenite, uraninite
22 J/9	sillimanite
22 L/7	gold
22 P/8	magnetite
23 B/11	safflorite
23 B/14	bismuth, bismuthinite, cobaltite, lollingite
23 B/16	hematite
23 C/1	rhodonite
23 I/4	quartz
23 I/5	quartz
23 I/10	phlogopite
23 J	minnesotaite
23 J/7	quartz
23 J/8	quartz
23 J/10	ankerite, minnesotaite
23 J/15	cryptomelane, goethite, hematite, hollandite, pyrolusite
23 O	hematite
23 O/2	riebeckite
23 O/3	riebeckite
23 O/16	biotite
24 C/14	ankerite, quartz
24 K/4	pyrite
24 K/5	pyrite
24 K/13	talc
24 L/8	boltwoodite, uranophane
24 L/16	talc
25 D/15	pyrite
31 F/9	allanite, chondrodite, fluorite, hydrocarbons, magnetite, molybdenite, monazite, pyrallolite, pyrargyrite, pyrochlore, scapolite, sphene, talc, thorianite, uraninite, vesuvianite
31 F/10	anhydrite, arsenopyrite, brucite, calcite, clinohumite, diopside, galena, grossular, hisingerite, hydromagnesite, hydrotalcite, jarosite, magnetite, nickeline, pyrallolite, pyroaurite, pyrochlore, pyrrhotite, scapolite, serpentine, silver, sphalerite, sphene, spinel, szajbelyite, tetrahedrite, thorite, tourmaline, uraninite, vesuvianite, wilsonite
31 F/15	allanite, apatite, calcite, cerite, chondrodite, euxenite, fluorite, graphite, grossular, heulandite, hornblende, lessingite, monazite, pyrallolite, pyrochlore, scapolite, sphene, stilbite, thorianite, thorite, uraninite, uranophane, wilsonite
31 F/16	allanite, andradite, cordierite, graphite, kornerupine, scapolite, sphene, thorite, uraninite, wilsonite, zircon
31 G	diopside
31 G/1	chalcopyrite
31 G/5	actinolite, apatite, calcite, diopside, epidote, fluorite, hisingerite, hornblende, magnetite, phlogopite, potassium feldspar, quartz, scapolite, sphene, tourmaline, tremolite, uraninite, vesuvianite, wilsonite
31 G/8	ancylite, andesine, andradite, augite, biotite, britholite, diopside, gonnardite, hornblende, latrappite, magnetite, melilite, monazite, monticellite, nepheline, niocalite, olivine, perovskite, phlogopite, pyrochlore, uraninite, vivianite, wairakite, wollastonite
31 G/9	akermanite, analcime, ancylite, andradite, augite, biotite, britholite, calcite, diopside, hornblende, kaolinite, latrappite, magnetite, melilite, monticellite, nepheline, olivine, perovskite, phlogopite, pyrochlore, thomsonite, tourmaline, wairakite, wollastonite
31 G/10	diopside, graphite, hornblende, kaolinite, magnesite, potassium feldspar, scapolite, serpentine, sphene, vesuvianite, wilsonite, wollastonite, zircon
31 G/11	actinolite, albite, allanite, apatite, barite, calcite, cassiterite, chabazite, chamosite, datolite, diopside, euxenite, faujasite, fluorite, graphite, hornblende, hydrocerussite, hydrozincite, monazite, pumpellyite, rozenite, rutile, scapolite, sphene, thorite, tourmaline, tremolite, uraninite, zircon
31 G/12	actinolite, albite, allanite, andradite, apatite, barite, bismuth, bismuthinite, brucite, calcite, caysichite, chabazite, chlorite, clinochlore, copiapite, diopside, epidote, eulytite, euxenite, fluorite, graphite, grossular, hematite, hornblende, hydromagnesite, hydrotalcite, jarosite, kainosite, lepidolite, ludwigite, magnetite, oligoclase, olivine, perovskite, phlogopite, potassium feldspar, prehnite, pumpellyite, pyrite, pyroaurite, pyrochlore, quartz, rozenite, rutile, scapolite, serpentine, sphene, stilbite, thorite, tochilinite, tourmaline, tremolite, uraninite, uvarovite, vesuvianite, wakefieldite, wilsonite, wollastonite, xenotime, xonotlite, zircon
31 G/13	albite, apatite, beryl, beyerite, bismutite, bismutoferrite, chabazite, diopside, euxenite, fergusonite, fluorite, fourmarierite, geikielite, hellandite, hematite, jarosite, kaolinite, lokkaite, monazite, muscovite, phlogopite, potassium feldspar, prehnite, pumpellyite, pyroaurite, quartz, rozenite, serpentine, spessartine, sphene, spinel, synchysite-(Y), tengerite, thorite, tourmaline, uraninite, uranophane, vermiculite, wilsonite, wollastonite, zavaritskite, zircon
31 G/14	allanite, cassiterite, diopside, epidote, hydrocarbons, rozenite, scapolite, sphene, tourmaline
31 G/15	apatite, brucite, hydrotalcite, magnesite, phlogopite, potassium feldspar, pyroaurite, scapolite, serpentine, sillimanite, sphene, talc, vesuvianite, zircon
31 G/16	apatite, diopside, graphite, ilmenite, labradorite, scapolite, sillimanite, sphene, vesuvianite, wollastonite

31 H/1 andalusite, chromite, ilmenite, kammererite, magnesite, millerite, muscovite, psilomelane, pyrrhotite, quartz, serpentine, sodalite, talc

31 H/2 bornite, brochantite, chalcocite, chloritoid, hematite, ilmenite, magnesite, malachite, millerite, muscovite, posnjakite, sodalite

31 H/3 calcite, hematite

31 H/5 aegirine, analcime, melilite, natrolite, nepheline, olivine, sodalite

31 H/6 cancrinite, hornblende, oligoclase

31 H/7 bytownite, cuprite, hematite, hercynite, nepheline, olivine, potassium feldspar, wulfenite

31 H/8 actinolite, aragonite, bornite, brochantite, calcite, chalcopyrite, chromite, cuprite, grossular, kammererite, langite, malachite, maucherite, millerite, posnjakite, pyroaurite, pyrrhotite, quartz, serpentine, tremolite, uvarovite

31 H/9 bornite, chalcocite, chromite, copper, diopside, kammererite, kaolinite, malachite, serpentine

31 H/10 azurite, bornite, brochantite, calcite, chalcocite, kaolinite, malachite, posnjakite

31 H/11 actinolite, aegirine, albite, analcime, ancylite, apophyllite, arfvedsonite, ashcroftine, astrophyllite, augite, bastnaesite, behoite, birnessite, britholite, brookite, burbankite, calcite, cancrinite, carletonite, catapleiite, chabazite, cordylite, datolite, dawsonite, donnayite, ekanite, elpidite, epididymite, eudialyte, ewaldite, fluorite, gaidonnayite, genthelvite, gibbsite, gmelinite, gotzenite, harmotome, hedenbergite, helvine, hilairite, hiortdahlite, hydrotalcite, jarosite, joaquinite, kainosite, karpinskyite, labuntsovite, lavenite, leifite, lemoynite, lepidolite, leucophane, leucosphenite, lollingite, mangan- neptunite, mckelveyite, molybdenite, narsarsukite, natrolite, nenadkevichite, nepheline, nordstrandite, olivine, parisite, pectolite, phillipsite, potassium feldspar, pyrochlore, pyrophanite, raite, ramsayite, rhabdophane, rhodochrosite, riebeckite, rinkite, rutile, sepiolite, serandite, siderite, sodalite, sphene, steenstrupine, stillwellite, strontianite, synchysite, thaumasite, thomsonite, tundrite, vesuvianite, villiaumite, vinogradovite, willemite, wohlerite, wollastonite, wurtzite, yofortierite, zircon

31 H/12 aegirine, analcime, ancylite, anhydrite, arsenic, baddeleyite, barite, barylite, burkankite, calcite, cancrinite, catapleiite, cryolite, dawsonite, diamond, dresserite, elpidite, epsomite, fluorite, harmotome, hornblende, hydrodresserite, mordenite, natrolite, nepheline, phillipsite, quartz, siderite, sodalite, strontianite, strontiodresserite, thenardite, weloganite, zircon

31 H/13 chondrodite, ilmenite, labradorite, magnetite, sphene

31 H/14 biotite

31 H/16 bornite

31 I/1 glockerite, melanterite

31 I/4 labradorite, sillimanite, spinel

31 I/5 spinel

31 I/6 scapolite, tourmaline

31 I/9 barite, calcite, vivianite

31 I/10 calcite, magnetite, tourmaline

31 I/13 chrysoberyl, samarskite

31 I/14 aegirine, cancrinite, goethite, greenalite, hastingsite, labradorite

31 I/15 calcite, monazite, sapphirine, scapolite, sphene, tremolite

31 I/16 anglesite, anthophyllite, brochantite, bytownite, cordierite, electrum, epidote, hexahydrite, hisingerite, hornblende, jarosite, magnesite, rozenite, scapolite, sillimanite, sphalerite, tourmaline, tremolite, wilsonite, wollastonite

31 J/1 ilmenite, tourmaline, vesuvianite

31 J/2 quartz, sillimanite, tourmaline, wollastonite

31 J/3 chondrodite, fluorite

31 J/4 calcite, chondrodite, clinohumite, diopside, fluorite, goethite, graphite, greenockite, hematite, hydrotalcite, melanterite, olivine, pyroaurite, quartz, rozenite, serpentine, sphene, spinel, tremolite, zircon

31 J/5 aeschynite, allanite, chrysoberyl, euxenite, fergusonite, hydrotalcite, phlogopite, quartz, thorite, uraninite, zircon

31 J/6 chondrodite

31 J/7 chondrodite, graphite, jarosite, monazite, rozenite, serpentine, szomolnokite, tremolite, wilsonite

31 J/8 quartz

31 J/9 samarskite

31 J/11 apatite, clinohumite, graphite, jarosite, olivine, scapolite, sillimanite, sphene, tremolite, uraninite, wilsonite

31 J/12 actinolite, allanite, beryl, clinohumite, fluorite, phlogopite, potassium feldspar, scapolite, thorianite, thorite, uraninite, uranophane

31 J/13 pyrochlore, thorianite, uraninite

31 J/15 aeschynite, serpentine

31 J/16 albite, beryl, chondrodite, euxenite, fergusonite, pyrochlore, samarskite, tourmaline, uraninite

31 K/1 calcite, phlogopite, scapolite, sphene, spinel, thorite, tourmaline

31 K/2 diopside, leonhardtite, scapolite, sphene

31 K/7 pyrite

31 K/8 calcite, jarosite, phlogopite, saponite, thorite, tourmaline, uraninite, zircon

31 K/9 fluorite, saponite, thorite, zircon

31 K/14 britholite

31 K/16 allanite, euxenite, fluorite, monazite, thorite

31 L/4 phlogopite

31 L/5 phlogopite, uraninite

31 L/6 stilpnomelane

31 L/7 kyanite

31 L/9 pyrite

31 L/10 graphite, kyanite

31 L/15 eucolite, uraninite, uranophane

31 L/16 agrellite, britholite, eudialyte, hiortdahlite, miserite, mosandrite, potassium feldspar, pyrochlore, rinkite, vlasovite

31 M/3 axinite, smaltite

31 M/6 galena, gold, scheelite, smythite, violarite

31 M/7 altaite, brochantite, chalcopyrite, gold, hessite, pentlandite, petzite, posnjakite, rozenite

31 M/10 beryl, spodumene

31 M/14 sulphur

31 M/15 beryl

31 M/16 beryl

31 N/11 axinite

31 N/12 enstatite

31 N/13 beryl

31 N/14 beryl

31 N/15 axinite

31 O/6	thorite, uraninite
31 P/3	allanite, potassium feldspar
32 A/8	calcite, quartz
32 A/9	calcite
32 A/16	calcite, serpentine, sphene, thorite, uraninite
32 B/13	gold
32 C/2	gold
32 C/3	altaite, gold, gypsum, petzite, scheelite, tellurbismuth, tourmaline, wehrlite
32 C/4	antlerite, brochantite, calaverite, carrollite, chalcanthite, chalcocite, chalcopyrite, cobaltite, diamond, gold, hessite, krennerite, malachite, muscovite, pearceite, petzite, proustite, pyrargyrite, pyrite, rozenite, rutile, scheelite, siderotil, silver, sphalerite, szomolnokite, tellurbismuth, tennantite, tetradymite, tetrahedrite, tourmaline
32 C/5	albite, beryl, bismuth, bismuthinite, columbite, euxenite, fluorite, holmquistite, lepidolite, microlite, molybdenite, muscovite, pollucite, powellite, pyrochlore, rozenite, scheelite, spessartine, sphalerite, spodumene, tetradymite
32 C/6	boulangerite, frohbergite
32 C/10	pyrite
32 C/11	pyrite
32 C/12	beudantite, gold, gunningite, leonhardtite, rhodochrosite, sphalerite
32 C/15	pyrite
32 D/1	axinite, beryl, bismuthinite, calaverite, fluorite, gold, muscovite, petzite, rutile, scheelite, spodumene, tourmaline
32 D/2	beryl, gold, hessite, jarosite, scheelite, tetradymite, tourmaline
32 D/3	altaite, brochantite, chalcopyrite, devilline, galena, gold, hisingerite, petzite, pyrite, rickardite, scheelite, sphalerite, sulphur, sylvanite, tellurbismuth, tourmaline
32 D/5	krennerite
32 D/6	altaite, ankerite, calaverite, chalcopyrite, chloritoid, cobalt pentlandite, cordierite, cosalite, electrum, epidote, frohbergite, gold, hessite, jarosite, klockmannite, krennerite, linnaeite, mackinawite, marcasite, melonite, montbrayite, muscovite, petzite, pyrite, silver, sphalerite, spinel, stannite, sylvanite, tellurbismuth, tetradymite, tetrahedrite, umangite
32 D/7	electrum, epidote, gold, pyrite, silver, sphalerite, tourmaline
32 D/8	beryl, bismoclite, bismuth, bismuthinite, bismutite, bornite, cobalt pentlandite, coloradoite, fluorite, gersdorffite, gold, heazlewoodite, hexahydrite, lepidolite, millerite, molybdenite, morenosite, pentlandite, phenakite, pyrrhotite, retgersite, sperrylite, spessartine, sphalerite, spodumene, talc, tantalite, valleriite, violarite, wulfenite
32 D/9	chalcopyrite, chrysocolla, coalingite, gold, malachite, nickel-iron, paratacamite, scheelite, sjogrenite, spessartine, sphalerite, tochilinite
32 D/10	brochantite, chalcopyrite, jarosite, siderite
32 D/11	chalcopyrite, gold
32 D/12	bismuth
32 D/13	gold
32 D/14	bornite, chalcocite, chalcopyrite, chloritoid, pyrite, scheelite, sphalerite
32 D/15	magnetite
32 D/16	montbrayite
32 E/3	kyanite
32 E/8	chalcopyrite
32 F/5	pigeonite
32 F/7	gold
32 F/9	paragonite, perovskite, polybasite, pyrargyrite
32 F/11	hornblende, labradorite, pigeonite
32 F/12	altaite, chalcopyrite, cobaltite, hessite, mattagamite, pyrite, tellurantimony
32 F/13	chalcopyrite, pyrite, sphalerite
32 F/14	kaolinite
32 G/4	gold
32 G/9	gold
32 G/10	pyrite
32 G/12	pyrite, rutile
32 G/13	gold, paragonite
32 G/14	chalcopyrite, pyrite
32 G/15	pyrite, uraninite
32 G/16	cobaltite, gold, magnetite, pyrite, pyrrhotite
32 H/1	millerite
32 H/2	millerite
32 H/14	chalcopyrite
32 I	lazulite, psilomelane
32 I/12	psilomelane
32 I/13	psilomelane
32 I/14	aegirine, goethite, greenalite, grunerite, hornblende, minnesotaite, psilomelane, stilpnomelane
32 J/10	beryl
32 J/11	beryl, spodumene
32 L/6	beryl
32 P	lazulite, psilomelane
32 P/2	grunerite
32 P/3	psilomelane
33 D/15	danalite, epidote, spodumene
33 E/11	spodumene
33 F/12	magnetite
33 G/12	magnetite
33 K/16	magnetite
33 N/1	magnetite
33 N/2	magnetite
33 N/11	axinite
33 N/15	axinite
33 O/13	quartz
34 B/1	spurrite
34 B/2	spurrite
34 C/1	epidote, quartz, rhodochrosite
34 C/2	hematite, quartz
34 C/7	hematite, quartz
34 C/8	epidote, quartz, rhodochrosite
34 C/10	hematite, quartz
34 C/15	hematite, quartz
34 F/2	hematite, quartz
34 F/7	hematite, quartz
35 A/8	biotite
35 J/4	biotite
35 M/11	pentlandite

SASKATCHEWAN

62 K	sylvite
62 M	sylvite
63 K/12	anthophyllite, antlerite, arsenopyrite, brochantite, calcite, covellite, cubanite, devilline, gold, jarosite, marcasite, posnjakite, scheelite, tetrahedrite
63 K/13	copper, sphalerite
63 L	diamond
63 L/9	almandine, arsenopyrite, atacamite, brochantite, chalcopyrite, devilline, gold, molybdenite, pyrite
63 L/10	acanthite, arsenopyrite, chalcopyrite, galena, muscovite, sphalerite, tetrahedrite
63 L/15	beryl, columbite, monazite
64 D/4	sphalerite
64 D/5	chalcopyrite
64 D/8	uraninite
64 D/9	kasolite, uraninite, uranophane
64 L/4	bayleyite, coffinite, kasolite, liebigite, nickeline, sklodowskite, uraninite, uranophane, wulfenite
72 P	sylvite
73 B	sylvite
73 C	sylvite
73 C/1	mirabilite
73 C/6	halite
73 I/16	talc
73 P/1	coffinite, curite, kasolite, monazite, uraninite, xenotime
73 P/6	azurite, chalcocite, chalcopyrite, copper, malachite, pyrite, scapolite, sphene
73 P/7	arsenopyrite, brochantite, carbonate-cyanotrichite, chalcopyrite, covellite, gold, jarosite
73 P/8	becquerelite, liebigite, pyrrhotite, uraninite
74 A/7	chalcopyrite, cordierite, cubanite, pentlandite, pyrrhotite, sperrylite, violarite
74 A/11	anatase, brannerite, davidite, uraninite

74 B/6	uraninite
74 K/6	altaite, gold, hydrocarbons, pararammelsbergite, uraninite
74 N/6	uraninite
74 N/7	fourmarierite, gold, hydrocarbons, muscovite, nolanite, tyuyamunite, umangite, uraninite, uranophane
74 N/8	clausthalite, cuprosklodowskite, gold, hydrocarbons, kasolite, klockmannite, liebigite, magnetite, malachite, metazeunerite, nickeline, nolanite, rammelsbergite, tiemannite, ullmannite, umangite, uraninite, uranophane, uranopilite, zippeite
74 N/9	brannerite, coffinite, hydrocarbons, hypersthene, monazite, pyrochlore, soddyite, thorite, tin, uraninite, uranophane
74 N/10	athabascaite, becquerelite, berzelianite, chalcomenite, clausthalite, copper, eskebornite, eucairite, klockmannite, monazite, silver, tyrrellite, umangite, uraninite, zippeite
74 N/14	uraninite
74 N/15	uraninite
74 O/5	uraninite
74 O/7	gold, monazite, pyrrhotite, uraninite
74 O/12	pyrrhotite, uraninite
74 O/13	allanite, apatite, harmotome, potassium feldspar, scapolite
74 P/2	graphite
74 P/3	uraninite
74 P/4	graphite, phosphuranylite
74 P/5	monazite, phosphuranylite, uraninite
74 P/7	thorianite, uraninite
74 P/13	graphite
74 P/14	graphite

YUKON

95 D/5	galena, sphalerite
95 E/8	franckeite, geocronite, stannite
105 A/2	galena, sphalerite
105 A/15	scheelite
105 B/1	azurite, beryl, cassiterite, fluorite, galena, malachite, quartz, scheelite, wolframite
105 B/3	columbite, fluorite, ludwigite, stannite, topaz
105 B/4	boulangerite, galena
105 B/6	beryl
105 C/2	quartz
105 C/6	enstatite, serpentine
105 C/7	molybdenite
105 C/13	molybdenite
105 C/14	bornite, chalcopyrite
105 D/1	bornite
105 D/2	acanthite, arsenopyrite, galena, gold, jamesonite, pyrargyrite, quartz, realgar, scorodite, silver, sylvanite, symplesite, tetrahedrite, yukonite
105 D/3	bornite, chalcostibite, copper, gold, hessite, stibnite
105 D/5	quartz
105 D/6	arsenopyrite, galena, hessite, petzite, quartz, sylvanite, tellurite
105 D/10	chalcocite, chalcopyrite, copper, epidote, perovskite, tenorite, tetrahedrite, wollastonite
105 D/11	allophane, aragonite, azurite, bornite, brochantite, chalcocite, chalcopyrite, chrysocolla, copper, cuprite, epidote, erythrite, gold, grossular, hematite, magnetite, malachite, perovskite, posnjakite, scheelite, stibnite, tenorite, tetrahedrite, valleriite, wollastonite
105 D/14	azurite, bornite, chrysocolla, epidote, malachite, perovskite, prehnite, tenorite, tetrahedrite
105 E/8	gold
105 F/1	molybdenite, powellite
105 F/4	galena, molybdenite
105 F/6	galena, sphalerite
105 F/8	muscovite
105 F/9	galena
105 F/14	barite
105 F/15	realgar
105 F/16	nickel-iron
105 G/3	bournonite, jamesonite, owyheeite, tetrahedrite, tintinaite
105 G/5	bornite, chalcocite, covellite
105 G/13	almandine
105 H/4	actinolite
105 H/5	actinolite
105 H/6	galena, sphalerite
105 H/8	sphalerite
105 H/9	sphalerite
105 H/16	axinite, bismuth, cubanite, fluorite, scheelite
105 I/7	scheelite
105 J	sanbornite, witherite
105 J/5	scheelite
105 J/16	barite, gillespite, pellyite, taramellite
105 K/6	anglesite, bournonite, galena, marcasite, pyrrhotite, sphalerite, tetrahedrite
105 K/16	boulangerite
105 M/10	cassiterite
105 M/11	gold, scheelite, stibnite
105 M/12	bismuth, scheelite, stibnite
105 M/13	acanthite, adalusite, anglesite, bournonite, galena, ilesite, polybasite, pyrargyrite, scheelite, szmikite
105 M/14	acanthite, anglesite, beudantite, bindheimite, boulangerite, bournonite, cassiterite, dundasite, galena, gold, gunningite, hawleyite, jamesonite, lepidocrocite, malachite, manganite, marcasite, meneghinite, mimetite, pharmacosiderite, plumbojarosite, polybasite, psilomelane, pyrargyrite, pyromorphite, rozenite, scorodite, senarmontite, siderite, silver, smithsonite, sphalerite, stephanite, symplesite, szomolnokite, tetrahedrite, zinc
105 N/7	jagowerite
105 N/9	galena
105 O/1	barite
105 O/4	vesuvianite
105 O/5	leucite
105 O/8	galena, scheelite, sphalerite
105 O/14	struvite
105 P/11	galena, sphalerite
105 P/14	barite, cerussite, galena, hydrozincite, smithsonite, sphalerite
106 A/3	galena, sphalerite
106 B/1	celsian
106 B/5	hematite
106 C/7	boulangerite, cerussite, hydrozincite, smithsonite, sphalerite
106 C/10	smithsonite, sphalerite
106 C/11	sphalerite
106 C/14	cobaltite, erythrite, uraninite
106 D/2	galena
106 D/3	galena, scheelite, sphalerite
106 D/4	beudantite, bindheimite, bismuth, bismutite, boulangerite, cassiterite, cerussite, galenobismutite, gold, jamesonite, lead, litharge, marcasite, mimetite, scheelite, scorodite, senarmontite, sphalerite, sulphur, tetradymite, tetrahedrite, wolframite
106 D/6	siderite, tetrahedrite
106 D/16	brannerite
106 E/1	brannerite, uraninite
106 E/2	uraninite
106 E/15	quartz
106 K/5	epsomite
106 O/4	hematite, tetradymite
115 A/3	azurite, galena, gold, jamesonite, malachite, sphalerite
115 A/5	bornite, chalcopyrite
115 A/6	copper, gold
115 A/11	bornite, chalcopyrite, gold
115 A/12	diopside, olivine
115 A/13	serpentine
115 B	copper
115 B/16	gold
115 F/9	scheelite
115 F/15	brochantite, chalcocite, chalcopyrite, chrysocolla, copper, cuprite, heazlewoodite, hexahydrite, malachite, marcasite, maucherite, pentlandite, pyrrhotite, realgar, rozenite
115 F/16	scheelite
115 G/1	gold
115 G/2	anhydrite, gypsum, quartz
115 G/5	chalcopyrite, hedleyite, hessite, pentlandite, pyrrhotite, violarite

115 G/6	altaite, bornite, cassiterite, chalcocite, copper, gold, hessite, malachite, molybdenite, platinum, silver, tellurbismuth
115 G/8	gold, molybdenite
115 G/9	gold, wolframite
115 G/11	quartz, serpentine
115 G/12	quartz, scheelite
115 G/13	scheelite
115 G/15	molybdenite
115 G/16	molybdenite
115 H/1	quartz, magnetite
115 H/2	magnetite
115 H/3	gold, molybdenite
115 H/4	gold
115 H/7	malachite
115 H/8	quartz
115 H/9	copper
115 H/13	chalcopyrite, molybdenite
115 H/14	tetradymite
115 I	actinolite
115 I/3	acanthite, andorite, anglesite, arsenopyrite, bismuthinite, bournonite, cerussite, freieslebenite, galena, gold, jamesonite, scorodite, silver, sphalerite, stibnite, tetradymite, tetrahedrite
115 I/4	chalcopyrite, molybdenite
115 I/6	azurite, chalcopyrite, gold, magnetite, malachite, stibnite, tourmaline
115 I/7	bornite, chalcopyrite, malachite
115 I/11	bornite, chalcopyrite
115 I/14	gold
115 J/4	gold
115 J/10	barite, cerussite, chalcopyrite, galena, molybdenite, silver, sphalerite
115 J/14	molybdenite, scheelite
115 J/15	cassiterite, chalcopyrite, molybdenite, tetradymite
115 K/2	psilomelane
115 K/15	coloradoite
115 N/15	galena, gold
115 O	gold, osmiridium
115 O/1	gold
115 O/2	gold
115 O/3	gold, rutile
115 O/4	leucite
115 O/5	leucite
115 O/9	anthophyllite
115 O/10	cassiterite, gold
115 O/14	gold, hematite, newberyite, struvite
115 O/15	hematite, gold
115 P	scheelite
115 P/9	bismuth, gold, joseite
115 P/10	axinite
115 P/11	struvite
115 P/12	quartz
115 P/13	cassiterite, quartz
115 P/14	cassiterite, gold, joseite, quartz
115 P/15	cassiterite
115 P/16	bismuth, cassiterite, gold, stibnite
116 A	osmiridium, struvite
116 B	osmiridium
116 B/2	gold
116 B/3	actinolite, cassiterite, electrum, gold, hematite, lead, muscovite
116 B/4	vivianite
116 B/5	tetrahedrite
116 C/2	gold
116 C/7	aragonite, brucite, hydromagnesite, opal, pyroaurite, serpentine
116 D/6	stibnite
116 N/5	vivianite
117 A/9	arrojadite, augelite, baricite, brazilianite, childrenite, kulanite, lazulite, ludlamite, maricite, metavivianite, penikisite, vivianite, wardite
117 A/10	lazulite

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