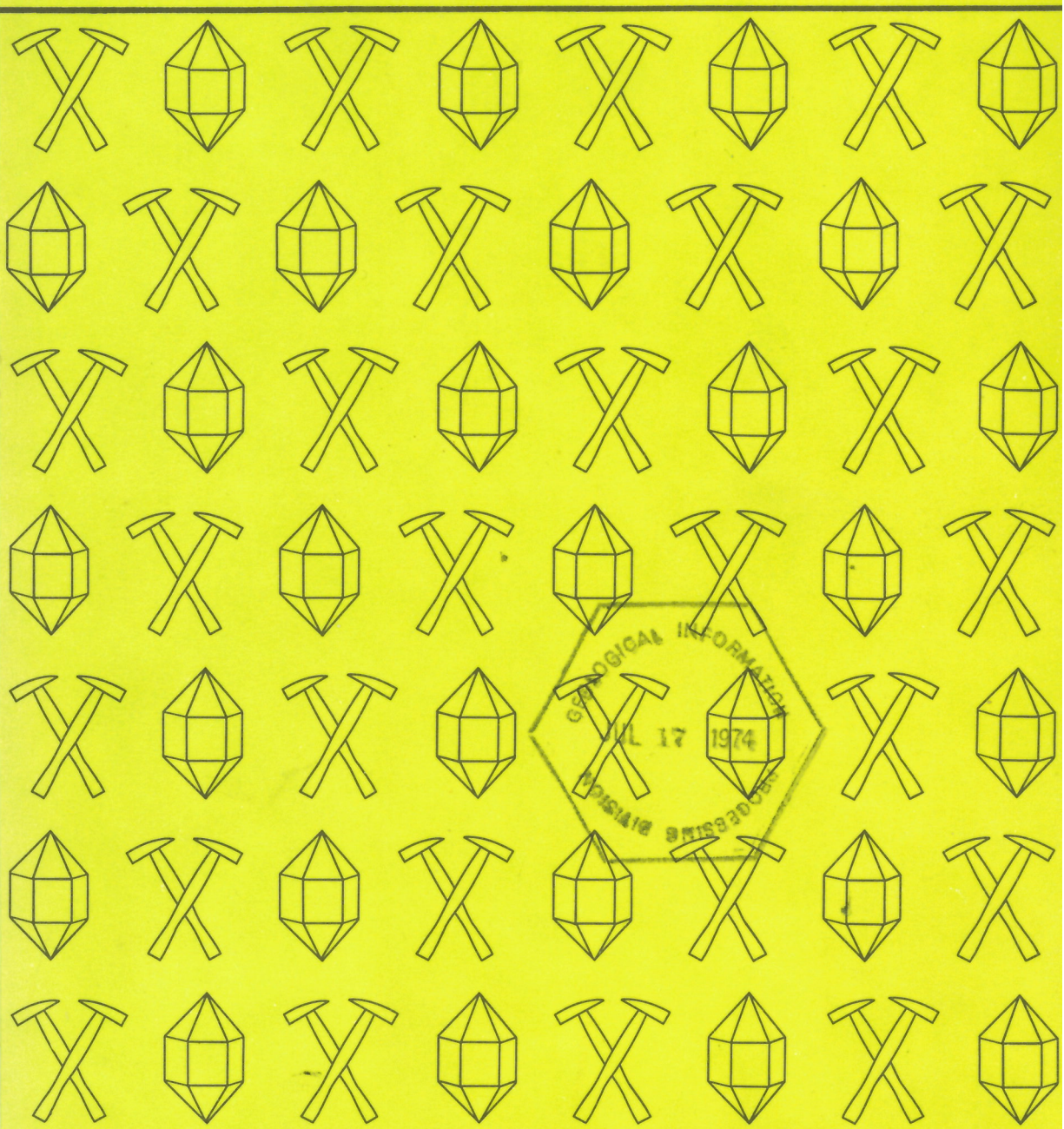
PAPER 73-30

ROCKS AND MINERALS FOR THE COLLECTOR

Kirkland Lake-Noranda-Val d'Or Ontario and Quebec

Ann P. Sabina

1974



DEPARTMENT OF ENERGY, MINES AND RESOURCES

GEOLOGICAL SURVEY

OF CANADA

PAPER 73-30

ROCKS AND MINERALS FOR THE COLLECTOR, KIRKLAND LAKE - NORANDA - VAL D'OR; ONTARIO AND QUEBEC

Ann P. Sabina

DEPARTMENT OF ENERGY, MINES AND RESOURCES

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Price: $3.00 Catalogue No. M44-73-30

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Information Canada
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1974

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ABSTRACT

Occurrences of minerals and rocks are described for localities in the Kirkland Lake – Larder Lake – Noranda – Val d'Or region, and in the area between Noranda and Normetal, and between Val d'Or and Matagami. The area includes the third-ranking all-time gold producing area in the world – the Kirkland Lake camp of which the cumulative production is exceeded only by that of the Porcupine camp, in second place, and of the Witwatersrand gold district, the world's forerunner. The gold and gold-copper mines of the Noranda – Val d'Or area have been Quebec's chief source of gold for nearly half a century; their gold out-put ranks second to that of Ontario in the national total.

The Kirkland Lake – Val d'Or area lies within the prolific mineralized belt of Precambrian rocks extending from Timmins to and beyond Val d'Or. Long before the first claims were staked for gold, Hudson's Bay Company officials and trappers reported seeing pieces of native gold in the possession of local Indians who found it in the course of their hunting expeditions in northwestern Quebec (Ref.: 178, p. 25). Prospecting in the area began when prospectors, attempting to duplicate their earlier success at Cobalt, extended their efforts northward and were subsequently rewarded in 1906 with the discovery of native gold at Opasatica Lake, Quebec and at Larder Lake, Ontario; the latter became the scene of the first gold rush in northeastern Ontario. A rush to the Opasatica region was, however, stifled when the rich showings originally discovered were not duplicated by later-arriving prospectors.

With the spectacular discovery of native gold in the Porcupine district in 1909, the gold-seekers shifted their efforts for a few years in that direction, returning to Kirkland Lake to participate in the rush of 1912-1913. About a decade later, adjacent northwestern Quebec became the scene of the greatest prospecting rush in its history following the discovery of gold-copper ore at what is now Noranda.

The Kirkland Lake – Noranda – Val d'Or area also contains deposits of lead-zinc, iron, nickel, copper, bismuth, and molybdenum, and occurrences of beryl, spodumene, and pollucite. Minerals and rocks suitable for lapidary purposes include jasper, serpentinite ("soapstone"), gabbro ("black granite"), rhyolite porphyry, feldspar porphyries, and chrome-mica rock.

Most of the collecting localities are the dumps of inactive mines and prospects. Road-cuts furnish some additional collecting sites. In general, operating mines are not collecting areas, but visits to the surface plants are, in some cases, arranged for visitors. Some of the famous old mines, no longer accessible, are described for historical interest.

RÉSUMÉ

L'auteur décrit les venues de minéraux et les roches d'endroits situés dans la région de Kirkland Lake – Larder Lake – Noranda – Val d'Or et dans les régions situées entre Noranda et Normétal et Val d'Or et Matagami. C'est dans cette partie que se trouve la région qui se classe au troisième rang dans le monde pour la production de l'or, soit le camp Kirkland Lake dont la production cumulative n'est dépassée que par celle du camp Porcupine qui occupe le deuxième rang, et celle du district aurifère Witwatersrand qui est au premier rang. Les mines d'or et d'or-cuivre de la région de Noranda – Val d'Or ont été au Québec les principales sources d'or durant près d'un demi-siècle. Cette production, pour l'ensemble du pays, classe le Québec immédiatement après l'Ontario.

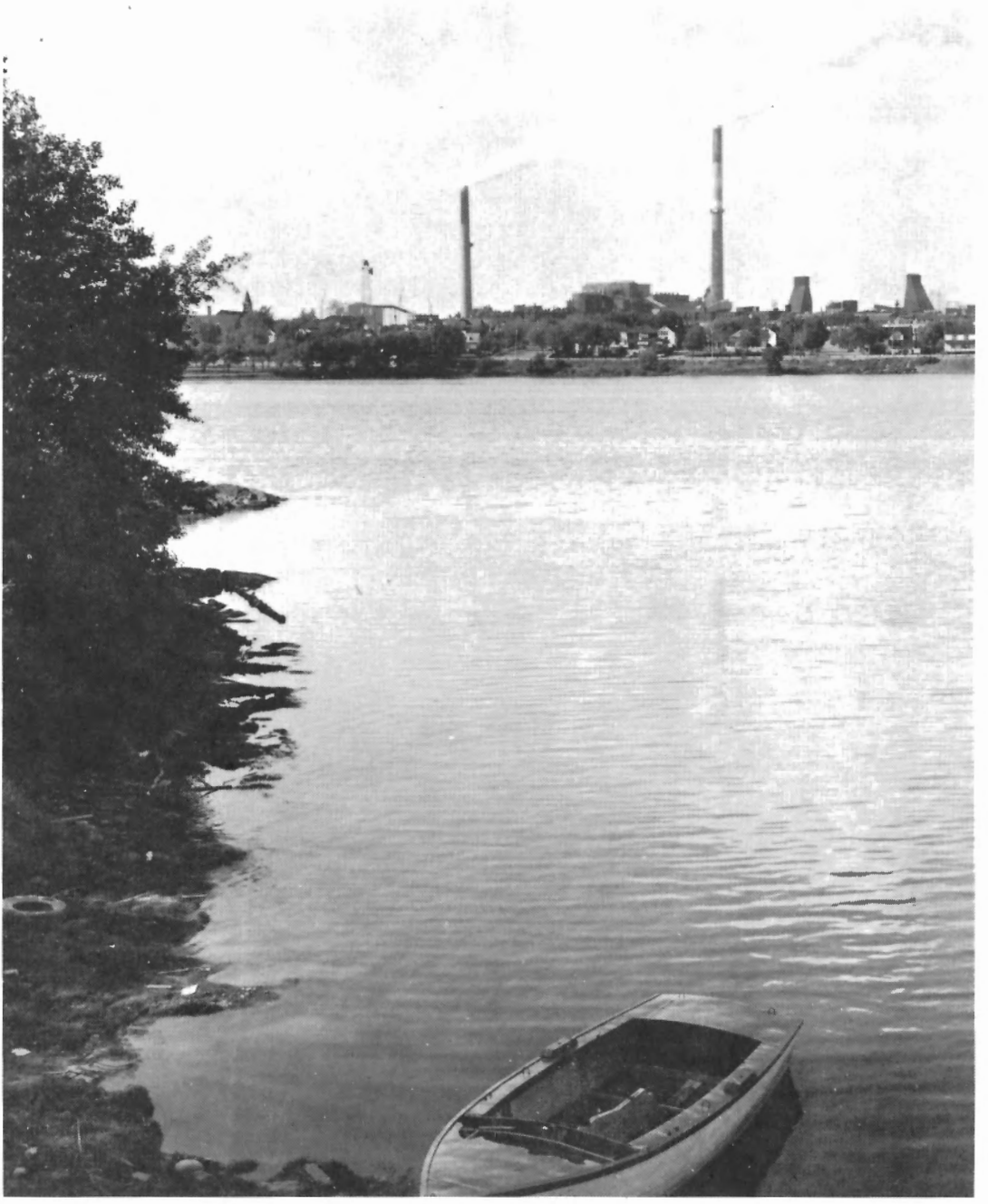
La région de Kirkland Lake – Val d'Or se trouve à l'intérieur de la riche zone minéralisée, a roches précambriennes. Bien avant que les premiers claims

n'eussent été jalonnés, les employés de la Compagnie de la baie d'Hudson et les trappeurs avaient vu de l'or natif entre les mains des Indiens de l'endroit. Les Indiens naturellement avaient trouvé cet or au cours de leurs expéditions de chasse dans le Nord-Ouest québécois (renvoi: 178, p. 25). La prospection a commence dans la région lorsque les prospecteurs essayant de répéter leur exploit de Cobalt ont étendu leur recherche vers le nord et ont fini par découvrir en 1906 de l'or natif au lac Opasatica (Québec) et au lac Larder (Ontario); c'est à ce dernier endroit que devait se produire la première ruée vers l'or du nord-est de l'Ontario. La ruée vers la région d'Opasatica cependant ne s'est pas maintenue, les derniers arrivés des prospecteurs n'ayant pas réussi a découvrir d'autres indices aussi prometteurs que les premiers.

Après la découverte spectaculaire d'or natif dans la région de Porcupine en 1909, les chercheurs d'or ont orienté leurs efforts durant quelques années dans cette direction pour revenir à Kirkland Lake participer à la ruée de 1912-1913. Environ dix ans plus tard, la partie adjacente du nord-ouest du Québec devenait le théâtre de la plus grande ruée vers l'or de l'histoire de la province; il s'agissait de la découverte de minerai d'or-cuivre où se trouve maintenant Noranda.

La région de Kirkland Lake – Noranda – Val d'Or possède aussi des gisements de plomb-zinc, de fer, de nickel, de cuivre, de bismuth et de molybdène et des venues de béryl, de spodumène et de pollucite. Parmi les minéraux et les roches utilisables en joaillerie on trouve du jaspe, de la serpentine ("pierre à savon") du gabbro ("granite noir") du porphyre à rhyolite, des porphyres à feldspath et des roches à chrome-mica.

La plupart des endroits intéressants pour le collectionneur sont des haldes de déchets de mines abandonnées. Les tranchées de route peuvent aussi constituer des endroits favorables. De façon générale, les mines en exploitation ne sont pas des endroits accessibles mais des visites des installations de surface peuvent dans certains cas être organisées. Quelques anciennes mines bien connues, maintenant inaccessibles, sont décrites à cause de leur intérêt historique.



Frontispiece: The Horne Mine and twin smokestacks of Noranda Mines Limited smelter on shore of lac Tremoy. (G. S. C. photo 161443)

ROCKS AND MINERALS FOR THE COLLECTOR KIRKLAND LAKE – NORANDA – VAL D'OR ONTARIO AND QUEBEC

INTRODUCTION

This booklet describes mineral and rock occurrences in the Kirkland Lake and Larder Lake areas in Ontario, and in the Noranda, Val d'Or and Matagami areas in Quebec. The occurrences between Timmins and Cobalt, and in adjacent parts of Quebec are described in Geological Survey of Canada Paper 73-13.

Most of the collecting localities are accessible by automobile from main roads and from secondary roads branching from them; in some cases, a short hike is required. Directions to reach each of the occurrences are given in the text, and are designed for use with official provincial road maps. Locality maps are included for deposits that may be difficult to find. Additional detailed information can be obtained from the appropriate topographic and geological maps listed for each locality. These maps are available from the agencies listed on page 124 .

Many of the inactive mines have not been operated for several years and entering shafts, tunnels, and other workings is dangerous. Collecting in operating mines is generally not permitted; their descriptions are included only as a point of interest to the collector. Some of the occurrences are on private property and are held by claims, their listing in this booklet does not imply permission to visit them. Please respect the rights of property owners at all times.

The localities were investigated in the summer of 1972 by the author ably assisted by Frances Gombos. The field investigation and report were facilitated by information received from H. L. Lovell, Ontario Ministry of Natural Resources, Kirkland Lake, and from L. Moyd, National Museums of Canada, Ottawa. The laboratory identification of minerals by X-ray diffraction was performed by G. J. Pringle, Geological Survey of Canada. This assistance is gratefully acknowledged.

A BRIEF GEOLOGICAL HISTORY

The entire collecting area is within the Canadian Shield – an immense body of Precambrian rocks occupying more than half of Canada and part of the northern United States. During Precambrian time there were repeated cycles of inundation, sedimentation, mountain building, intrusion, and erosion producing a variety of igneous, metamorphic, and volcanic rocks. Within these rocks the great metallic mineral resources of the Kirkland Lake-Noranda-Val d'Or region are contained.

At the close of the Precambrian era, a long period of erosion reduced the Shield to a nearly featureless plain and set the stage for uplift, inundation, and deposition that took place during the long Paleozoic Era that followed. Great thicknesses of sediments were deposited by Paleozoic seas over much of the Shield and still remain along its margins.

In more recent times – during the Pleistocene Period – great ice sheets spread southward across the Shield moulding the landscape as we know it today and leaving behind accumulations of sand, gravel, and till. As the ice withdrew, lake waters were ponded in an area extending north from Lake Temiskaming to form glacial Lake Ojibway-Barlow. Upon its retreat, the lake left a thick mantle of clay that forms the Great Clay Belt of northeastern Ontario and northwestern Quebec. Other deposits – beach sands, stream detritus are of recent times.

The geological history with examples of rocks formed is summarized in Table I.

TABLE I

AGE (millions of years)	ERA		PERIOD	ROCKS FORMED	WHERE TO SEE THEM
	Cenozoic		Quaternary	Gravel, sand, clay, till	Lake shores, stream-beds, eskers
			Tertiary	Not represented in collecting area	
65					
225	Mesozoic			Kimberlite	Upper Canada Mine
	Paleozoic			Not represented in collecting area	
570	PRECAMBRIAN ERA	Proterozoic		Gabbro	Canada Black Granite quarry
				Diabase	Powell Rouyn, Quemont mines
2,480		Archean		Granodiorite	Fontana, Sullivan, Siscoe, Bevcon mines
				Granite	Elder, Eldrich mines
				Diorite	Aldermac, Norbenite Malartic, Louvicourt Goldfield mines
				Alaskite	Mooshla Mine
				Pegmatite	Preissac-Lacorne area molybdenite mines; Quebec Lithium Mine; Massberyl, Valor properties
				Peridotite	Marbridge Mine
				Amphibolite	Akasaba Mine; road-cut Highway 112, Mile 0.2
				Syenite, syenite porphyry	Lucky Cross, Argonaut, Kirkland Rand mines; road-cuts highways 112, 650
				Conglomerate	Road-cuts Highway 66 at Mile 0.7, 6.0; Kirkland Rand, Toburn Granada, O'Brien mines
				Greywacke	Kirkland Lake gold mines; Duvan, Granada mines
				Agglomerate	Upper Canada, Aldermac, New Hosco, Barvue mines
				Rhyolite	Noranda area gold-copper mines; Lyndhurst, Hunter mines
				Volcanic rocks, lava	Swastika gold mines, Argonaut Mine, Kerr Addison Mine
				Andesite	Norbec, Newbec, Bouscadillac, Vendome mines
				Trachyte	Kirkland Lake gold mines
				Sericite schist	New Formaque, Manitou-Barvue, Aumaque mines
				Iron-formation, chert	Adams Mine

COLLECTING ALONG THE ROUTE

The route is shown in Figure 1; it comprises Highway 66 in Ontario and Highway 59 in Quebec. There are several side trips leading from these main routes.

Information on each locality is systematically listed as follows: mileage along the highways, starting at the junction of highways 11 and 66; name of mine or occurrence; minerals or rocks found in deposit (shown in capital letters); mode of occurrence; brief notes on the locality with special features of interest to the collector; location and access; references to other publications indicated by a number and listed at the end of the booklet; references to maps of the National Topographic System (T), and to geological maps (G) of the Geological Survey, Ontario Ministry of Natural Resources, and Quebec Department of Natural Resources.

KIRKLAND LAKE – NORANDA – VAL D'OR; ONTARIO AND QUEBEC

Mile 0 Junction Highway 11 and Highway 66 (East); the road log follows Highway 66 to the Ontario/Quebec border and Highway 59 from the border to Val d'Or.

0.7 Road-cuts expose Timiskaming conglomerate containing red jasper pebbles and boulders of granitic and other rocks.

1.4 Junction single-lane road on left to Baldwin (Kelmac) Mine.

Baldwin (Kelmac) Mine

NATIVE GOLD, PYRITE, MOLYBDENITE, CHALCOPYRITE

In quartz and quartz-carbonate veins in sheared zone.

Native gold was associated with pyrite in veins occupying a sheared zone at the contact of Timiskaming sediments (conglomerate and greywacke) and Keewatin andesite. Molybdenite and chalcopyrite have been reported from the deposit.

Gold was discovered on the property in 1911 by a prospector named Baldwin. Underground exploration from a shaft was originally done in 1917 and 1918 by Baldwin Gold Mining Company Limited, and intermittently from 1926 to 1938 by Baldwin Kirkland Gold Mines Limited, Lucky Kirkland Gold Mines Limited, and Kelmac Mines Limited. Between 1929 and 1938, the mine yielded gold valued at $1,247 from 81 tons of ore. In 1946, the mine was dewatered and an underground investigation was conducted by Baldwin Consolidated Mines Limited. The mine was serviced by a shaft, 420 feet deep.

The mine is located 0.2 mile north of Highway 66 at Mile 1.4.

Refs.: 36 p. 52; 86 p. 18-20; 131 p. 13-14; 152 p. 36-37; 188 p. 114; 190 p. 155; 193 p. 159

Maps (T): 42 A/1E Kirkland Lake
(G): 2239 Ebby-Otto area, Timiskaming district (Ont. Ministry Natur. Resour., 1 inch to $\frac{1}{2}$ mile)

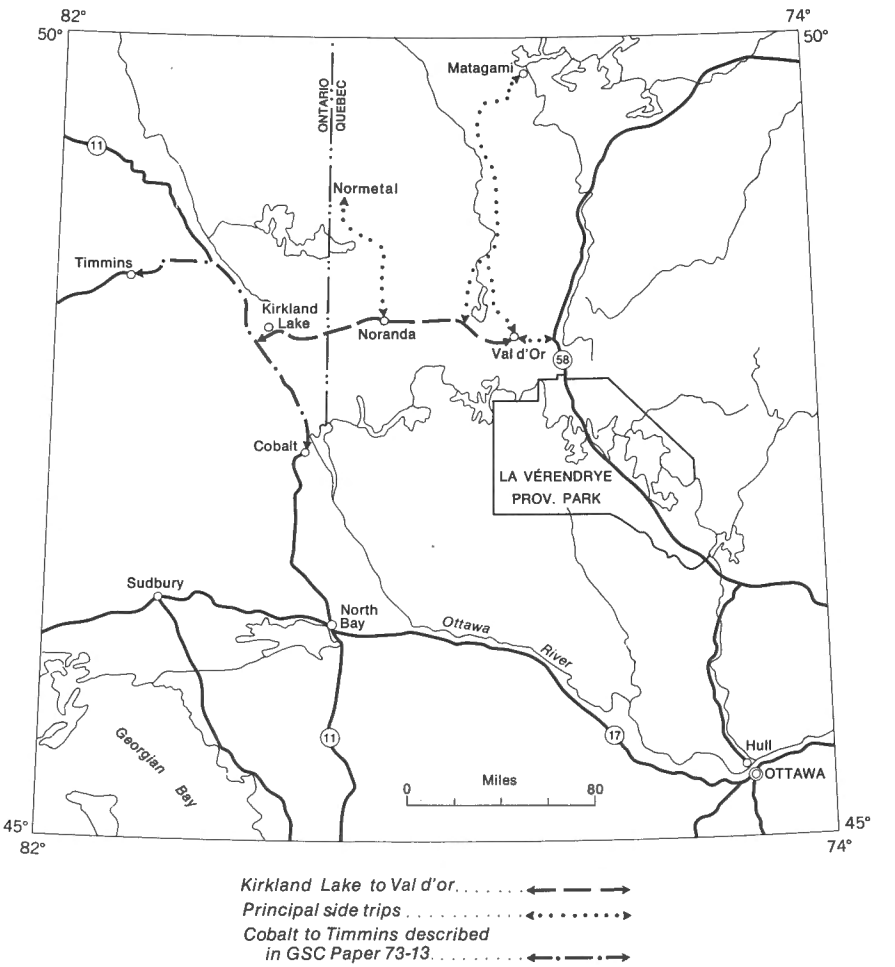


Figure 1. Map showing collecting route: Kirkland Lake - Noranda - Val d'Or.

Mile 2.2 Road-cut on left exposes rusty weathered volcanic rock containing finely disseminated, crystalline and radiating aggregates of pyrite. The rock is coated with dull brownish yellow, powdery goethite.

The Kirkland Lake-Larder Lake Area

The Kirkland Lake area has produced, to the end of 1969, a cumulative total of 33,373,505 ounces of gold, a yield surpassed only by the production from the Witwatersrand and Timmins mines. The average grade of ore produced by the Kirkland Lake Mines was, however, through most of its history, superior to that of the Porcupine camp. Production at the Kirkland Lake camp peaked in 1931 and 1932 when the annual output exceeded one million ounces; the decline that began during World War II resulted in a succession of mine closures until only one – the Macassa Mine – remains in operation in 1972.

The Larder Lake camp, in spite of its earlier history of prospecting and development, did not achieve importance until the 1930s when the Omega Mine and the Kerr Addison Mine came into production; the latter is the sole current producer at Larder Lake and was the first property staked in the area.

In the wake of the staking rush in Cobalt following the discovery in 1903 of sensationally rich silver-bearing veins, and stimulated by reports of the discovery of a possible new gold field in the Opasatica Lake area (near what is now Arntfield, Quebec), prospectors directed their efforts further into the remote north country, many taking the water route northward to Larder Lake where the first gold claim was staked on July 31, 1906 by Dr. R. Reddick of Winchester, Ontario. Reports indicate that prospectors were guided to the gold showings by Tonene, an Indian within whose hunting ground Larder Lake was located. Other claims were soon staked including the claim staked by Dr. William Addison and H. L. Kerr. When samples rich in native gold were displayed by prospectors returning from the north in the autumn of 1906, a stampede of gold-seekers headed to Larder Lake which became the scene of the first gold rush in north-eastern Ontario. During the winter of 1906-1907 some 4,000 claims were speedily and indiscriminately staked, and over 40 companies with a capitalization of nearly $100,000,000 were hastily formed to develop the claims. When exploration in the following summer failed to disclose economic gold ore, the district became discredited, capital was withdrawn, and the few properties that merited exploitation suffered a set-back that retarded their development for 30 years.

With the completion of the railway northward to Dane in 1906, prospectors penetrated the surrounding area and found gold-bearing veins at Otto Lake. Claims were staked at Kirkland Lake at about this time, but were allowed to lapse. Following the successful developments in the Porcupine camp and the commencement of production at Swastika, interest in the Kirkland Lake area was renewed. The first showing of visible gold was staked in July, 1911 by Bill Wright on the property that was later developed as the Wright-Hargreaves Mine. Other claims that later became important producers were staked in 1911 and in 1912, but the real prospecting rush to the Kirkland Lake area was generated later by the discovery and subsequent shipment of spectacular high-grade gold ore in 1912 from the Tough-Oakes property; the event caused the greatest prospecting excitement since the Porcupine discoveries. Unlike the Cobalt and Porcupine camps, the Kirkland Lake camp was a slow starter: initial development of most properties was unrewarding, production being obtained only after several years of development. The first mine to produce was the Toburn Mine in 1912 followed by

others at successive intervals during a 21-year span ending with the Macassa Mine in 1933. Mining activity brought the town of Kirkland Lake into being, but the lake of the same name was gradually filled with mine tailings until no water remained by 1930.

The gold ores in the Swastika-Kirkland Lake-Larder area occur in a geological fault zone that extends eastward to the Cadillac-Malartic region in Quebec. The host rocks are early Precambrian volcanics, sediments, and intrusive rocks. Within the fault zone, the rocks have been carbonatized and are characterized by the presence of green mica (fuchsite) and quartz. The ore contained native gold, gold tellurides, and sulphides. Seven mines shared the $3\frac{1}{2}$-mile ore zone that produced the bulk of gold from the Kirkland Lake camp and that occupied a fault commonly referred to as the "Main Break",; the contiguous mines from west to east are the Macassa, Kirkland Lake Gold, Teck-Hughes, Lake Shore, Wright-Hargreaves, Sylvanite, and Toburn.

The workings of some of the mines within the town of Kirkland Lake have been sealed leaving no evidence of former operations; their location along Highway 66 is given in the road log as a matter of historical interest. Visits to operating mines are arranged during the summer months by the Kirkland Lake District Chamber of Commerce, Duncan Avenue, Kirkland Lake.

Refs.: 16 p. 203; 29 p. 59; 67 p. 55; 87 p. 5-7; 104 p. 9-10, 16, 21, 98; 131 p. 1-6; 151 p. 5; 178 p. 166; 183 p. 95, 126; 206 p. 99-100, 108-109

Maps (T): 32 D/SW Rouyn-Larder Lake
42 A/SE Kirkland Lake
(G): 2205 Timmins-Kirkland Lake, Cochrane, Sudbury and Timiskaming districts (Ont. Ministry Natur. Resour., 1 inch to 4 miles)

Mile 4.1 Turn-off (right) to Swastika (Crescent) Mine, and to Culver Park.

Swastika (Crescent) Mine

NATIVE GOLD, PYRITE, GALENA, MOLYBDENITE

In quartz veins in volcanic rocks and in diorite

Auriferous quartz veins were first noted on the shore of Otto Lake in 1906 by Bill and Jim Dusty who were prospecting for Tavistock Mining Partnership of Tavistock, Ontario; the deposit was later developed as the Swastika Mine. At the end of that year, the gold-bearing veins that were to become the Lucky Cross Mine were found. Exploration of the original discovery was done by shaft-sinking which failed to disclose any veins of importance. The rich gold-bearing veins were, however, found in 1910 following a program of surface exploration. Mining and milling commenced in the same year by Swatika Gold Mining Company Limited; the mill was the first gold mill operated in northeastern Ontario. Further production, obtained in 1911 and in 1913, brought the total to a value of $11,457. The production shaft was 420 feet deep. The property was acquired in 1936 by Kirkland Gold Mines Limited.

The mine became a producer again between 1941 and 1947 when Golden Gate Mining Company Limited renewed operations. Ore was mined from an adit at the shore of

Otto Lake south of the shaft, and from the shaft. Operations were terminated in 1949. The combined production from this and from the nearby Lucky Cross Mine was valued at slightly over 1 million dollars.

The mine is located south of Highway 66 at Mile 4.1. Tours to the adit are guided during June, July and August by the Associated Canadian Travellers of Kirkland Lake; entry is at Culver Park, Swastika.

Refs.: 104 p. 9-11; 131 p. 27-28; 152 p. 47-49; 159 p. 109-110; 163 p. 597; 181 p. 462-463; 195 p. 57

Maps (T): 42 A/1E Kirkland Lake
(G): 2239 Eby-Otto area, Timiskaming district (Ont. Ministry Natur. Resour., 1 inch to $\frac{1}{2}$ mile)

Mile 4.8 Junction road (on right) to Lucky Cross (Golden Gate) Mine.

Lucky Cross (Golden Gate) Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, MOLYBDENITE

In quartz veins in volcanic rocks and in syenite porphyry

The deposit is similar to that at the Swastika Mine. It was staked by John Wood and Walter Hurd. In the original exploration of the deposit by the sinking of several shallow shafts in 1907 and 1908, the rich gold-bearing veins at and near the surface were overlooked. The investigation was performed by the Crawford Mining Syndicate. Following the discovery of rich ore at the Swastika Mine in 1910 and 1911, attention was again directed to the Lucky Cross deposit; surface exploration under the direction of J. W. Vandergrift resulted in the discovery of veins carrying good values in gold. In 1911, Lucky Cross Mines Limited of Swastika undertook development of the deposit and installed a 10-stamp mill.

An inclined shaft was sunk to a depth of 250 feet; in the course of sinking the shaft a number of spectacular showings of free gold were encountered "shot after shot bringing out rich samples" (Ref.: 181 p. 672). Operations ceased in 1913. Ten years later, Kirkland Gateway Gold Mines Limited deepened the shaft to 350 feet. Most of the production was, however, obtained from 1938 to 1942 by Golden Gate Mining Company Limited. The company sank a vertical shaft to a depth of 1,000 feet and installed a 150-ton mill. The total combined production from the Swastika Mine and the Lucky Cross Mine was valued at slightly over 1 million dollars.

Access is via a road, 0.2 mile long, leading south from Highway 66 at Mile 4.8.

Refs.: 24 p. 20; 92 p. 297; 104 p. 11-12; 131 p. 27-28; 152 p. 47-49; 163 p. 597-598; 181 p. 672; 182 p. 20-22

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Plate I. Boulder of banded iron formation, Adams Mine; it is composed of alternating bands of massive magnetite and of chert. (G. S. C. photo 161447)

Mile 5.5 Junction Highway 112. Road logs to Adams Mine, Boston molybdenite occurrence, Barry-Hollinger (Patricia) Mine, and Cathroy Larder (Yama) Mine begin at this junction. The descriptions of these localities follow:

Adams Mine

MAGNETITE, HEMATITE, PYRITE, PYRRHOTITE, GRAPHITE, MARCASITE, GARNET, EPIDOTE, ACTINOLITE, CHLORITE, CALCITE, SPHALERITE, GALENA, CHALCOPYRITE

In iron-formation

The ore consists of alternating layers of massive magnetite and dark grey to dark red chert, and contains an average of 25 per cent iron. Magnetite also occurs as disseminations in cherty quartzite and is associated with hematite, graphite, marcasite, pyrite, pyrrhotite, and buff-coloured amphibole. The pyrite occurs as nodules and as cubic crystals. Non-metallic minerals associated with the ore body are brownish red garnet, epidote, actinolite, chlorite, and calcite. Base metal minerals in non-economic amounts occur in the deposit: sphalerite and galena in carbonate veins cutting volcanic rocks, chalcopyrite, pyrite and pyrrhotite in cherty quartzite.

Plate II. Open pit, Adams Mine. (G. S. C. photo 161448)

Eight orebodies have been outlined in the iron range which extends about 6 miles, and varies from 3,000 to 4,000 feet in width. The iron range is composed of irregular lenses of iron-formation and cherty quartzite separated by lava flows (basalt and andesite). It has been known since 1902 but until recently was regarded as too low-grade for exploitation. In 1948, Dominion Gulf Company undertook a 6-year exploration program of the Boston Township iron range including airborne and ground magnetometer surveys, mapping, sampling, and drilling. The property was optioned in 1954 to Jones and Laughlin Steel Corporation and ten years later production from an open pit began. The mine is equipped with concentrating and pelletizing plants. In 1971, it was acquired by Dominion Foundries and Steel Limited. Enquiries regarding visits to the property should be directed to the Kirkland Lake Chamber of Commerce. Road log from Highway 66 at Mile 5.5:

Mile 0 Junction Highway 112 and Highway 66; proceed onto Highway 112.

0.2 Road-cuts expose hornblendite for a distance of about 0.3 mile. Crusts of finely crystalline epidote associated with actinolite ("micro" bladed aggregates), chlorite, and titanite ("micro" prisms) occur along fractures in the rock.

4.5 Junction; turn left onto Highway 650. Pink syenite outcrops at the junction.

5.1 Coarse pink syenite is exposed by a road-cut on left. The rock contains radiating bladed aggregates of dark green actinolite, and reddish brown grains and granular patches of titanite.

10.9 Adams Mine.

Refs.: 34 p. 79-82; 35 p. 176-181; 90 p. 49-50; 225 p. 81

Maps (T): 32 D/4W Larder Lake
(G): 1957-4 Boston Township and part of Pacaud Township, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Boston Molybdenite Occurrence

MOLYBDENITE, PYRITE, CHALCOPYRITE

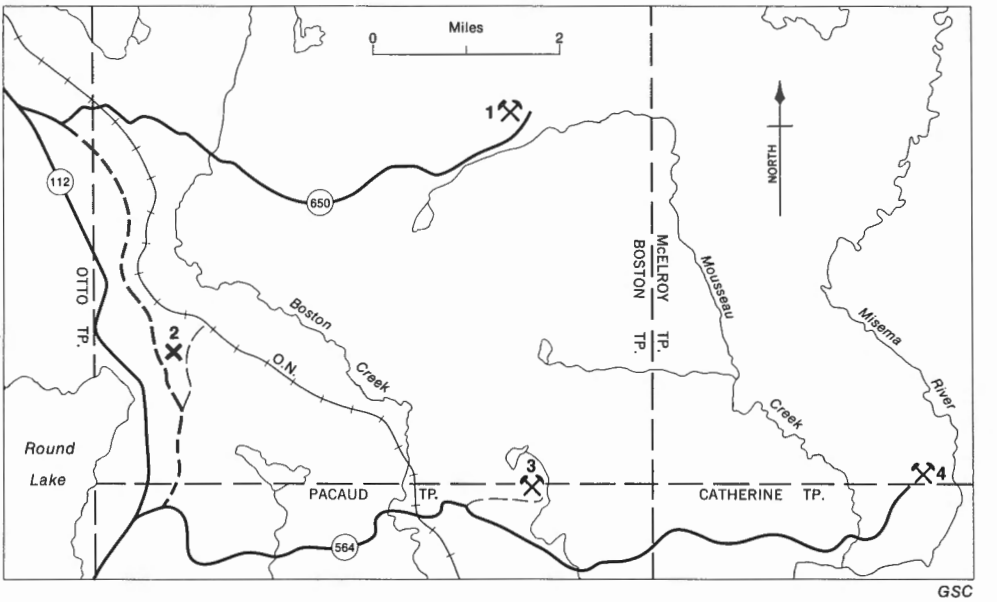
In quartz veins cutting volcanic rock

Coarse flakes and crystals of molybdenite occur with pyrite and chalcopyrite in quartz. The deposit has been exposed by pits, now partly overgrown.

Road log from Highway 66:

Mile 0 Junction Highway 112 and Highway 66; proceed onto Highway 112.

4.5 Junction Highway 650.



1. Adams Mine;
2. Boston molybdenite occurrence;
3. Barry-Hollinger Mine;
4. Cathroy Larder Mine.

Map 1. Kirkland Lake area.

9.3 Junction; turn left onto Highway 564.

9.7 Junction rough single-lane road; turn left onto it.

10.8 Fork at gravel pits; proceed onto road on right.

11.35 Pits on left side of road (Boston molybdenite occurrence).

Maps (T): 32 D/4W Larder Lake
(G): 1957-4 Boston Township and part of Pacaud Township, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Barry-Hollinger (Patricia) Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, SPHALERITE, CHALCOCITE

In quartz veins in lava

Native gold, visible in the hand specimen, occurred at this former gold mine; it was generally associated with the chalcopyrite. Pyrite, sphalerite, and chalcocite occurred in the deposit.

This area was originally staked for gold in 1905 and 1907 during the gold rush in the Larder Lake area; staking activity was renewed in 1913 following the discoveries of rich gold-bearing veins at Kirkland Lake. Exploration of the Barry-Hollinger property began in 1916 by Lyman and associates of Cobalt; it was then known as the Boston-Hollinger claim. In 1917 and in 1918, the Patricia Syndicate worked the deposit using a shaft 215 feet deep. A mill with a capacity of 50 tons per day was in operation and gold valued at about $10,000 was recovered. The mill and all mine buildings were destroyed by a forest fire in 1919. Barry-Hollinger Gold Mines Limited later renewed operations and the mine produced gold from 1925 until 1936 when it was closed. Total gold production (from 1918) was valued at $1,622,118; a small amount of silver was recovered. The mine was serviced by a shaft and a winze to a depth of 2,250 feet.

Road log from junction Highway 112 and Highway 564 (9.3 miles south of the junction of highways 112 and 66):

Mile 0 Proceed west along Highway 564 to and beyond Boston Creek settlement.

4.6 Turn left into rough single-lane road.

5.3 Junction mine road; turn left.

5.45 Barry-Hollinger Mine.

Refs.: 23 p. 1, 14-15; 83 p. 45-46; 131 p. 15; 140 p. 92; 141 p. 101-102

Maps (T): 32 D/4W Larder Lake
(G): 1957-4 Boston Township and part of Pacaud Township, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

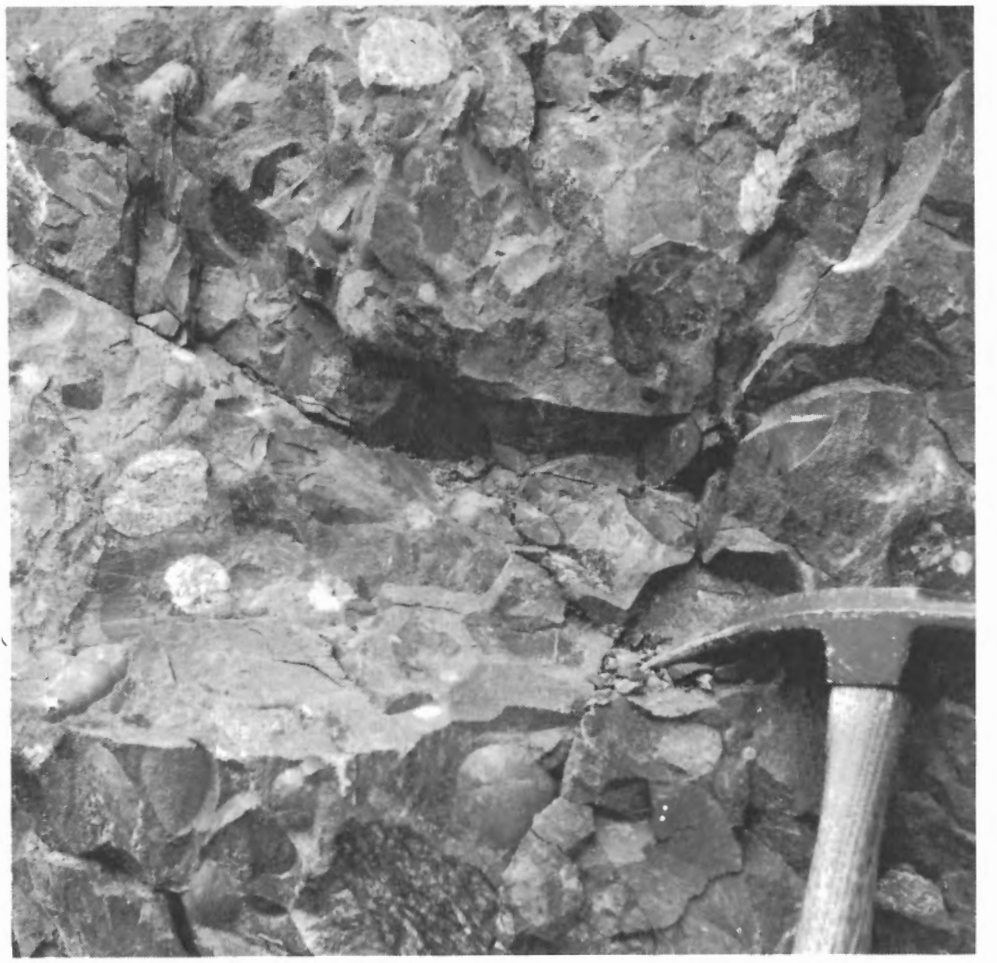


Plate III. Timiskaming conglomerate exposed by a road-cut at Mile 6.0, Highway 66. The pebbles and boulders are of jasper, chert, various types of porphyries. (G. S. C. photo 161444)

Cathroy Larder (Yama) Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, SPHALERITE

In quartz-carbonate veins in sheared volcanic rocks

This deposit was staked in about 1918 but development did not follow for a number of years. Preliminary surface investigation was done in 1937 by Yama Gold Mines Limited. A shaft was later sunk to a depth of 528 feet and production was obtained from 1941 to 1943; about 3,000 ounces of gold and 946 ounces of silver were recovered. In 1945, Cathroy Larder Mines Limited outlined by diamond drilling another orebody south of the original workings and sank a shaft to a depth of 500 feet. A small amount of gold resulted from this undertaking. Operations terminated in 1948.

The mine is located at the end of Highway 564, 10.3 miles from its junction with Highway 112. The area just north of the mine and west of Misema River was the scene, in 1902, of the first prospecting for gold in northeastern Ontario.

Road log from Highway 112:

Mile 0 Junction Highway 564 and Highway 112; proceed onto Highway 564.

0.4 Turn off to Boston molybdenite occurrence; continue along highway.

4.6 Junction road to Barry-Hollinger Mine; continue straight ahead.

6.5 Junction; continue straight ahead.

8.8 Junction; proceed along road on left.

10.3 Cathroy Larder Mine.

Refs.: 1 p. 5, 39-40; 131 p. 20-21

Maps (T): 32 D/4W Larder Lake
(G): 2043 Catharine and Marter Townships, Timiskaming district. (Ont. Ministry Natur. Resour., 1 inch to $\frac{1}{2}$ mile)
1950-3 Township of McElroy and portion of Township of Boston, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

The main road log along Highway 66 is resumed.

Mile 5.5 Junction Highway 112.

6.0 Road-cuts expose Timiskaming conglomerate containing red to purplish red jasper pebbles and green, grey and black chert pebbles. The pebbles measure up to 3 inches in diameter. Also enclosed by the rock are pebbles and boulders of porphyritic rocks.

7.4 Junction Goldthorpe Road leading to Macassa Mine.

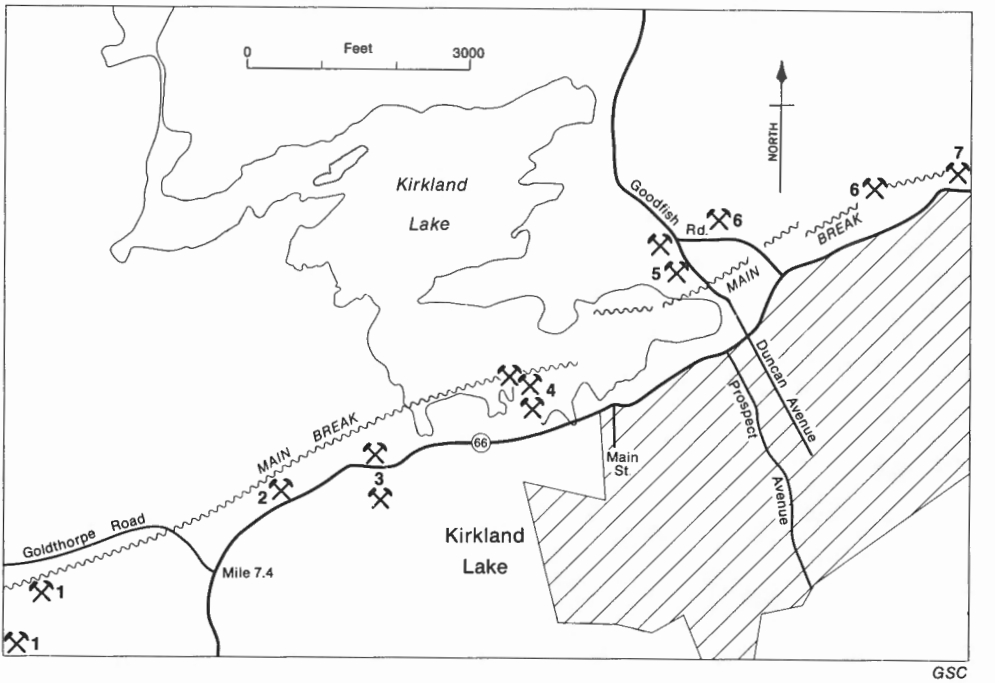
Macassa Mine

NATIVE GOLD, ALTAITE, COLORADOITE, MOLYBDENITE, PYRITE, SPECULARITE

In quartz veins occupying fractures in sediments (mostly conglomerate) and in syenitic rocks

Native gold is associated with the tellurides, altaite and coloradoite, and with molybdenite. Pyrite is common.

The Macassa Mine is the most westerly of the seven adjoining mines that comprised the $3\frac{1}{2}$-mile gold-producing strip in Kirkland Lake; it is the only one of the seven



1. Macassa Mine;
2. Kirkland Lake Mine;
3. Teck-Hughes Mine;
4. Lake Shore Mine;
5. Wright-Hargreaves Mine;
6. Sylvanite Mine;
7. Toburn Mine.

Map 2. The Kirkland Lake gold-strip showing the location of the seven mines that shared the 3½-mile ore-zone along the Main Break; the shoreline of Kirkland Lake is shown as it was before the lake was filled.

currently (1973) in production. The original claims were staked in the summer of 1911 by Dave Elliott; claims staked late in 1912 by Harry Oakes, Ernie Martin, and a Mr. Anderson, who was a Swastika assayer, became part of the property in 1926. Between 1916 and 1919, development by means of a 523-foot vertical shaft was conducted by Elliott-Kirkland Gold Mines Limited. No ore of economic importance was located, and operations ceased. A profitable orebody was found in 1931 by Macassa Mines Limited as a result of five years of underground exploration. A new shaft was put down, a mill installed, and production began in 1933 continuing to the present. The underground workings extend to a depth of 6, 950 feet; in 1971 an underground extension was made to the Tegren property. The mine is equipped with a 500-ton per day mill. At the end of 1970, the property was acquired by Willroy Mines Limited. Total production to the end of 1972 amounted to 2, 002, 085 ounces of gold and over 300, 000 ounces of silver from 4, 628, 860 tons of ore milled and valued at $74, 178, 376.

The mine is located on the Goldthorpe Road, 0.5 mile from its junction with Highway 66 at Mile 7.4. Enquiries regarding visits to the mine should be directed to the Kirkland Lake Chamber of Commerce.

Refs.: 62 p. 119; 90 p. 22-23; 104 p. 16, 54; 131 p. 52-53; 167 p. 85-86; 168 p. 125-126, 129; 225 p. 195; 228 p. 354

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1, 000 feet)

Mile 7.6 Kirkland Lake Mine on left.

Kirkland Lake Mine

NATIVE GOLD, PYRITE, ALTAITE, CALAVERITE, CHALCOPYRITE, MOLYBDENITE, GRAPHITE, TOURMALINE

In quartz veins in augite syenite, syenite porphyry, and in Timiskaming sediments

Native gold, rarely visible, was associated with pyrite and with the tellurides – altaite and calaverite-in quartz which also carried small amounts of chalcopyrite, molybdenite, graphite and tourmaline.

The original claim was staked in April, 1911 by C. A. McKane on a gold-bearing vein covered by 20 feet of overburden and revealed by deep trenching. In 1913, initial exploration of the discovery vein was undertaken by Kirkland Gold Mines Limited and was continued by Beaver Consolidated Mines Limited which deepened the shaft to 600 feet. In 1915, a second shaft that became the main shaft was sunk (southwest of the original shaft) by Kirkland Lake Gold Mining Company Limited which brought the mine into production in 1919 and acquired the Chaput-Hughes and the Grozelle claims in 1929 and 1936 respectively.

The mine was developed on 61 levels by 2 shafts and 4 winzes to a maximum depth of 6, 003 feet. Except for one year (1925), production was continuous until 1960; during this time, the mill processed 3, 141, 051 tons of ore for a recovery valued at $39, 124, 929. Production peaked in 1940 when gold valued at $2, 051, 790 was obtained

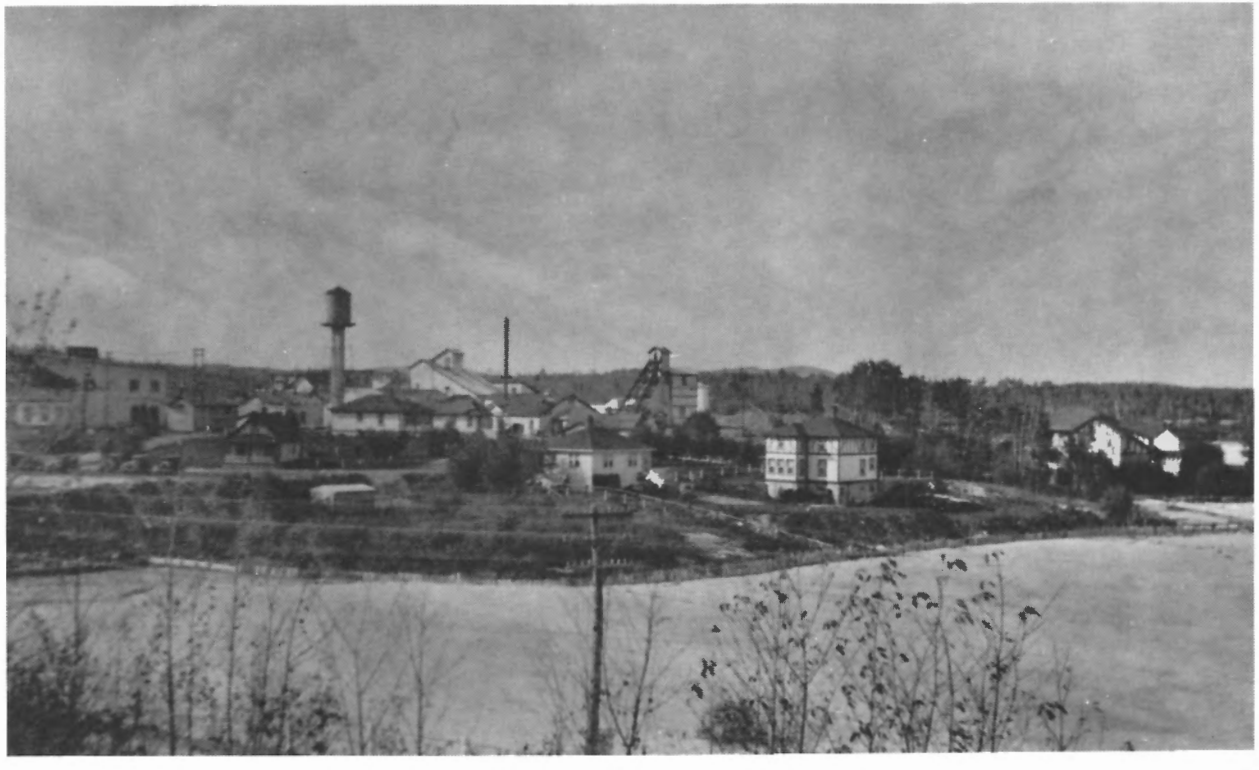


Plate IV. Teck-Hughes Mine and concentrator, October, 1931; a small bay that was at the southwestern end of Kirkland Lake is in foreground. (Public Archives of Canada photo PA-14426)

from 137, 986 tons of ore. After operations ceased, the property was acquired by Teck-Hughes Gold Mines Limited.

The Kirkland Lake Mine is located at the eastern end of the Main Break, between the Macassa Mine to the west and the Teck-Hughes Mine to the east. The main shaft is on the north side of Highway 66 (Government Road) at Mile 7. 6.

Refs.: 104 p. 44-45, 52-54; 108 p. 133, 134, 138; 131 p. 42-43; 157 p. 81-82, 93-98

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1, 000 feet)

Mile 7. 9 Teck-Hughes Mine. The original southern shore of Kirkland Lake paralleled Government Road (Highway 66) from the Teck-Hughes Mine to Duncan Avenue.

Teck-Hughes Mine

NATIVE GOLD, ALTAITE, COLORADOITE, CALAVERITE, PYRITE, MOLYBDENITE, GRAPHITE, HEMATITE, PYRRHOTITE, MAGNETITE, CHALCOPYRITE, BARITE

In quartz veins in sediments, tuffs and intrusive rocks

Operations at this mine ceased in 1968. Visible gold was associated with tellurides (altaite, coloradoite, and calaverite) and with pyrite. Minor amounts of molybdenite graphite, specular hematite, pyrrhotite, magnetite, chalcopyrite, and red barite have been reported from the orebody. The most common host rocks were conglomerate, feldspar porphyry, and syenite.

The Teck-Hughes property comprises a number of claims that were staked in the early days of the Kirkland Lake camp; these are the claims staked by Stephen Orr, by John Reamsbottom, and by C. A. McKane early in 1911, and claims staked in the west shore of Kirkland Lake by Sandy McIntyre for James A. Hughes, who later acquired the Reamsbottom claims. The promising discovery that was made by McIntyre led to the formation of Teck-Hughes Gold Mines Limited in 1913. Initial exploration on the Hughes claims by the Nipissing Mining Company of Cobalt in 1914 and 1915 failed to locate economic ore, and the company dropped its option.

Exploration was resumed by Teck-Hughes Gold Mines Limited which had been taken over in 1915 by the owners of the Buffalo Mines Limited of Cobalt. In 1916 the shaft was deepened to a depth of 500 feet and a 50-ton mill was installed; gold valued at $66, 722 was recovered in 1917 marking the beginning of 51 years of production. The Orr claims were acquired in 1923; a 400-foot shaft had been sunk on this deposit in 1917-1918 by Kirkland Porphyry Gold Mines Limited. The 1923 production of gold and silver from the Teck-Hughes Mine valued at $1, 117, 963 was the highest of any mine in Kirkland Lake in that year. Production reached a peak in 1931 when 294, 421 ounces of gold and 24, 686 ounces of silver valued at $6, 093, 199 was won. The total value of gold produced from the mine (1917-1968) was $107, 824, 554, the third highest value of the seven mines in the Kirkland Lake gold-strip.

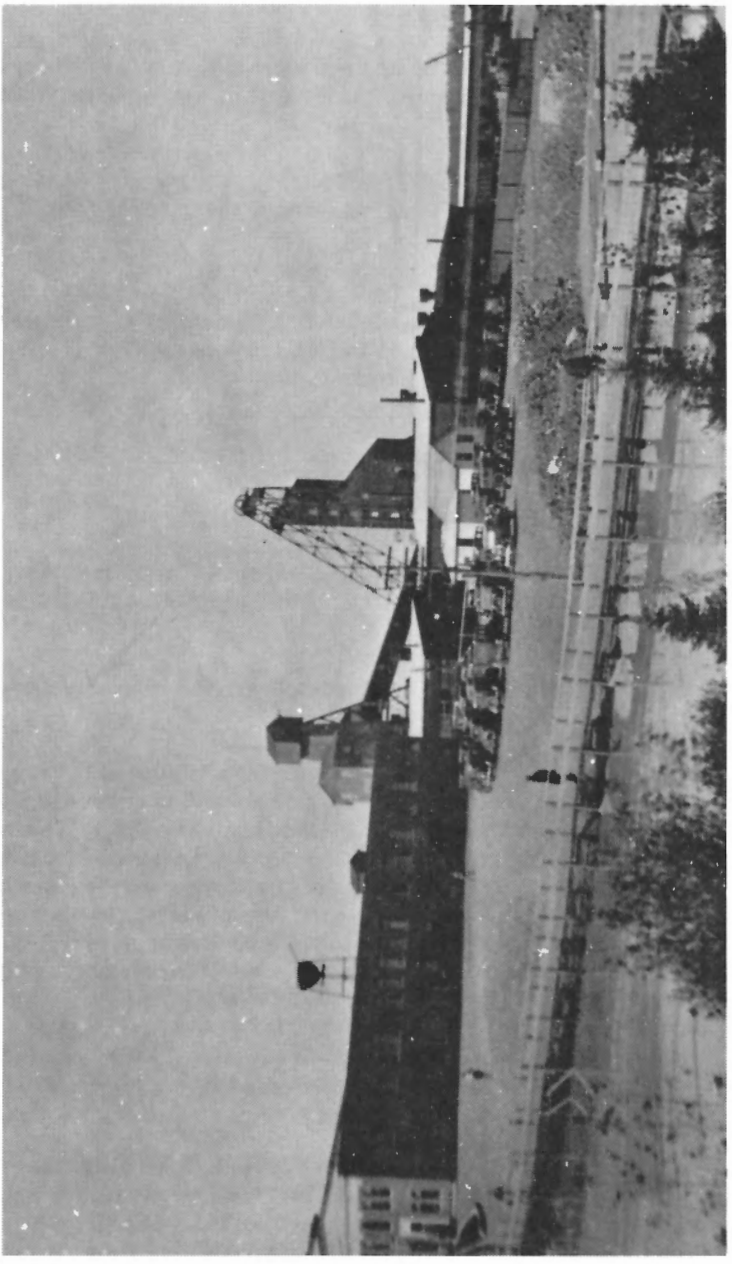


Plate V. Lake Shore Mine, 1931. (Public Archives of Canada photo PA-14455)

The Teck-Hughes mine has been developed on 50 levels from 4 shafts and 6 winzes to a maximum depth of 6, 148 feet. In 1960, the Teck-Hughes company acquired the adjoining property of the old Kirkland Lake Mine, incorporated in 1913 to develop the claims staked by C. A. McKane.

The mine workings are on both sides of Highway 66 at Mile 7. 9 in Kirkland Lake. Enquiries regarding visits to the property should be directed to the Kirkland Lake Chamber of Commerce.

Refs.: 22 p. 30-31; 49 p. 141-146; 62 p. 109, 110, 119; 104 p. 14, 15, 29-30, 43, 51; 125 p. 5; 126 p. 9; 131 p. 42-43, 66-67; 139 p. 83; 142 p. 118; 219 p. 346

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1, 000 feet)

Mile 8. 35 Site of the Lake Shore Mine on left.

Lake Shore Mine

NATIVE GOLD, PYRITE, CALAVERITE, COLORADOITE, ALTAITE, PETZITE, CHALCOPYRITE, GALENA, MOLYBDENITE, SPHALERITE, ARSENOPYRITE, PYRRHOTITE, BARITE, CALCITE

In quartz veins cutting augite syenite, syenite prophyry, and conglomerate and greywacke

The Lake Shore Mine was the largest gold producer in the Kirkland Lake camp. The gold occurred in quartz, in the altered wall-rock, and in association with pyrite (the chief metallic mineral), and with some of the tellurides. The order of abundance of the tellurides was: altaite, calaverite, coloradoite and petzite, calaverite being the most abundant gold telluride. The best showings of coarse native gold and of tellurides (in particular, calaverite) were found above the 1, 000-foot level, and the most spectacular showing of massive gold of any mine in the Main Break occurred at the 800-foot level where one mass of native gold measured 4 inches by 2 inches by 1 inch. The sulphide minerals, other than pyrite, and the barite and calcite were minor constituents of the ore. The gold-bearing tellurides accounted for 11 to 19 per cent of the gold in the ore and about 90 per cent of the telluride content was present as calaverite. One section of the mine produced exceptionally rich ore that averaged over $40. 00 per ton over widths of 10 to 45 feet.

The original claims were staked on July 30, 1912 by Harry Oakes who later acquired claims staked by George Minaker in February, 1911, and by Melville McDougall in June, 1911. Lake Shore Mines Limited was organized in 1914 by Harry Oakes and development began immediately with the sinking of a shaft (No. 1) on the discovery vein. Production began in 1918 after the more productive veins to the north were encountered; these veins outcropped beneath the south arm of the Lake (Kirkland Lake) which covered about half the property. A new shaft that became the main production shaft was put down in 1927 at a location 250 feet northwest of No. 1 shaft.

The mine was serviced by 4 surface shafts and 2 internal shafts, one of them extending the underground development to a depth of 8,174 feet (below sea level), a depth exceeded in North America only by the Wright-Hargreaves Mine. With the start of production in 1918, the Lake Shore Mine established itself as the camp's leader in the annual yield of gold, a position it maintained for almost 40 years. When production ceased in 1965, the cumulative value of the ore treated (16,630,766 tons) totalled $271,164,534 accounting for about 40 per cent of the recovery from the seven mines in the Kirkland Lake gold-strip, and placing it in second place, after the Hollinger Mine in Canada's gold production to that time. In its peak years from 1931 to 1940, its annual yield was valued at over 10 million dollars, an annual value not achieved by any other mine in the camp; the highest recovery was in 1934 when ore valued at $16,305,819 was milled. In 1956, the Lake Shore Mine and the adjoining Wright-Hargreaves Mine were acquired by Little Long Lac Gold Mines Limited.

The mine, now sealed, occupied a central position in the Main Break flanked by the Teck-Hughes Mine on the west side and the Wright-Hargreaves Mine to the east. It was located on the north side of Highway 66 (Government Road) at Mile 8.35.

Refs.: 26 p. 150, 154-155; 62 p. 110, 112, 115; 88 p. 29; 104 p. 15, 21; 131 p. 47-49; 153; 157 p. 72-73, 82, 112, 120-122; 215 p. 183

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 8.8 Kirkland Lake, at Prospect Street and Government Road (Highway 66); Prospect Street leads to the Kirkland Rand Mine.

Kirkland Rand (Ontario Kirkland) Mine

NATIVE GOLD, TELLURIDES, PYRITE, CHALCOPYRITE, MOLYBDENITE, JASPER

In quartz veins occupying fractures in Timiskaming conglomerate and greywacke, and in syenite porphyry

Gold was associated with tellurides, pyrite, and chalcopyrite; visible gold was rare. Molybdenite has also been reported from the deposit. Pebbles and fragments of bright red jasper and of grey, brown and black chert occur in sheared conglomerate on the mine dumps. Pink calcite and chlorite were noted on specimens of the conglomerate.

The deposit yielded gold valued at about $10,000 in 1922 when it was operated by Ontario Kirkland Gold Mines. At that time the mine was serviced by a 450-foot shaft and a 100-ton mill. The property was known as the Hurd claim and it was initially explored by La Rose Mines Limited in 1917 by means of a 100-foot shaft. A number of companies involved in subsequent development included: Montreal-Ontario Mines Limited (1923-1924), Kirkland Rand Limited (1924-1927), Kirkland Premier Mines Limited (1927-1929), Kirkland Gold Rand Limited (1931-1937), and Hudson-Rand Gold Mines Limited (1946-1947). The shaft was ultimately deepened to 800 feet and a winze extended the workings to a depth of 1,425 feet. There was no production after 1922.

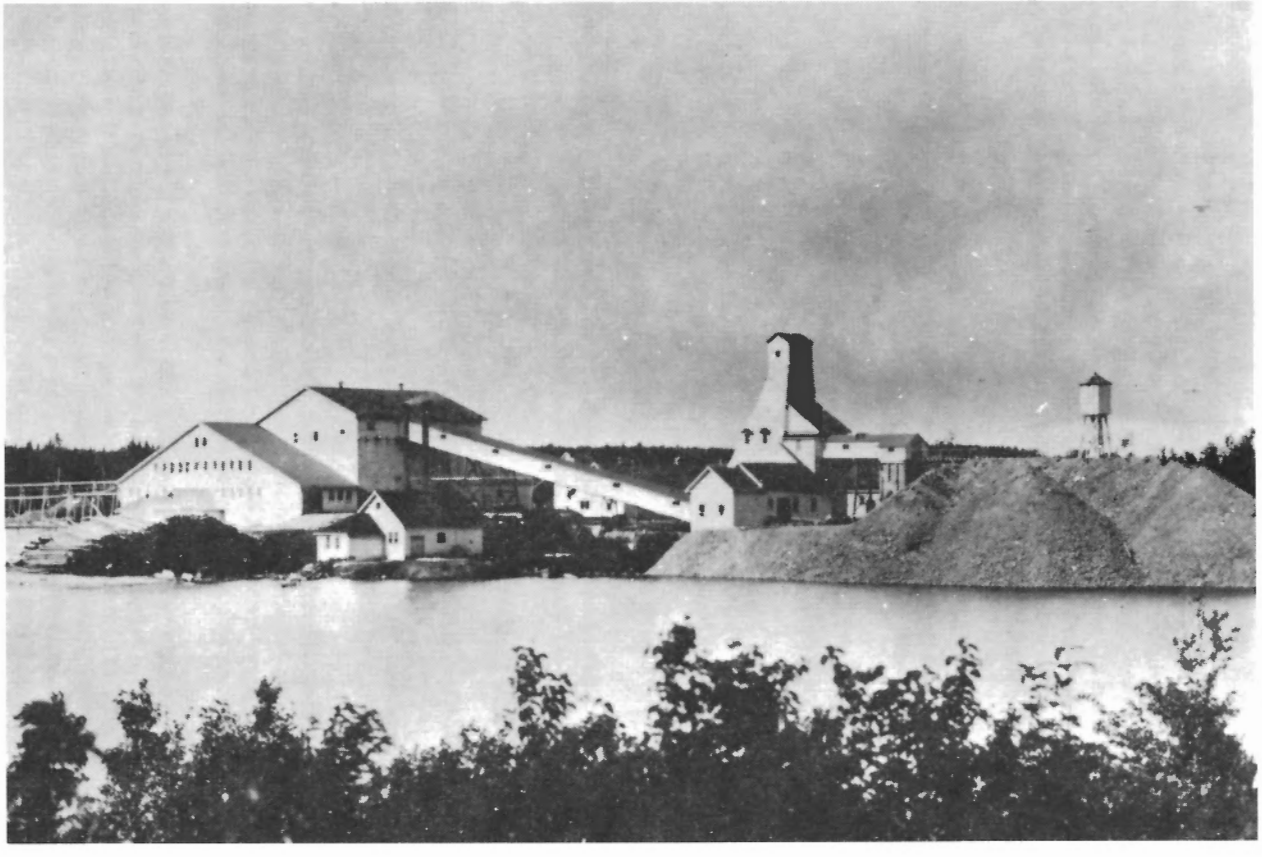


Plate VI. Wright-Hargreaves Mine on shore of south arm of Kirkland Lake, ca. 1931. (Public Archives of Canada photo PA-17494)

The mine is located south of the intersection of Prospect and Premier avenues, 0.6 mile south of Highway 66 (Government Road).

Refs.: 22 p. 42-44; 131 p. 40-41; 143 p. 42; 186 p. 235-236; 188 p. 123

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 8.9 Intersection Duncan Avenue and Government Road. The Kirkland Lake District Chamber of Commerce and the Museum of Northern History are located on Duncan Avenue, north of Government Road.

Wright-Hargreaves Mine

NATIVE GOLD, CALAVERITE, COLORADOITE, ALTAITE, PETZITE, MELONITE, PYRITE, CHALCOPYRITE, HEMATITE, GALENA, SPHALERITE, MOLYBDENITE, GRAPHITE, BARITE, APATITE, CALCITE, ORTHOCLASE

In quartz veins in augite syenite, syenite porphyry and in conglomerate and greywacke

Gold occurred in the native state, in pyrite, and associated with the tellurides, the latter occurring in the high-grade portions of the veins. Calaverite and altaite were the most common tellurides. Minute crystals of smoky quartz occurred with the tellurides in vugs in massive quartz. Pyrite was the chief metallic mineral; the other metallic minerals and the gaugue minerals were minor constituents of the veins. The two main productive veins were the easterly continuation of the Lake Shore veins.

The first discovery of gold in the Kirkland Lake camp was made on this property by W. H. (Bill) Wright who staked three claims on July 27, 28 and 29, 1911. A claim staked about two months later by his brother-in-law, Ed Hargreaves, became part of the property. The discovery vein consisted of short shoots of rich ore in porphyry. In 1913, about $3\frac{1}{2}$ tons of ore carrying 43 ounces of gold and 404 ounces of silver were shipped by R. Cartwright from a vein 550 feet north of the discovery vein. Development of the deposit was resumed in 1916 by Wright-Hargreaves Mines Limited which brought the mine into production in 1921.

The mine was serviced by 4 surface shafts and 2 internal shafts. It was developed to a depth of 8,222 feet sharing with the Lake Shore Mine the record for the deepest workings (below sea-level) of any mine on the continent. The mill ceased operations in 1957 and until the mine was closed in 1965, ore was treated at the Lake Shore mill. In 1956, the property was acquired by Little Long Lac Gold Mines Limited. From 1921 until 1965, precious metals valued at $160,634,103 were recovered from 9,934,427 tons of ore, the second highest yield in the Main Break. The mine's most productive period was from 1934 until 1941 when its annual output was valued at approximately 8 million dollars.

The mine, now sealed, was located west of Duncan Avenue, about $\frac{1}{4}$ mile north of Government Road and between the Lake Shore and Sylvanite mines. The site of the discovery vein is on Tweedsmuir Road, 375 feet north of Government Road.

Refs.: 62 p. 111, 114; 66 p. 161, 164-170; 88 p. 29, 55; 104 p. 16-17; 123 p. 63-65; 131 p. 73-74; 153; 157 p. 125-131

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 9.35 Site of Sylvanite Mine on left.

Sylvanite Mine

NATIVE GOLD, PETZITE, ALTAITE, COLORADOITE, PYRITE, MOLYBDENITE, CHALCOPYRITE, GALENA

In quartz veins in syenite porphyry, and in greywacke and conglomerate

Visible gold and tellurides occurred in slip planes and along fractures in quartz. Pyrite was the chief metallic mineral.

The property comprised claims staked by J. Stirrup (for W. H. Wright) in October, 1911, and by R. W. Robbins in September of the same year. In 1913, Sylvanite Gold Mines Limited was formed to develop the deposit. Although visible gold in quartz was encountered in the preliminary surface exploration, the results were not encouraging and underground development was not undertaken until after rich discoveries were made in the two adjoining properties. By 1927, the shaft reached a depth of 1,500 feet and a mill was installed.

Development consisted of 4 surface shafts and one internal shaft that has a maximum depth of 5,605 feet. Production was continuous from 1927 until 1961 and the total of 5,049,446 tons of ore produced gold and silver valued at $56,596,502. Production was at its highest level from 1936 until 1943 with an annual recovery valued at over $2,000,000.

The Sylvanite Mine was located near the eastern end of the Kirkland Lake gold-strip; the Toburn Mine adjoins it to the east. The workings, now sealed, are north of Government Road at Mile 9.35.

Refs.: 62 p. 111; 89 p. 177-181; 104 p. 16, 28, 38; 131 p. 65-66; 153; 157 p. 134-140

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 9.5 Toburn (Tough-Oakes Burnside) Mine on left.

Toburn (Tough-Oakes Burnside) Mine

NATIVE GOLD, ALTAITE, PETZITE, MELONITE, CALAVERITE, TETRADYMITE, HESSITE, COLORADOITE, PYRITE, CHALCOPYRITE, SPHALERITE, MOLYBDENITE, ORTHOCLASE, CALCITE, TALC, CHLORITE, HEMATITE

In quartz veins occupying fractures in greywacke, conglomerate and feldspar porphyry

Native gold was associated with tellurides in fractures in quartz. The most common telluride was altaite; it was admixed with petzite, melonite, calaverite, tetradymite, hessite, and coloradoite. Pyrite was the most abundant metallic mineral in the veins. Chalcopyrite, sphalerite, and molybdenite were present in minor amounts. The gangue minerals were quartz, pink to white calcite, red orthoclase, yellowish green

Plate VII. Toburn Mine, 1972. (G. S. C. photo 161446)

talc, and dark green chlorite. Patches of specular hematite were noted on pink calcite specimens found on the rock dumps. The white calcite fluoresces pink when exposed to ultraviolet rays.

The Toburn Mine comprised the original Tough-Oakes and Burnside properties and is at the eastern end of the 3½-mile Kirkland Lake gold-strip. The three Burnside claims were staked in July, 1911 by "Swift" Burnside, the five Tough-Oakes claims in January, 1912 by the Tough brothers of Huntsville for Harry Oakes. When preliminary surface exploration of the Tough-Oakes property revealed extremely high-grade gold-bearing veins, the discovery triggered the prospecting rush in Kirkland Lake in 1912 and in 1913. The first shipment of ore from the Kirkland Lake camp was made in September, 1912 from an open cut on the Tough-Oakes property; hand-sorted ore totalling 101 tons and averaging $457.00 per ton was shipped in 1912 and in 1913. Ore that was not hand-sorted was treated in a 5-stamp mill. In 1913, Tough-Oakes Gold Mines Limited was incorporated to continue development of the deposit. Operations ceased in 1918 when the high-grade ore was exhausted.

The adjoining Burnside property was originally worked by Burnside Gold Mines Limited in 1913. Ten years later, the two properties were amalgamated as Tough-Oakes Burnside Gold Mines Limited; mining and milling were conducted by the company until October, 1928. Toburn Gold Mines Limited acquired the property in 1931. Production was continuous from 1932 until closure in 1953.

The mine consisted of 4 shafts. The main shaft (No. 3) is on the north side of Highway 66 (Government Road) at Mile 9.5; there are 21 levels, the lowest at a depth of 2,475 feet. Total production from the mine amounted to $17,738,506 from 1,186,316 tons of ore milled. Enquiries regarding visits to the mine should be directed to Mr. F. T. O'Connor of Kirkland Lake.

Refs.: 22 p. 23-24, 37-41; 24 p. 25-29; 62 p. 111, 114; 101 p. 184-185, 186; 104 p. 16, 21-22, 24, 38; 131 p. 69-70; 144 p. 148; 150 p. 95-97

Maps (T): 42 A/1E Kirkland Lake
(G): 1945-1 Township of Teck, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 9.7 Historic site (on left) commemorates the Kirkland Lake Gold camp.

12.6 Crossroad at King Kirkland; road on right leads to King Kirkland Mine.

King Kirkland Mine

NATIVE GOLD, PYRITE, GALENA, BARITE, CALCITE

In veins in fractured zones in porphyritic rocks

Very fine visible gold occurred with pyrite and minor galena at this old mine. The veins consisted of quartz, calcite, barite and ankerite.

The property was staked in 1918 by R. Montgomery. Development of the deposit was undertaken in 1920 by King Kirkland Gold Mines Limited. An inclined shaft was sunk

to a depth of 450 feet with two levels. The property was optioned in 1923 to the Tonapah Mining Company which conducted additional exploration at the 400-foot level. There is no record of production.

The mine is on the south side of the railway tracks south of King Kirkland village. There is a small dump adjacent to the shaft.

Road log from Highway 66 at King Kirkland village (Mile 12.6):

Mile 0 Proceed south from Highway 66.

0.25 Junction; turn right.

0.45 End of road; proceed south for a distance of about 150 yards to King Kirkland Mine on the south side of the railway tracks.

Refs.: 22 p. 48; 67 p. 70-72; 131 p. 36-37

Maps (T): 32 D/4 Larder Lake
(G): 53a Township of Lebel, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 13.1 Junction gravel road, on left, leading to Bidgood Kirkland Mine.

Bidgood Kirkland Mine

GOLD, PYRITE, MOLYBDENITE, CHALCOPYRITE, HEMATITE, PYRRHOTITE, CALAVERITE, BARITE, FELDSPAR, EPIDOTE, ALTAITE

In veins cutting diorite, porphyry, and hornblende syenite

The gold-bearing quartz veins contained pyrite and small amounts of molybdenite, chalcopyrite, specular hematite, pyrrhotite, calaverite, and altaite. Barite, ankerite, and feldspar were constituents of the gangue. "Micro" crystals of epidote associated with tiny plates of specular hematite occur in cavities in black volcanic rocks, and irregularly-shaped patches of epidote alone occur in the rock on the dumps. Red feldspar porphyry and greyish green quartz porphyry are common on the dumps. Specimens of pink and white calcite containing pyrite and chlorite are also found on the dumps.

Development of the deposit began in 1919 by Bidgood Gold Mines Limited. By 1923 a shaft had been put down to a depth of 600 feet and operations were suspended. Underground development was resumed by Bidgood Consolidated Mines Limited from 1927 to 1931; the original (No. 1) shaft was deepened to 725 feet and another shaft was sunk to a depth of 500 feet. In 1933, Bidgood Kirkland Gold Mines Limited acquired the property and brought it into production in 1934. Ore was hoisted through No. 2 shaft which was 2,025 feet deep. The total gold recovered was valued at $5,917,133 from 586,367 tons of ore. The mine was closed in 1949.

Road log from Highway 66 at Mile 13.1:

Mile 0 Proceed onto gravel secondary road.

0.1 Junction; follow road on right.

1.0 Bidgood Kirkland Mine (No. 1 shaft) on right.

2.0 Bidgood Kirkland Mine (No. 2 shaft) and dumps on left, and dump and open cuts on right.

Refs.: 22 p. 47-48; 67 p. 73-74; 107 p. 657; 131 p. 16-17; 202 p. 22

Maps (T): 32 D/4W Larder Lake
(G): 53a Township of Lebel, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

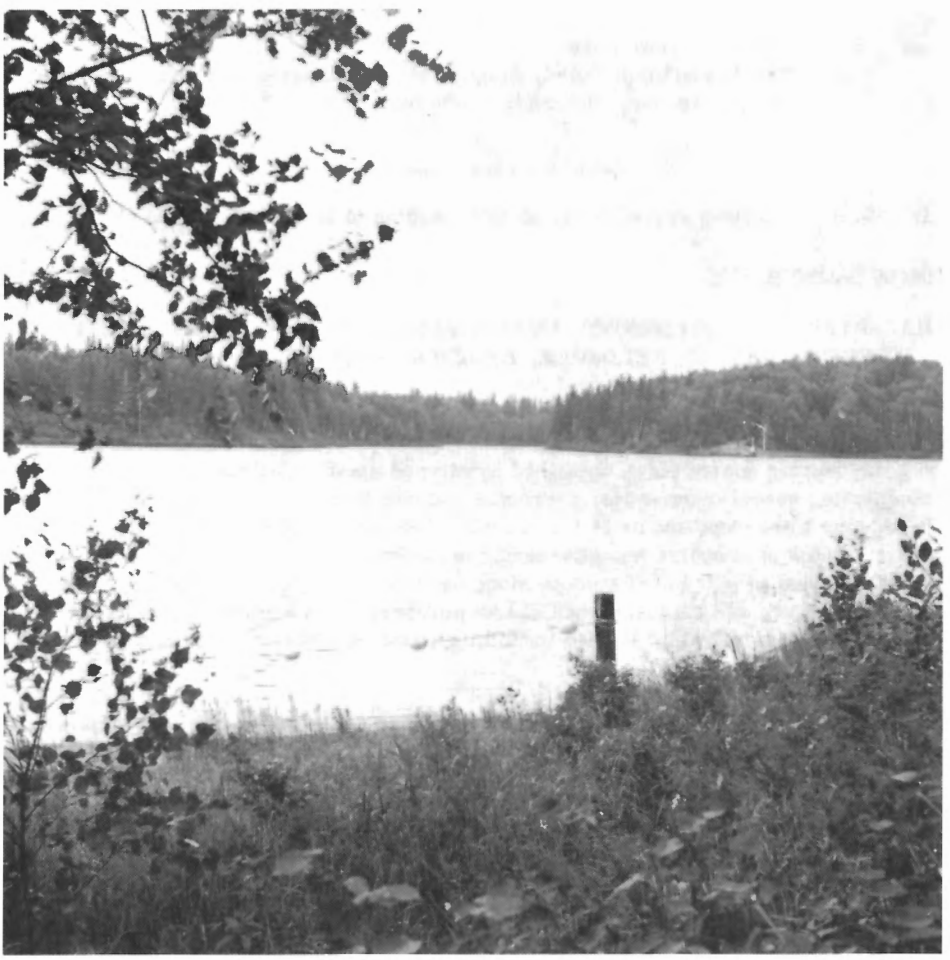


Plate VIII. Panagapka Lake, Esker Lakes Provincial Park. (G. S. C. photo 141445)

Mile 13.7 Mud Lake on left.

14.5 Railway crossing.

14.8 Wood (Morris) Kirkland Mine on right.

Wood (Morris) Kirkland Mine

GOLD, PYRITE, GALENA, CHALCOPYRITE, HEMATITE

In fault zone in trachyte intruded by porphyry dyke

The gold values at this mine were associated with the sulphides of which pyrite the most common. Small masses of platy specular hematite occur in dolomite-quartz specimens on the dumps. A finely textured porphyry consisting of white feldspar phenocrysts in a dark grey matrix sprinkled with fine grains of pyrite is found on the dumps.

The property was staked by E. B. Wood; it was acquired in 1920 by Wood-Kirkland Gold Mines Limited which initiated underground development by sinking a shaft to 100 feet. A second shaft that became the production shaft was sunk to a depth of 765 feet between 1929 and 1934 by Kirkland Gold Belt Mines Limited. From 1935 until 1941 when operations ceased, the mine was operated by Morris Kirkland Gold Mines Limited and gold valued at $621,544 was recovered. The mine was serviced by a shaft, 1,651 feet deep, and a 100-ton mill.

The main shaft is on the south side of Highway 66 at Mile 14.8. The original shaft is 1,000 feet to the southwest.

Refs.: 131 p. 56; 157 p. 158-159

Maps (T): 32 D/4W Larder Lake
(G): 53a Township of Lebel, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 16.5 Junction road to Crystal Lake

17.5 Junction road to Esker Lakes Provincial Park. Within the park are a number of clear lakes occupying depressions in a mantle of gravel and sand that resulted from glacial action in Pleistocene time. About ½ mile south of the park gate, the road enters the Arctic watershed; all streams from that point northward flow into Hudson Bay, the streams south of that point flow into the Lake Superior-St. Lawrence River system.

Mile 18.4 Junction Upper Canada Road.

Upper Canada Mine

NATIVE GOLD, PYRITE, ALTAITE, TOURMALINE, CHALCOPYRITE, SPHALERITE, GALENA, ARSENOPYRITE, MAGNETITE, TENNANTITE, MOLYBDENITE, HEMATITE, CHLORITE, SELENITE, CELESTITE, BARITE, ANHYDRITE, GRAPHITE, TALC, EPIDOTE, LEUCOXENE, TITANITE, APATITE, SCHEELITE, CALCITE, KIMBERLITE

In altered tuff, trachyte, trachyte porphyry, and syenite porphyry

The gold occurred in fractures in silicified zones, in association with pyrite and altaite, and in quartz-calcite and quartz-feldspar-calcite gangue. Some coarse native gold was found in the upper levels of the mine. Black massive tourmaline was common in the ore zone; arsenopyrite was associated with the tourmaline.
Chalcopyrite, sphalerite, galena, magnetite, tennantite, and molybdenite occurred in bluish cherty quartz. Other minerals reported from the deposit include specular hematite, chlorite, selenite, celestite, barite, anhydrite, graphite, dolomite, talc, epidote, leucoxene, titanite, apatite, scheelite, and blue calcite crystals. A kimberlite dyke intruded into porphyritic syenite was encountered underground at the 2, 750-foot level; the rock is dark greenish grey to greenish black with a porphyritic texture and contains grains (visible in hand specimen) of olivine, purplish red garnet, and phlogopite.

Mining operations at the Upper Canada Mine ceased in 1972 concluding 34 years of continuous production that resulted in the recovery of 1, 394, 590 ounces of gold and 589, 157 ounces of silver.

The mine was serviced by a 6, 150-foot shaft, a 1, 800-foot shaft, and a 600-ton per day mill. Prior to acquisition of the property by Upper Canada Mines Limited in 1929, a shaft had been sunk to 125 feet in 1928 by East Main Gold Mines Limited; this shaft was later deepened and became the Upper Canada No. 1 shaft. The ore zone that prompted the mine to begin production was located by surface diamond drilling in 1936. Production began in 1938, the ore being treated at the Morris Kirkland mill; in 1939 the mill at the Upper Canada Mine commenced operations.

Enquiries regarding visits to the property should be directed to the Kirkland Lake Chamber of Commerce.

Road log from Highway 66 at Mile 18. 4:

Mile	0	Proceed onto Upper Canada Road.
	0. 7	Junction; continue straight ahead.
	0. 75	Upper Canada Mine shaft No. 1 on left.
	1. 2	Upper Canada Mine shaft No. 2, and mill.

Refs.: 14 p. 89-90; 84 p. 1, 4; 131 p. 70-71; 155 p. 23-26; 162 p. 24, 29-34; 225 p. 334

Maps (T): 32 D/4W Larder Lake
(G): 50c Township of Gauthier, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1, 000 feet)

Argonaut (Huronia) Mine

NATIVE GOLD, CHALCOPYRITE, PYRITE, MAGNETITE, MOLYBDENITE, TOURMALINE, TETRAHEDRITE, HEMATITE, EPIDOTE

In andesite or basalt intruded by syenite porphyry, hornblende syenite and diabase

Gold, silver and copper were formerly produced from this mine. Quartz-calcite veins filling fractures in the host rocks contained visible gold, chalcopyrite, magnetite, pyrite, molybdenite, feldspar, tourmaline, and specular hematite. Tetrahedrite intergrown with chalcopyrite has been reported from the deposit. An epidote-quartz-feldspar rock suitable for polishing, and epidote in basalt have been reported from the deposit.

The gold-bearing veins on the west shore of Beaverhouse Lake were discovered in 1912 by Alfred Beauregard. The deposit was originally developed by La Mine D'Or Huronia Limited of Three Rivers, Quebec from 1913 to 1916; a shaft was sunk to a depth of 102 feet and a 15-stamp mill was put in operation. The first production of gold was obtained in 1913. Production was resumed in 1919 by Argonaut Gold Limited, and was continued intermittently until 1935. The mine was developed to a depth of 1,250 feet. The total recovery of gold was valued at about $800,000. From 1965 to 1972, the mine was operated by Upper Beaver Mines Limited producing gold, silver and copper. The ore was treated at the Upper Canada mill.

Road log from Highway 66 at Mile 18.4:

Mile 0 Proceed onto Upper Canada Road.

0.7 Junction; turn right.

1.5 Junction at Dobie; turn left onto gravel road.

6.0 Argonaut Mine.

Refs.: 15 p. 93-95; 43 p. 6, 10; 45 p. 28-31; 67 p. 76-81; 76 p. 65-76; 131 p. 47; 138 p. 168; 140 p. 98-99; 155 p. 3, 16-18; 225 p. 334

Maps (T): 32 D/4W Larder Lake
(G): 50c Township of Gauthier, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 19.1 Anoki Mine on left.

Anoki Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE

In altered intrusive rock

Coarse native gold was found in association with pyrite and chalcopyrite in a light-coloured altered rock. Specimens of light greyish green siliceous rock studded with

tiny pyrite crystals (about 1/8 inch in diameter) are common on the dumps. Epidote was noted in dark volcanic rock fragments on the dumps.

The deposit was staked as the Elstone-Duncan claim in 1916, and was subsequently explored at various times but there is no record of gold production. Surface exploration was originally done between 1916 and 1927 by Elstone Duncan Mines Limited (1928-1929), and by Oriole Mines Limited (1930-1932). Underground development was conducted from 1938 to 1940 by Anoki Gold Mines Limited; a shaft was sunk to a depth of 754 feet without locating ore of economic grade.

The mine is located on the north side of Highway 66 at Mile 19.1.

Refs.: 67 p. 82-83; 131 p. 11-12; 155 p. 13-15; 187 p. 167; 188 p. 118; 189 p. 132

Maps (T): 32 D/4W Larder Lake
(G): 50c Township of Gauthier, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 23.0 Bridge over Misema River.
A road-cut on the east side of the bridge exposes a conspicuous green carbonate rock that contains bright green chrome-mica (fuchsite) disseminated in quartz; the mica-bearing quartz is colourful, takes a good polish, and is used as an ornamental stone.

25.4 Larder Lake, at junction Highway 624.
The name Larder is a translation of the Indian word Tegousiewabie, a place for storing supplies (Ref.: 179 p. 2).

25.6 Junction road to Raven Beach camp-site.

Raven River (Harris-Maxwell) Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, GALENA, FUCHSITE, TOURMALINE, MAGNESITE, DOLOMITE

In quartz veins cutting altered syenite

Native gold occurred along fractures in quartz; pyrite, chalcopyrite, and galena were associated with the gold at this former producer. An emerald-green mica (fuchsite) occurring as masses in white quartz is found on the dumps. The fuchsite contains black tourmaline as "micro" prisms and as finely granular patches; amber magnesite and white massive dolomite are associated with the mica. Small cubes of pyrite were noted in dark grey talc-chlorite schist specimens on the dumps.

This deposit was one of the earliest to be developed in the Larder Lake district, and one of the most promising of the early discoveries. Spectacular ore specimens consisting of abundant visible gold in quartz enclosed by silicified dolomite were displayed in 1908 at the offices of the Toronto Star.

Surface exploration began in 1907 by Harris-Maxwell Gold Mining Company Limited; a test shipment of 1,500 pounds of ore sent to the Kingston School of Mining assayed

$13.20 per ton. Some rich samples of ore were obtained from a pocket near the surface. A 10-stamp mill was operated for a short time in the summer of 1908; the workings consisted of an open cut at the top of a hill and an adit at the shore of Larder Lake. Following a brief period of operation in 1909 by the Lucky Boy Mining Company, the property remained idle until 1913 when Associated Goldfields Mining Company Limited sank a shaft to a depth of 438 feet. Further underground development was performed between 1934 and 1939 by Raven River Gold Mines Limited; the shaft was deepened to the 500-foot level from which a winze was sunk to a depth of 700 feet. A 50- to 70-ton mill operated from 1937 to 1939 resulting in the recovery of gold valued at $287,513, from 42,259 tons of ore.

The mine is located on the steep shore of Northwest Bay (Larder Lake) near the Raven Beach Camp-site.

Road log from Highway 66 at Mile 25.6:

Mile 0 Proceed onto road to Raven Beach Camp-site.

0.2 Junction; proceed along road on left.

0.6 Junction; turn left onto single-lane road.

0.7 End of road at base of hill; follow path up for about 50 yards to the Raven River Mine dumps and fenced shafts at the top of the hill.

Refs.: 16 p. 216; 42 p. 10; 131 p. 45-46; 151 p. 76, 78-80; 177 p. 53; 179 p. 34, 514; 180 p. 344; 193 p. 227; 194 p. 227

Maps (T): 32 D/4E Larder Lake
(G): 50b Township of McVittie, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)
1947-1 Township of Hearst and portion of township of McFadden, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 27.1 Junction single-lane road to Omega Mine.

Omega Mine

NATIVE GOLD, PYRITE, ARSENOPYRITE, CHALCOPYRITE, GRAPHITE, FUCHSITE

In sheared zone in dacitic lava

Gold occurred in the native state in quartz and in association with the sulphides. The host rocks were talc-chlorite schist and carbonate rock, the latter containing green chrome mica (fuchsite). Pyrite was the most common sulphide; arsenopyrite and chalcopyrite were relatively uncommon. Graphite was present in the orebody.

The deposit was discovered in 1914 by a prospector, Jack Costello. The vein was developed simultaneously by Associated Goldfields Company and by the Crown Reserve

Mining Company. Production was obtained from 1926 until 1928 when mining operations were suspended. Mining and milling were resumed in 1936 by Omega Gold Mines Limited and continued without interruption until closure in 1947. The underground workings reached a depth of 2, 000 feet. A total of 1, 615, 081 tons of ore valued at $7, 788, 606 was produced.

The mine is located 0. 2 mile north of Highway 66 at Mile 27. 1.

Refs.: 131 p. 58-59; 152 p. 5; 154 p. 82-87

Maps (T): 32 D/4E Larder Lake
(G): 50 a Township of McGarry, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1, 000 feet)

Mile 28. 5 Cheminis Mine on left.

Cheminis Mine

GOLD, PYRITE, ARSENOPYRITE, FUCHSITE, DOLOMITE

In sheared volcanic rocks

Gold values are associated with pyrite in this deposit. Arsenopyrite occurs with the pyrite. Specimens of banded emerald-green fuchsite and white to pink massive dolomite are found on the dumps; "micro" crystals of dolomite occur in cavities in the massive dolomite. A black, lustrous, compact talc-rock occurs on the dumps.

The deposit was discovered as a result of a program of diamond drilling conducted by Consolidated Mining and Smelting Company of Canada Limited from 1937 to 1938. The exploration was stimulated by the resumption of mining operations in 1936 at the nearby Omega Mine and by the discovery of an important ore-body at the Kerr-Addison Mine. Underground development began in 1938 and a shaft was sunk to a depth of 553 feet before operations were suspended in 1940; at that time the property was acquired by Cheminis Gold Mines Limited.

The mine is located on the north side of Highway 66 at Mile 28. 5.

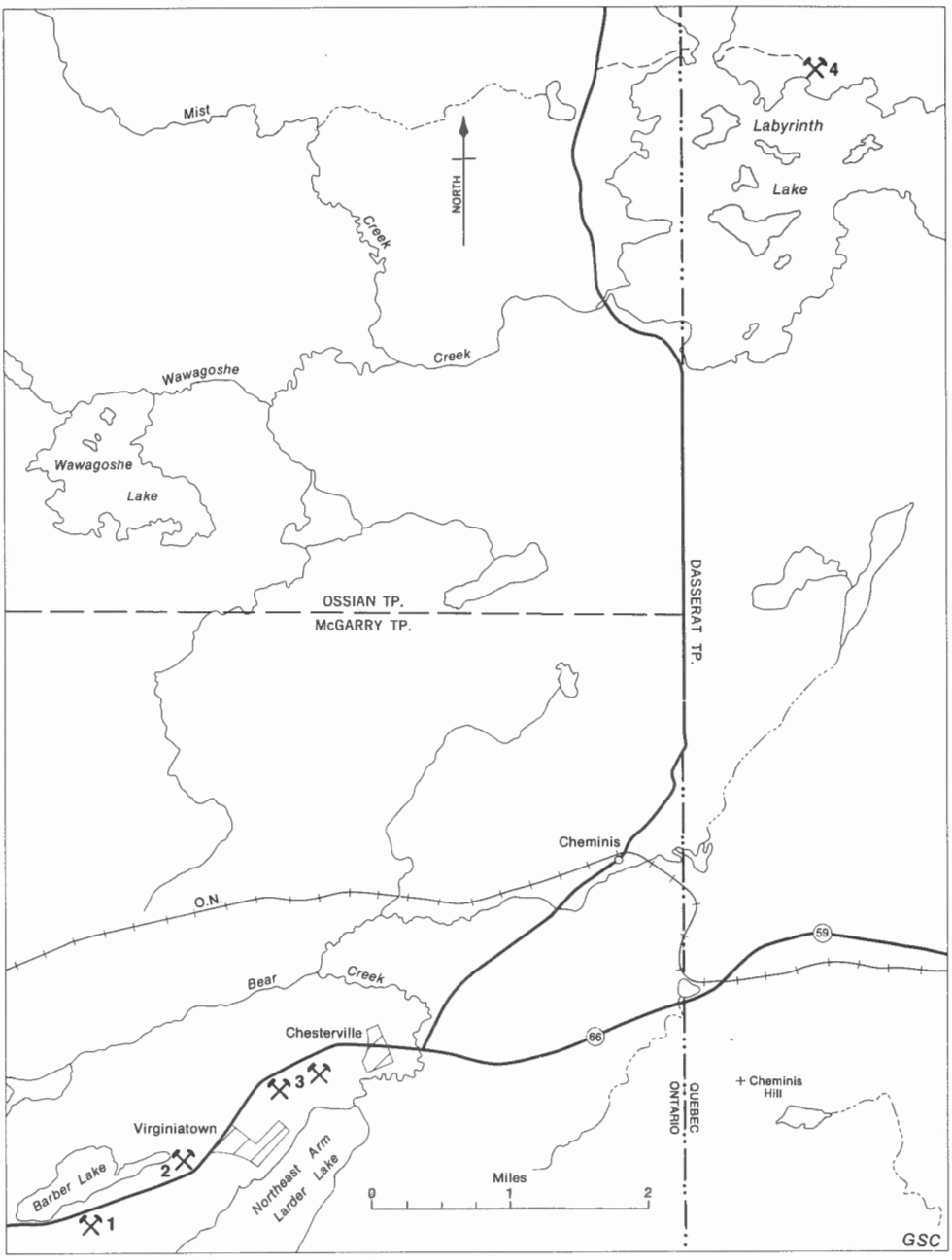
Refs.: 131 p. 10-11; 151 p. 5, 49-53

Maps (T): 32 D/4E Larder Lake
(G): 50b Township of McVittie, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1, 000 feet)

Mile 31. 2 Barber-Larder Mine on right.

Barber-Larder Mine

GOLD, PYRITE, PYRRHOTITE, CHALCOPYRITE, FUCHSITE



1. Barber-Larder Mine;
2. Armistice Mine;
3. Kerr Addison Mine;
4. Russian Kid Mine.

Map 3. Larder Lake - Labyrinth Lake area.

In lava flows and volcanic breccia

Gold is associated with sulphides including pyrite, pyrrhotite, and some chalcopyrite at this property. The sulphides are finely crystalline occurring as disseminated masses and veinlets in the host rocks. Green chrome-mica (fuchsite) occurs in a carbonate rock; specimens containing the mica occur sparingly in the mine dumps.

Development of the deposit was conducted by Barber-Larder Gold Mines Limited from 1937 to 1939. The orebody was located by diamond drilling and was explored by a shaft sunk to a depth of 410 feet. In 1942, the property was acquired by Amalgamated Larder Mines Limited. There is no record of production from the mine.

The mine is located on the south side of Highway 66 at Mile 31.2.

Ref.: 151 p. 45-49

Maps (T): 32 D/4E Larder Lake
(G): 50a Township of McGarry, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 32.0 Junction single-lane road to Armistice Mine

Armistice Mine

GOLD, PYRITE, FUCHSITE, CALCITE

In carbonatized fault zone at contact of Timiskaming sediments and Keewatin lava

Exploration and development of this property failed to locate the required concentration of gold values to constitute an orebody; there is no record of production. The dump furnishes specimens of bright green mica (fuchsite) in grey quartz-carbonate rock; colourless "micro" crystals of calcite occur as encrustations on the rock.

The claim on which the shaft was sunk was staked in 1906. Underground development conducted from 1945 to 1948 by Armistice Gold Mines Limited consisted of shaft-sinking to a depth of 1,281 feet; 8 levels were opened.

The mine is located 0.1 mile north of Highway 66 at Mile 32.0.

Refs.: 131 p. 13; 151 p. 57

Maps (T): 32 D/4E Larder Lake
(G): 50 a Township of McGarry, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 32.5 Turn-off to Virginiatown

33.4 Kerr-Addison Mine on right.

Kerr-Addison Mine

NATIVE GOLD, FUCHSITE, CHLORITE, PYRITE, ARSENOPYRITE, CHALCOPYRITE, SPHALERITE, GALENA, SCHEELITE, MILLERITE

In green carbonate rock, sheared syenite, volcanic rocks, talc-chlorite schist

Two types of ore occur in the Kerr-Addison Mine. In green carbonate rock and in syenite, the ore consists of native gold in white quartz containing green mica (fuchsite) and chlorite; the sulphides-pyrite, arsenopyrite, chalcopyrite, and sphalerite are sparsely disseminated in the quartz. Hair-like crystals of millerite have been found associated with ankerite. The other ore, in the volcanic rocks (lava, tuff), is composed of native gold associated with pyrite and traces of chalcopyrite, arsenopyrite, galena, sphalerite, and scheelite. Coarse grains and patches of native gold occur in the white quartz containing the green mica, and in smoky grey quartz veins and stringers traversing the volcanic rocks. Massive emerald-green mica (fuchsite) in quartz is common in this deposit.

This property comprises the first claims staked in the Larder Lake area. The first property to be staked for gold was the Annie R. claim; it was staked by Dr. R. Reddick of Winchester, Ontario on July 31, 1906. The showing consisted of a large body of quartz containing visible gold exposed on the northeast arm of Larder Lake. The discovery was the result of a prospecting expedition undertaken by Dr. Reddick, Edward Flynn (of Chesterville, Ontario), John Hummel and William Knott (both of Hilliardton, Ontario) who were attracted to the district when reports of the recent discoveries of gold in the Opasatica Lake area (near Arntfield) of adjacent Quebec and in nearby Boston and Playfair townships had filtered down from the north country. The party staked 7 claims in the area. A short time later, the Kerr-Addison claim was staked by Dr. William Addison who had been informed about the possibilities of the area by H. L. Kerr, an assistant to Dr. W. A. Parks in the 1904 geological investigation of the region for the Geological Survey of Canada.

Development of the properties began in 1907 by Dr. Reddick Larder Lake Mines Limited. In the following year, a 20-stamp mill was in operation on the Reddick property and gold valued at $314 was recovered and used in the minting of the first gold coins in Canada. At the time, the mine consisted of a shaft, 83 feet deep, and several test pits and open cuts. In 1914, the Reddick and Kerr-Addison properties were acquired by Associated Goldfields which examined the workings but failed to locate ore; its successor, Canadian Associated Goldfields, deepened the shaft in 1921 to 325 feet with equally disappointing results. A program of surface and underground exploration undertaken in 1936 by Kerr-Addison Gold Mines Limited culminated in 1937 in outlining a large tonnage of ore by diamond drilling. A mill was rushed to the site and production commenced in 1938. Since that time, the mine has been in continuous production; to the end of 1972, its total output of 9,188,000 ounces of gold (valued at $335,665,000 from 33,931,000 tons of ore milled) is almost equal to that of the Dome Mine (at Timmins) which ranks third in gold production from Ontario mines.

The mine is serviced by three surface shafts and one internal shaft. The main (No. 3) shaft is 4,000 feet deep with 26 levels and an internal shaft reaching a depth of 6,023 feet; No. 1 shaft has been sunk to a depth of 700 feet, No. 2 to 86 feet. The mill has a capacity of 4,500 tons per day. In 1963, the name of the company was changed to Kerr-Addison Mines Limited.

The mine is located at Virginiatown (Mile 33.4 on Highway 66). Enquiries regarding visits to the property should be directed to the Kirkland Lake Chamber of Commerce.

Refs.: 131 p. 34-36; 151 p. 5, 64-75; 160 p. 369; 177 p. 53-54; 178 p. 166; 217 p. 97-99; 225 p. 177, 178; 228 p. 184

Maps (T): 32 D/4E Larder Lake
(G): 50a Township of McGarry, district of Timiskaming, Ontario (Ont. Ministry Natur. Resour., 1 inch to 1,000 feet)

Mile 34.3 Junction road to Cheminis and to Russian Kid Mine

Russian Kid (Bordulac) Mine

NATIVE GOLD, PYRITE, SCHEELITE

In quartz-carbonate veins in sheared diorite

The mine is located on the northeastern shore of Labyrinth Lake where quartz veins carrying coarse auriferous pyrite and visible gold were discovered in the fall of 1924 by A. W. Balzimer and Mike Mitto. Abundant native gold was found in the vein where it was first opened by trenches; the gold occurred in the weathered product (limonite) of pyrite. Scheelite occurred in the quartz.

Surface exploration by numerous trenches and open-cuts was done immediately after discovery of the gold-bearing veins. It was called the Russian Kid deposit after Balzimer, the giant-statured prospector and co-discoverer of the deposit. The property was acquired in 1945 by Bordulac Mines Limited which sank a shaft to a depth of 350 feet in 1951-1952 and conducted a program of diamond drilling and geophysical surveys in 1956 and 1957. Early in 1972, Gold Hawk Mines Limited dewatered the shaft and planned underground development.

Road log from Highway 66 at Mile 34.3:

Mile 0 Proceed north onto road to Cheminis.

2.0 Junction at Cheminis station; proceed along road on left.

8.2 Junction; turn right.

9.0 End of road at west shore of Labyrinth Lake. The mine is on the north shore of the east arm of the lake, about a mile by boat from the end of the road.

Ref.: 28 p. 19-20; 30 p. 234-235; 65 p. 87; 203 p. 25; 208 p. 34; 226 p. 1, 12

Maps (T): 32 D/4E Larder Lake
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Natur. Resour., 1 inch to 4 miles)
271A Rouyn-Harricanaw area, Abitibi and Témiscamingue counties Quebec (G. S. C., 1 inch to 4 miles)

Mile 36.2 Ontario/Quebec border; the road log continues eastward along Highway 59 to Val d'Or.

36.3 Cheminis Hill on south side of highway.
This steep-walled, flat-topped monadnock hill, the most prominent topographical feature in the area, rises from an elevation of 1,100 feet (approximate elevation of Highway 59 at Mile 36.3) to 1,662 feet above sea level. It is composed of Huronian sedimentary rocks including a slate-like rock, quartzite, arkose, and breccia conglomerate. It was named Cheminis ('big island') Hill by the Indians who claimed it was visible from such distant points as Lake Abitibi and Timagami Lake. (Refs.: 106 p. 220; 174 p. 26; 177 p. 12).

48.2 Junction Highway 46. The mines in the Belleterre area may be reached via Highway 46; they are described in Geological Survey of Canada Paper 73-13.

The Noranda – Val d'Or Area

The mineral deposits along Highway 59 lie within the gold-producing belt of early Precambrian volcanic rocks and sediments that extends eastward from Timmins through Kirkland Lake to and beyond Val d'Or; they comprise numerous gold-copper, and copper-zinc-gold deposits. Outside this mineralized belt, the region contains deposits of molybdenite, bismuth, lithium, and beryl associated with granitic batholiths that intruded the older rocks, and deposits of nickel in ultrabasic rocks. The majority of the early producers are now inactive.

Mining in the region has been primarily for base metals but it was the search for precious metals that initiated prospecting in the area. The early discoveries of gold mineralization were made in 1906 at Fortune Lake, in 1910 at Cadillac and at Duparquet Lake, and in 1911 at Lac de Montigny, a time when the attention of prospectors and developers was focussed on the exciting developments in the Porcupine district. Consequently the Noranda – Val d'Or area did not experience extensive prospecting until 1923-1924 following the 1922 discoveries by Horne and Powell that were developed into the Horne Mine and Powell Rouyn Mine respectively. During that prospecting rush, the entire Noranda-Rouyn area was staked, numerous discoveries of gold and copper-gold showings were made, and claims staked several years earlier were re-examined. Production increased successively each year from 1928 until 1942 when thirty-two mines in the western Quebec area accounted for the bulk of the province's output of slightly over one million ounces of gold. The 1939 production of 951,681 ounces of gold (from western Quebec mines) placed the province in second position to Ontario in Canada's gold production, a rank it has maintained since that time. Since the inception of mining, the Noranda area has produced metals valued at over one billion dollars while the Val d'Or district's production amounted to nearly one billion dollars. The number of producers in the Noranda – Val d'Or area decreased steadily since the 1940s leaving only nine mines in production in 1972.

Descriptions are given for mines and occurrences accessible from Highway 59. Information regarding visits to operating mines can be obtained from the Tourist Information Offices in Rouyn and in Val d'Or.

Refs.: 3 p. 6-8; 111 p. 15; 112 p. 28; 124 p. 10, 55

Maps (T): 32 C Senneterre
32 D Noranda-Rouyn
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 50.2 Arntfield, at junction to Arntfield Mine

Arntfield Mine

NATIVE GOLD, PYRITE, HEMATITE, EPIDOTE, TOURMALINE, CHLORITE, TALC, MICA, ORTHOCLASE

In sheared volcanic rocks, diorite, and quartz-feldspar porphyry

Gold at this former producer was associated with pyrite in quartz; visible gold was rare. The best ore was in agglomerate and tuff. Some of the ore-bearing rock was red due to the presence of hematite. The dumps furnish specimens of epidote and black tourmaline in quartz, dark green chlorite associated with yellowish green talc, grey mica, pyrite, and specular hematite in quartz-carbonate specimens, pink granular massive calcite, and brick red massive orthoclase.

The original claim was staked by F. S. Arntfield in the autumn of 1923 when the 1923 prospecting rush at Rouyn spread to adjacent areas. The property was brought into production in 1935 after a 15-year program of exploration and development by Arntfield Gold Mines Limited resulted in locating an economic orebody. When production ceased in 1942, gold valued at $2,011,755 was recovered from 529,987 tons of ore. The orebody has been opened by 3 shafts; one was sunk to a depth of 100 feet, the others to over 1,000 feet. The mill operated at a capacity of 350 tons per day; it was dismantled upon termination of operations.

It was at the east end of Fortune Lake, about two miles west of Arntfield, that the first discovery of gold mineralization in northwestern Quebec was made in 1906 by Alphonse Olier and Auguste Renaud of Ville-Marie. A rush to the area was, however, checked when later-arriving prospectors from Cobalt and from adjacent areas, returned from the newly discovered area without locating showings of gold.

Spectacular native gold associated with sulphides and tellurides (sylvanite, petzite) in quartz-ankerite veins was encountered in the underground workings of the Fortune Lake deposit, but ore of consistent commercial grade was not located. Investigation of the deposit was done intermittently by various companies between 1907 and 1935; a shaft was put down to a depth of 500 feet and some gold was obtained by panning the sand.

Road log from Highway 59 at Mile 50.2 to Arntfield Mine:

Mile 0 Arntfield, at intersection; proceed north.

0.2 Junction; follow road on left.

0.5 Single-lane road on right leads to site of mill.

Mile 0.8 No. 3 shaft and small dump on left (headframe has been removed).

1.9 Main (No. 2) shaft, Arntfield Mine.

Refs.: 4 p. 22-23; 20 p. 64-72; 30 p. 270-275; 33 p. 132-133, 134-135; 55 p. 55 p. 711-716; 56 p. 485-486; 178 p. 63; 181 p. 65; 199 p. 214

Maps (T): 32 D/3W Rouyn
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles). 45-17A Western Beauchastel, Témiscamingue County, Quebec (G. S. C., 1 inch to 1,000 feet)

Mile 51.1 Aldermac, at junction road on left to gravel pit.

52.4 Aldermac, at junction road on left to Aldermac Mine.

Aldermac Mine

PYRITE, MAGNETITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE, TREMOLITE, EPIDOTE, HORNBLENDE, DEVILLINE, BROCHANTITE, GYPSUM, GOETHITE

In rhyolite, tuffs and agglomerates intruded by diorite and porphyry

The mine is a former producer of copper, gold, silver, and sulphur. The ore consisted of finely granular, massive pyrite in quartz with minor amounts of magnetite, pyrrhotite, chalcopyrite, and sphalerite. Tremolite replacing quartz and chlorite has been reported from the wall-rock. Epidote and black tourmaline are associated with quartz in specimens on the dumps. Secondary minerals including greenish blue devilline, bright green brochantite, white (rusty stained) gypsum, and dull, rusty-brown goethite occur as coatings and encrustations on ore specimens found on a small rock dump at the railway on the north side of Highway 59 at Mile 52.4; massive ore specimens are also available. A buff-coloured porphyritic rhyolite suitable for lapidary purposes occurs at the mine; it is composed of lath-shaped oligoclase feldspar in a fine-grained matrix of feldspar, quartz, and sericite. Irregular fragments of the rock are found in gravel pits in the vicinity of the mine.

The deposit was staked in the winter of 1923. Two years later, Towagamac Exploration Company succeeded in locating an economic orebody by a program of diamond drilling and underground exploration. From 1927 to 1929, Aldermac Mines Limited explored the deposit utilizing a shaft sunk to a depth of 1,125 feet. A mill with a capacity of 1,000 tons per day was erected and the concentrates were conveyed by a pipe to a filter plant located at the railway. Remnants of the plant and a small dump are on the north side of Highway 59 at Mile 52.4. The shaft was later deepened to 1,250 feet. Production began in 1932 and was continuous from 1937 until 1943; it amounted to 30,845 tons of copper, 10,675 ounces of gold and 389,100 ounces of silver.

The mine is located east of the gravel pit that is reached by a road, 1.1 miles long, leading north from Highway 59 at Mile 51.1. Another road, 1.1 miles long, leads from the site of the filter plant at Mile 52.4 to the mine.

Refs.: 4 p. 21; 20 p. 74-86; 30 p. 175-183; 61 p. 719-725

Maps (T): 32 D/3E Rouyn
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
45-17A western Beauchastel, Témiscamigue County, Quebec (G. S. C., 1 inch to 1,000 feet)

Mile 52.9 Junction road (on right) to Wasa Lake Mine

Wasa Lake Mine

PYRITE, NATIVE GOLD, FUCHSITE, HEMATITE, EPIDOTE

In sheared volcanic rocks

Gold was discovered on this property in 1936. The gold values were in the pyrite which was associated with quartz, carbonate, and chlorite; fuchsite, epidote, and hematite were less common. Visible gold was very rare.

Original exploration was performed from 1936 to 1938 by La Mine d'Or Champlain which sank a shaft to 220 feet but failed to locate a promising orebody. In 1944, Wasa Lake Gold Mines Limited intersected a gold-bearing shear zone by diamond drilling and developed it by sinking a shaft that, in 1950, reached a depth of 1,050 feet. Wasamac Mines Limited brought the mine into production in 1965. The 1500-ton per day mill from the Bicroft Mine (Bancroft area) was installed on the site and operated until the mine was closed in 1971. Gold and silver were recovered. Ore was hoisted through a shaft, 1,375 feet deep with 7 levels. The property belongs to Wright-Hargreaves Mines Limited.

The mine is located $\frac{1}{2}$ mile south of Highway 59 at Mile 52.9.

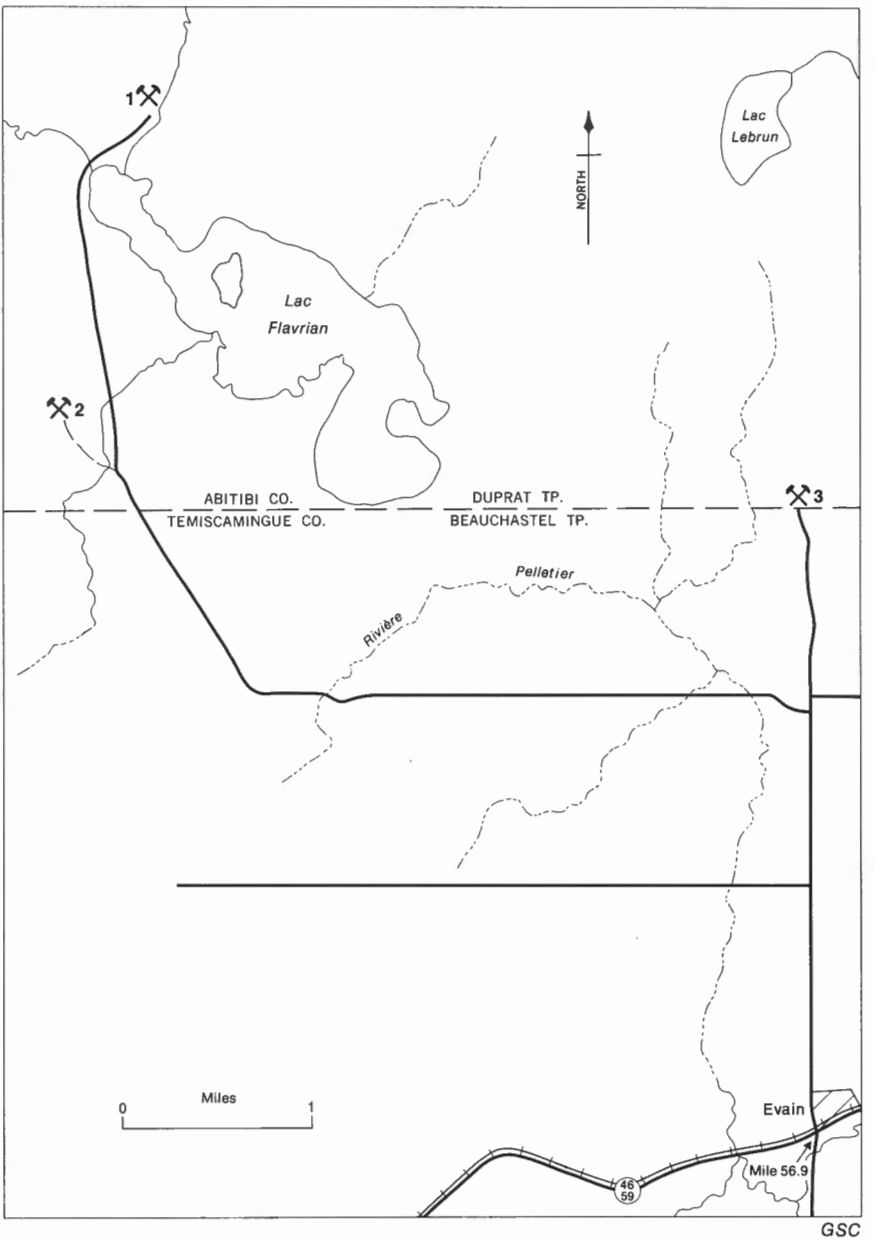
Refs.: 4 p. 23-24; 44 p. 730-733; 176 p. 47; 203 p. 110; 218 p. 343-344; 222 p. 396-397

Maps (T): 32 D/3E Rouyn
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
1106A Southeast Beauchastel Township, Témiscamingue County, Quebec (G. S. C., 1 inch to 1,000 feet)

Mile 56.9 Evain, at crossroad.

Elder Mine

NATIVE GOLD, PYRITE, HEMATITE, CHALCOPYRITE, GALENA, MOLYBDENITE, QUARTZ CRYSTALS



1. Eldrick Mine; 2. Quesabe Mine
3. Elder Mine.

Map 4. Evain area.

In silicified zone in red and grey granite

The ore at this former gold producer consisted of pyrite with minor amounts of specular hematite, chalcopyrite, galena and molybdenite. Native gold occurred in fractures in cherty bluish quartz. Vugs lined with crystals of quartz and of pyrite were found in massive quartz.

Gold on this property was first reported in 1940. Surface exploration was originally performed by O'Leary Malartic Mines Limited. The property was acquired in 1944 by Elder Mines Limited which carried out an extensive program of diamond drilling followed by underground development. Production was obtained from 1946 until 1966 resulting in the shipment of over 2,100,000 tons of siliceous gold ore to the Noranda smelter. The property was developed by two shafts, about $\frac{1}{2}$ mile apart; No. 1 inclined shaft was developed to a depth of 1,250 feet with 6 levels, No. 2 vertical shaft to 2,500 feet with 10 levels. The name of the operating company was changed several times as a result of successive reorganizations; since 1963, the operator was Peel-Elder Limited.

Access is via a road leading north from Highway 59 at Evain (Mile 56.9; No. 2 shaft is 3 miles from the highway and No. 1 shaft is about $\frac{1}{2}$ mile further north (see road log page 45).

Refs.: 28 p. 2, 5; 70 p. 7-10; 204 p. 69; 216 p. 263

Maps (T): 32 D/6E Kanasuta River
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
271A Rouyn-Harricanaw area, Abitibi and Témiscamingue counties, Quebec (G.S.C., 1 inch to 4 miles)

Quesabe Mine

PYRITE, CALCITE, CHLORITE, EPIDOTE, NATIVE GOLD

In quartz lenses in volcanic rocks

The mine is a former small gold producer. The gold was associated with pyrite in quartz and in the host rock; visible gold was rare. The dumps furnish specimens of coarsely cleavable white calcite (fluoresces bright pink when exposed to "long" ultra-violet rays), pink massive calcite, chlorite, epidote, and pyrite.

From 1950 to 1952, this mine produced about 100,000 tons of ore with an average grade of about 0.25 ounces of gold per ton. Development consisted of two shafts to depths of 635 feet and 1,050 feet; a mill with a capacity of 400 tons per day was erected at the mine-site. Original surface exploration of the deposit began in 1934 by Birrell Gold Mines Limited; other operators including Flavrian Gold Mines Limited and Payco Gold Mines Limited were involved in intermittent exploration and development until 1946 when Quesabe Mines Limited resumed operations and brought the mine into production in 1950.

Access to the mine is given in the road log to the Eldrich Mine.

Refs.: 28 p. 33-34; 54 p. 413-415; 146 p. 86-87

Maps (T): 32 D/6E Kanasuta River
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
271A Rouyn-Harricanaw area, Abitibi and Témiscamingue counties, Quebec (G. S. C., 1 inch to 4 miles)

Eldrich Mine

PYRITE, NATIVE GOLD, CALCITE, CHLORITE, EPIDOTE

In quartz veins in granite and in diorite

Gold was associated with pyrite in quartz. Specimens of pyrite, of flaky masses of chlorite, of white calcite (fluoresces pink under "long" ultraviolet rays), and of epidote are available from the rock dumps. An ornamental rock consisting of abundant epidote (as irregular patches) in pink to red granite is common on the dumps; it takes a good polish.

Development of the deposit was undertaken in 1954 by Eldrich Mines Limited. Production from 1955 to 1962 amounted to 100, 076 ounces of gold from 717, 654 tons of ore. The mine was serviced by a 1, 064-foot shaft with 7 levels. The ore was processed at the smelter in Noranda.

Road log from Highway 59 at Evain (Mile 56. 9, see page 42).

Mile 0 From intersection at Evain, proceed onto road leading north.

2. 2 Junction; road straight ahead leads 0. 6 mile to Elder Mine. The road log continues along the main road leading west.

6. 7 Turn-off (left) to Quesabe Mine; the mine is 0. 3 mile from this junction. The road log continues along main road.

8. 7 Eldrich Mine.

Refs.: 7 p. 7-8; 118 p. 92; 204 p. 70; 213 p. 58-59

Maps (T): 32 D/6E Kanasuta River
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
271A Rouyn-Harricanaw area, Abitibi and Témiscamingue counties, Quebec (G. S. C., 1 inch to 4 miles)

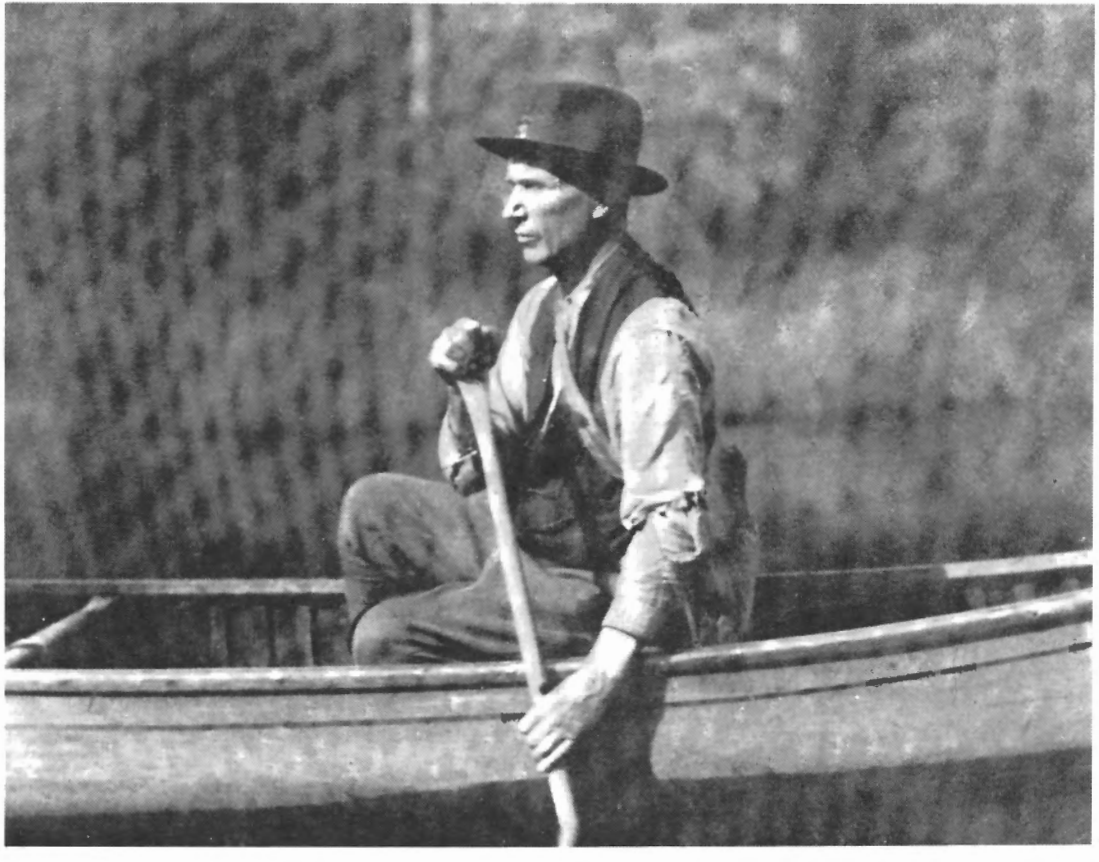


Plate IX.
Ed Horne, the Nova Scotia prospector and miner who worked in the Nova Scotia, Colorado, and British Columbia mining camps before coming to northern Ontario in 1908. After prospecting at Cobalt, Gowganda and Kirkland Lake, he went on to the Tremoy (Osisko) Lake area where he discovered copper-gold mineralization in 1917; that deposit became the Horne Mine. (Photo courtesy Noranda Mines Limited)

Mile 61.0 Noranda

Mile 61.9 Rouyn, at junction Highway 391.

Canada Black Granite Quarries

GABBRO

In dyke cutting Precambrian sediments

The gabbro is fine- to medium-grained and is composed of labradorite, augite, and magnetite with some olivine. It takes a high polish exhibiting a uniform distribution of black, bluish grey, and light grey tones. It is known commercially as "black granite" and was, used as a monument stone. The gabbro occurs in a dyke, about 500 feet wide, extending in a southwesterly direction from Beauchastel (KeKeKo) Lake almost to Moose Bay on the east side of Opasatica Lake.

The deposit was worked by Canada Black Granite Company Limited for a few years beginning in 1946. One quarry is located about 500 feet west of Highway 391 at a point 9.5 miles from its junction with Highway 59 in Rouyn; another is located $\frac{1}{2}$ mile east of Highway 391 at a point 9.1 miles from its junction with Highway 59.

Refs.: 25 p. 73-75

Maps (T): 32 D/3E Rouyn
(G): 1106A Southeast Beauchastel Township, Témiscamingue County, Quebec (G. S. C., 1 inch to 1,500 feet)

Mile 62.4 Rouyn, at junction Highway 46

Horne Mine

PYRITE, CHALCOPYRITE, PYRRHOTITE, SPHALERITE, MAGNETITE, NATIVE GOLD, ELECTRUM, HESSITE, PETZITE, SYLVANITE, KRENNERITE, CALAVERITE, ALTAITE, TETRADYMITE, RICKARDITE, KLOCKMANNITE, UMANGITE, GALENA, TETRAHEDRITE, EPIDOTE, CLINOZOISITE, CHLORITE, OTTRELITE

In siliceous, chloritized and sericitized rhyolite

The ore consists principally of massive sulphides of which pyrite is the most abundant; chalcopyrite, pyrrhotite, sphalerite, and magnetite are associated with the pyrite. Native gold and electrum, the tellurides-hessite, petzite, sylvanite, krennerite, calaverite, altaite, tetradymite, and rickardite- and the selenides-klockmannite and umangite -- are also present. Galena and tetrahedrite have been reported. Epidote, clinozoisite, chlorite, and ottrelite occur in the host rocks containing the orebodies.

The mine produces copper, gold, silver and pyrite. The deposit, exposed as a rusty weathered sulphide-bearing rock, was found by Edmund Henry Horne in 1917 after two previous summers (in 1911 and 1914) of prospecting in the area. On September 11, 1920, he and his partner, Ed Miller, staked the claims that became the Noranda Mine;

the claims were staked on behalf of the Tremoy Lake Prospecting Syndicate that was formed in New Liskeard to finance prospecting in adjacent parts of Quebec. In 1922, Noranda (Northern Canada) Mines Limited was incorporated to develop the property. Production has been continuous since 1927. The mine is serviced by 6 surface shafts and an internal shaft that reaches a depth of 8, 000 feet. The ore is processed in the company's 3, 500-ton-per-day concentrator and the 4, 000-ton-per-day smelter. The mine has produced over 1 million tons of copper and over $8\frac{1}{4}$ million ounces of gold from about 57, 489, 000 tons of ore treated. The ore is expected to be exhausted in mid-1974.

The mine is located in Noranda. Surface tours are arranged daily for visitors; enquiries regarding the tours should be directed to the Tourist Information Office on Highway 59 (Avenue du lac) in Rouyn.

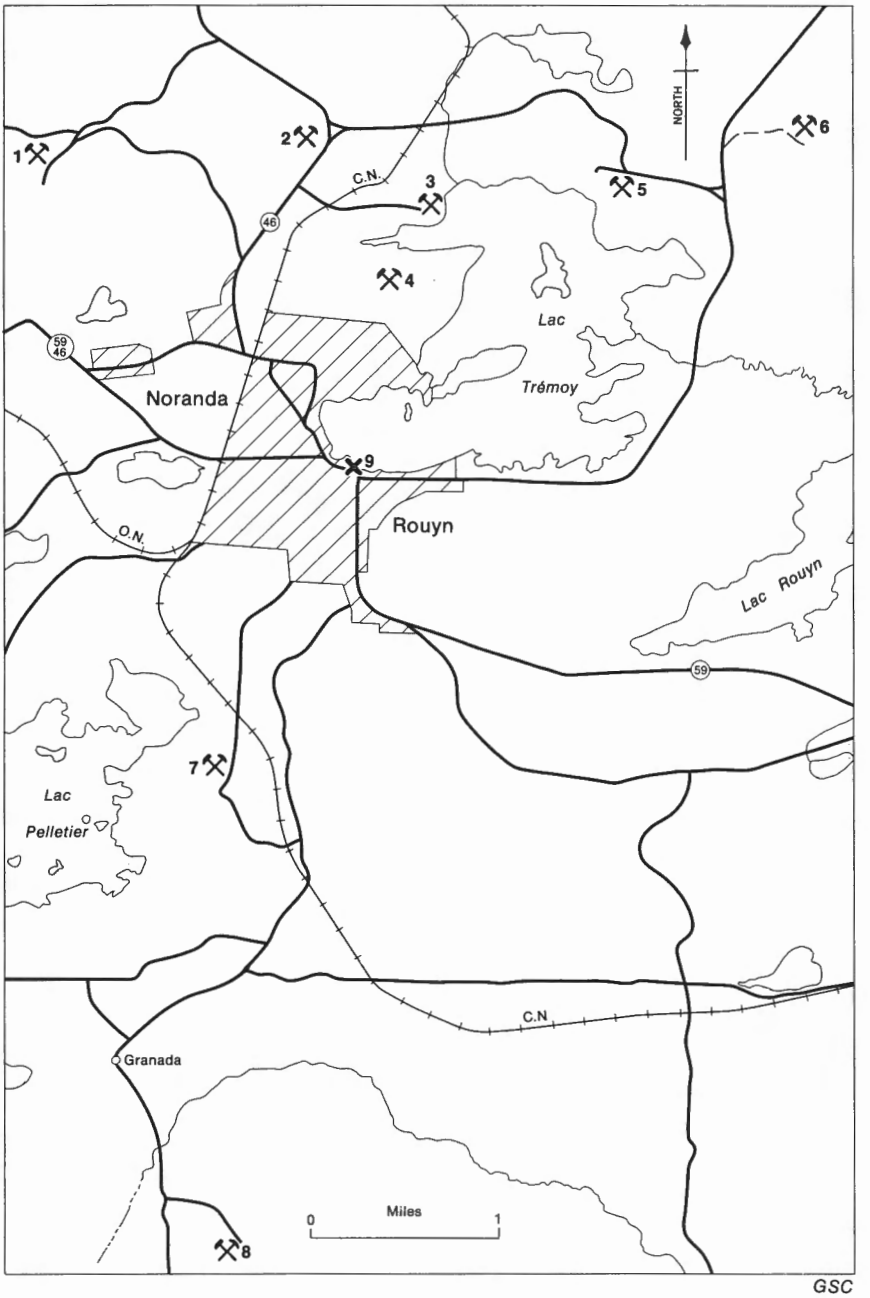
Refs.: 64 p. 41-44; 109 p. 13-14; 124 p. 25; 159 p. 35-38; 175 p. 82-98; 225 p. 244, 246; 228 p. 251-252

Maps (T): 32 D/6E Kanasuta River
(G): 453A Rouyn area, Rouyn Township, Témiscamingue County, Quebec (G. S. C., 1 inch to 800 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Road log to mines along Highway 46

(Descriptions of the mines follow the road log):

Mile	0	Junction Highway 59 and Highway 46 in Rouyn; proceed onto Highway 46.
	0.2	Noranda, at intersection 19ième rue; this is the turn-off to the Noranda Mines property. Road log continues along Highway 46.
	1.3	Junction road (on left) leading to Powell Rouyn Mine.
	1.8	Turn-off (right) to Quemont Mine.
	2.2	Turn-off (left) to Joliet Mine.
	5.2	Turn-off (left) to Millenbach Mine.
	7.8	Turn-off (left) to Norbec Mine.
	8.5	Turn-off (right) to Newbec Mine.
	17.7	Reneault, at junction road to Destor.
	19.0	Duquesne Mine on left.
	21.2	Junction Highway 63; the Beattie Mine and the Hunter (Beattie-Hunter) Mine are reached via this road. Road log continues along Highway 46.



1. Powell Rouyn Mine;
2. Joliet Mine;
3. Quemont Mine;
4. Horne Mine;
5. Donalda Mine;
6. D'Eldona Mine;
7. Stadacona Mine;
8. Granada Mine;
9. Tourist Information Office.

Map 5. Noranda-Rouyn area.

Mile 27.5 Junction road (on right) to Laferté and Lyndhurst Mine.

40.0 Macamic, at junction Highway 45; the Duvan Mine and Normetal Mine are reached via Highway 45.

Enquiries regarding visits to the operating mines should be directed to the Tourist Information Office, Avenue du lac (Highway 59) in Rouyn.

Powell Rouyn Mine

PYRITE, NATIVE GOLD, CHALCOPYRITE, HEMATITE, MARCASITE, FUCHSITE, SPHALERITE, GUNNINGITE, EPIDOTE, CHLORITE, CALCITE, SIDERITE, JAROSITE

In quartz veins cutting granite and diabase

This mine is a former low-grade gold producer. Pyrite, with which the gold was associated, was the chief metallic mineral in the ore; native gold was rare. Chalcopyrite, specular hematite, and marcasite were associated with the pyrite. Green mica (fuchsite) has been reported from this deposit. Specimens available from the dumps include: brown sphalerite coated with white gunningite; epidote, as "micro" crystals in cavities in massive quartz-epidote rock; chlorite, associated with epidote; white massive calcite that fluoresces deep pink under "long" ultraviolet rays; dark brown siderite; platy specular hematite; pyrite, as cubes in quartz and in siderite; and yellow-powdery jarosite on ore specimens.

Gold mineralization was discovered on this property by T. W. Powell. It was the 1922 discovery of gold-bearing quartz veins on this property and on the nearby Horne claim that sparked the prospecting rush in the Rouyn district in the following year. Early exploration of the Powell deposit was conducted by the Chadbourne-Thompson Syndicate in 1923, by the Nipissing Mining Company from 1923 to 1924, and by Powell Mining Properties Limited from 1927 to 1931; the latter shipped some gold-bearing ore from a weathered outcrop to the Noranda Smelter. In 1933, Powell Rouyn Gold Mines Limited undertook an intensive program of underground development that brought the mine to the production stage in 1937.

The mine produced siliceous gold ore until 1955 when operations ceased. The ore was utilized as a direct-fluxing ore for the Noranda Mines' copper smelter. Production amounted to 3,084,647 tons of ore averaging 0.13 ounce gold per ton, and some silver. There are three shafts on the property; the production shaft reaches a depth of 3,300 feet, two others are at depths of about 500 feet. All mine buildings have been removed from the property; there remain some small dumps.

Road log from Highway 46 at Mile 1.3 (see page 48):

Mile 0 Turn left onto road leading to cemetery.

0.1 Junction; continue straight ahead toward cemetery and beyond it.

1.2 Television station on left; continue straight ahead.

Mile 1.6 Powell Rouyn Mine.

Refs.: 30 p. 236-240; 93 p. 739-747; 175 p. 125-132; 204 p. 158-159

Maps (T): 32 D/6E Kanasuta River
(G): 453A Rouyn area, Rouyn township, Témiscamingue County, Quebec (G. S. C., 1 inch to 800 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Quemont Mine

PYRITE, PYRRHOTITE, SPHALERITE, CHALCOPYRITE, MAGNETITE

In rhyolite breccia

The Quemont Mine is a former gold-silver-copper-zinc producer. Pyrite was the most common mineral in the ore; it occurred as disseminated grains and in massive form with pyrrhotite, sphalerite, chalcopyrite, and magnetite.

The property, staked in 1922, was then known as the Murray claims. The early underground development of the deposit was performed by United Verde Extension Mining Corporation (1926-1928), and by Quemont Mining Corporation (1929-1930); a shaft was put down to a depth of 922 feet, but the investigation failed to disclose an economic orebody. As a result of a subsequent drilling program conducted in 1944, a large tonnage of gold-silver-copper-zinc ore was discovered beneath Tremoy (Osisko) Lake. Production commenced in 1949 continuing to 1971 when operations were terminated; total production amounted to 184,800 tons of copper, 1,918,300 ounces of gold, 7,941,700 ounces of silver, 280,300 tons of zinc, and 3,692,000 tons of pyrite concentrates from 15,349,000 tons of ore milled. The mine was developed by the Main shaft extending to a depth of 4,150 feet, by an auxiliary 200-foot shaft, and by the original 922-foot shaft. The mine was equipped with a concentrator, cyanide plant, and pyrite plant.

The property was acquired by Kerr Addison Mines Limited in 1968.

The road to the mine leads east from Highway 46 at Mile 1.8 (see page 48). Enquiries regarding visits to the property should be directed to the Tourist Information Office, Avenue du Lac (Highway 59), Rouyn.

Refs.: 149 p. 405-413; 175 p. 145; 225 p. 177-178

Maps (T): 32 D/6E Kanasuta River
(G): 453A Rouyn area, Rouyn township, Témiscamingue County, Quebec (G. S. C., 1 inch to 800 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Joliet Mine

PYRITE, CHALCOPYRITE, GOLD

In rhyolite breccia

Pyrite and chalcopyrite occur in rhyolite breccia and in quartz stringers where gold accompanies the sulphides.

The deposit has been operated by Noranda Mines Limited since 1954 supplying ore for use as flux for the smelter; the ore is obtained through an underground connection to the 1,200-foot level of the Noranda shaft. In previous operations, by Joliet-Quebec Mines Limited, a shaft had been completed to a depth of 628 feet in 1947.

The mine is located on the west side of Highway 46 at Mile 2.2 (see page 48).

Refs.: 72 p. 26-27; 118 p. 225; 205 p. 105

Maps (T): 32 D/6E Kanasuta River
(G): 453A Rouyn area, Rouyn township, Temiscamingue County, Quebec (G. S. C., 1 inch to 800 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Millenbach Mine

PYRITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE, MAGNETITE, GALENA, ARSENOPYRITE, MACKINAWITE, NATIVE SILVER

In volcanic rocks

The mine is a new copper-zinc producer. The ore consists of massive sulphide lenses in which pyrite, pyrrhotite, chalcopyrite, and sphalerite are the dominant constituents with minor amounts of magnetite, and traces of galena, arsenopyrite, mackinawite, and native silver.

The deposit was discovered in 1966 as a result of a surface diamond drilling program conducted by Lake Dufault Mines Limited. Production began in 1971. The mine is serviced by a shaft to a depth of 3,994 feet; the deposit is approximately 3,000 feet below the surface. The ore is trucked to the Norbec mill for treatment. The mine and mill are operated by Falconbridge Copper Limited, Lake Dufault Division.

The mine is located at Mile 5.2 on Highway 46 (see page 48). Visits to the property are restricted; enquiries should be directed to the Tourist Information Office, Avenue du Lac (Highway 59), Rouyn.

Refs.: 136 p. 67-78; 224 p. 1, 14; 225 p. 125

Maps (T): 32 D/6E Kanasuta River

Maps (G): 457A Dufault area, Dufresnoy and Rouyn townships, Abitibi and Témiscamingue counties, Quebec (G. S. C., 1 inch to 800 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Norbec (Lake Dufault) Mine

PYRITE, SPHALERITE, CHALCOPYRITE, PYRRHOTITE, MAGNETITE, GALENA

At andesite-rhyolite contact

The massive sulphide orebody consists of pyrite, sphalerite, and chalcopyrite with minor pyrrhotite, magnetite, and galena. The mine produces copper, zinc, silver, gold, and cadmium; it was brought into production in 1964 by Lake Dufault Mines Limited. The orebody at a depth of 1,100 feet, was located as a result of an extensive diamond drilling campaign conducted over a number of years. In 1971, it was acquired by Falconbridge Copper Limited. The mine is serviced by a 2,000-foot shaft and a 1,400-ton-per-day concentrator.

The mine is located 1.9 miles by road west of Highway 46 at Mile 7.8 (see page 48). Visits to the property are restricted; enquiries should be directed to the Tourist Information Office, Avenue du Lac (Highway 59), Rouyn.

Refs.: 110 p. 53-54; 114 p. 39-40; 118 p. 85; 165 p. 123; 225 p. 125

Maps (T): 32 D/6E Kanasuta River
(G): 455A Waite area, Duprat and Dufresuoy townships, Abitibi County, Quebec (G. S. C., 1 inch to 800 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Newbec Mine

CHALCOPYRITE, PYRITE

In andesite at its contact with quartz-porphyry

This mine was worked briefly for copper. Chalcopyrite and pyrite occurred with quartz and calcite. The deposit was exploited by a 250-foot shaft between 1928 and 1930 by Newbec Mines Limited; in 1930, about 278 tons of ore containing 6.74 per cent copper were shipped to the smelter at Noranda.

The mine is 0.3 mile east of Highway 46 at Mile 8.5.

Refs.: 30 p. 231-233; 118 p. 86

Maps (T): 32 D/6E Kanasuta River
(G): 456A Newbec area, Dufresnoy township, Abitibi County, Quebec (G. S. C., 1 inch to 800 feet)

Maps (G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Duquesne Mine

PYRITE, MAGNETITE

In quartz-feldspar porphyry

Finely disseminated pyrite occurs with minor magnetite. A small amount of gold was produced between 1949 and 1952. Development consisted of a 1,250-foot shaft with nine levels. The deposit was operated by Consolidated Duquesne Mining Company Limited.

The mine is on the west side of Highway 46 at Mile 19.0 (see page 48).

Refs.: 40 p. 78; 46 p. 50-51; 118 p. 73

Maps (T): 32 D/6E Kanasuta River
(G): 825 Parts of Hebecourt, Duparquet and Destor townships, West-Destor sheet, Abitibi-West County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

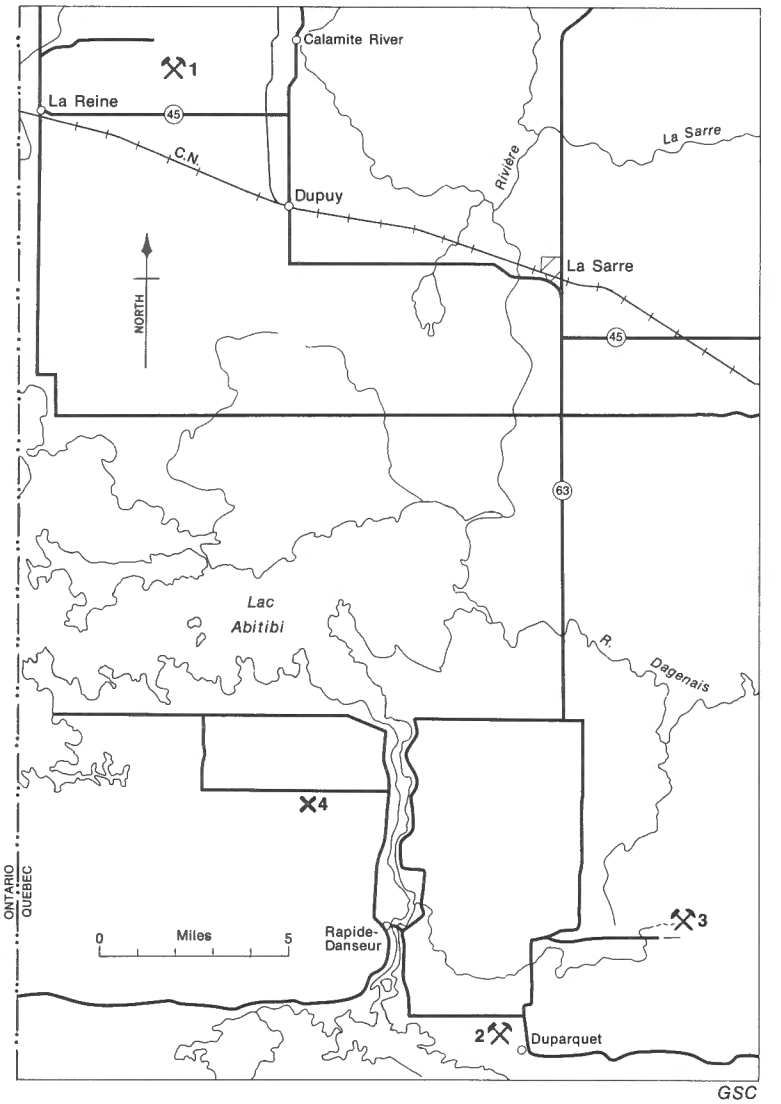
Beattie Mine

PYRITE, ARSENOPYRITE, NATIVE GOLD, MAGNETITE, LEUCOXENE, ILMENITE, MOLYBDENITE, CHLORITE, TITANITE, MICA, FLUORITE, TOURMALINE

In sheared silicified porphyries

The mine is a former low-grade gold producer. The gold occurred as very fine particles associated with finely crystalline pyrite and arsenopyrite. Magnetite, leucoxene, ilmenite, molybdenite, chlorite, titanite, green mica, fluorite, and tourmaline have been reported from the deposit.

The original gold claims were staked on Beattie Island, lac Duparquet by John Beattie in 1910; twenty years later he made a new discovery on the east side of lac Duparquet and this became the Beattie Mine. An extensive diamond drilling program conducted by Ventures Limited in 1931-1932 indicated a sufficiently large tonnage of economic ore to warrant development which was undertaken by the newly-formed Beattie Gold Mines Limited. Production began in 1933 and continued until 1956 when the ore became exhausted. The deposit was developed by several shafts to a maximum depth of 2,075 feet. Production amounted to 10,614,421 tons of ore grading 0.12 ounce of gold per ton and valued at $41,803,499. The following companies, each a reorganization of its predecessor, were involved in mining the deposit: Consolidated Beattie Mines Limited, and Beattie-Duquesne Mines Limited. The property is currently held by Donchester-Duquesne Mines Limited.



1. Duvan Mine;
2. Beattie Mine;
3. Hunter Mine;
4. Jasper occurrence.

Map 6. Duparquet - La Reine area.

The mine is located in Duparquet, 9 miles west of Highway 46 at its junction with Highway 63.

Refs.: 33 p. 84-96; 46 p. 48-50, 52; 80 p. 32-33; 102 p. 3-14, 20-26; 118 p. 89; 189 p. 23; 225 p. 115

Maps (T): 32 D/11E Palmarolle
(G): 823 Parts of Hebecourt, Duparquet and Destor townships, West-Duparquet sheet, Abitibi-West County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Hunter (Beattie-Hunter) Mine

CHALCOPYRITE, PYRITE, MAGNETITE, SERPENTINE

In sheared rhyolite

Chalcopyrite and pyrite occur in massive form and as disseminations in a gangue consisting of quartz, calcite, and sericite. Magnetite and serpentine were also found in specimens collected from the dump.

The mine was operated in 1956 and 1957 by Beattie-Duquesne Mines Limited producing 2,616,292 pounds of copper, 26 ounces of gold and 24,279 ounces of silver from 136,738 tons of ore. The mine was serviced by a shaft, 747 feet deep. The ore was treated at the mill at the Beattie Mine.

Road log from Highway 46 at Mile 21.2 (see page 48):

Mile	0	Junction Highway 63 and Highway 46; proceed west along Highway 63.
	9.0	Duparquet, at turn-off to Beattie Mine; continue along Highway 63.
	9.9	Junction Highway 388; continue along Highway 63.
	12.0	Junction. Road on left leads to the Rapide-Danseur jasper occurrence. To reach it, proceed to Rapide-Danseur, a distance of 4 miles; from the bridge over the Duparquet River, proceed along the road to Roquemaure for 3 miles to a junction. Follow road on left for 1.8 miles to the exposure on the south side of the road (Pers. comm.: C.S. Longley).
		To reach the Hunter Mine, proceed along the gravel road on right (from Mile 12.0).
	13.2	Fork; bear right.
	15.5	Hunter Mine.

Refs.: 118 p. 90; 165 p. 133

Maps (T): 32 D/11EW Palmarolle
(G): 293A Palmarolle sheet, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Lyndhurst Mine

PYRITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE, GALENA, BROCHANTITE, SIDEROTIL, JAROSITE

In shear zone in rhyolite

Chalcopyrite and pyrite in massive form and as disseminations are associated with some pyrrhotite, sphalerite, and galena in a quartz-dolomite-talc gangue: cubes of pyrite are common. Secondary minerals including green brochantite, white siderotil, and rusty brown jarosite occur as coatings on specimens on the dumps.

The mine produced 5,656,271 pounds of copper, 61,238 ounces of gold, and 52,146 ounces of silver from 156,362 tons of ore in 1956 and 1957. The ore was treated at the Beattie mill. The mine was serviced by a shaft, 710 feet deep; it was operated by Lyndhurst Mining Company Limited.

Road log from Highway 46 at Mile 27.5 (see page 48):

Mile 0 Proceed east onto road to Laferté.

2.9 Junction; turn right.

3.6 Lyndhurst Mine.

Refs.: 118 p. 72; 165 p. 114

Maps (T): 32 D/10W Taschereau
(G): 856 Part of townships of Palmarolle and Poularies, County of Abitibi-West (Que. Dept. Natur. Resour., 1 inch to 2,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Duvan Mine

BORNITE, CHALCOPYRITE, PYRITE, MAGNETITE, PYRRHOTITE, SPHALERITE

In vein cutting greywacke

This mine was formerly worked for copper. The ore consisted of massive chalcopyrite and bornite with pyrite and some magnetite, pyrrhotite, and sphalerite.

The deposit has been known since the 1920s when it was held by Rex Copper Mines Limited. Some surface exploration was done by Desmeloizes Mining Corporation prior to acquisition in 1954 by Duvan Copper Company Limited which completed a shaft to a depth of 1,000 feet by 1957. An ore shipment of about 1,500 tons was treated at the Noranda smelter in 1960; it contained values in copper and silver.

The mine is located northeast of the town of LaReine.

Road log from the terminal point of Highway 45 at LaReine:

Mile	0	Proceed north through the town.
	1.5	Junction; turn right.
	4.7	Road turns right.
	5.2	Duvan Mine.

Refs.: 114 p. 33; 118 p. 70; 165 p. 109; 204 p. 65-66; 208 p. 90

Maps (T): 32 D/14W La Sarre
(G): 1401 Desmeloizes township, Abitibi-West County (Que. Dept. Natur. Resour., 1 inch to 2,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Normetal (Abana) Mine

PYRITE, SPHALERITE, CHALCOPYRITE, PYRRHOTITE, GALENA, ARSENOPYRITE, CHALCOCITE, BORNITE, OTTRELITE, GARNET, CHLORITE, MAGNETITE, KYANITE

In sheared rhyolite

The mine produces copper, zinc, gold, and silver. The ore consists of massive sulphides of which pyrite, sphalerite, and chalcopyrite are the most abundant; pyrrhotite, galena, arsenopyrite, chalcocite, and bornite are also present. Ottrelite, as platy crystal aggregates, occurs in the rhyolite and tuff. Red garnet associated with chlorite, and magnetite have been reported from a skarn zone in the deposit. Grey prismatic crystals of kyanite measuring about an inch long have been reported to occur in schist at the 675-foot level.

The deposit was discovered in 1925 by M. Lefevre. Underground development was initiated in the same year by Abana Mines Limited which sank a shaft to a depth of 500 feet before operations were suspended in 1930. Since 1933, the mine has been operated by Normetal Mining Corporation Limited which was acquired by Kerr Addison Mines Limited in 1968. Production began in 1937. The mine is serviced by several shafts from which the underground workings extend to a maximum depth of 7,994 feet, and by a 1,000-ton-per day concentrator. Production to the end of 1972 amounted to 10,513,300 tons of ore containing 233,900 tons of copper, 544,400 tons of zinc, 168,800 ounces of gold, 14,251,300 ounces of silver, and 595,600 tons of pyrite concentrates.

This mine is located at Normetal, Quebec. Since this is an operating mine, visits are restricted; enquiries should be directed to the mine office in Normetal.

Refs.: 19 p. 683-687; 158 p. 19-28; 165 p. 110-111; 175 p. 72; 225 p. 177-178; 228 p. 184

Maps (T): 32 D/14W La Sarre
32 E/3W Perron-Rousseau
(G): 683 Normetal Mine area, Abitibi West County (Que. Dept. Natur. Resour., 1 inch to 800 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

The main road log along Highway 59 is resumed.

Mile 62.4 Rouyn, at junction Highway 59 and Highway 46; the road log continues along Highway 59.

62.6 Tourist Information Office on left; enquiries regarding visits to operating mines should be directed to this office.

62.65 Intersection rue Perrault and Highway 59.

Donalda Mine

PYRITE, NATIVE GOLD, CHALCOPYRITE, SPHALERITE, GALENA, EPIDOTE, ACTINOLITE, HEMATITE, CHLORITE, CALCITE

In quartz vein in porphyritic rhyolite

The mine produced gold and some silver from 1948 to 1956. The ore comprised pyrite and native gold, and minor amounts of chalcopyrite, sphalerite, and galena. The dumps furnish specimens of pyrite (as tiny cubes), of epidote containing "micro" prisms of actinolite and flakes of specular hematite, and specimens of coarse cleavable masses of pink and white calcite. The white calcite fluoresces a bright orange-pink colour when exposed to ultraviolet rays.

The deposit was discovered in 1943 as a result of a diamond drilling campaign conducted by Donalda Mines Limited. Production commenced in 1948, the ore being shipped to the mill at the Powell Rouyn Mine. In 1951, a mill at the Donalda Mine was put into operation. The mine produced 692,094 tons of ore assaying $5.85 in gold per ton. Ore was hoisted through a shaft, 1,860 feet deep.

Road log from intersection rue Perrault and Highway 59 in Rouyn:

Mile 0 Proceed north onto rue Perrault.

3.1 Junction; turn left.

3.7 Donalda Mine.

Refs.: 2 p. 59-60; 28 p. 55-56; 118 p. 226-227; 165 p. 295; 207 p. 85

Maps (T): 32 D/7W Clericy
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
635A Clericy, Abitibi and Témiscamingue counties, Quebec (G. S. C., 1 inch to 1 mile)

D'Eldona (Delbridge) Mine

PYRITE, SPHALERITE, CHALCOPYRITE, GALENA, NATIVE GOLD, ELECTRUM, NATIVE SILVER

In agglomerate at or near rhyolite-porphyry contact

The ore consisted of massive and disseminated pyrite and sphalerite with chalcopyrite, galena, and minor amounts of native gold, electrum, and native silver.

The deposit was developed by D'Eldona Mines Limited between 1944 and 1952. A shaft was put down to a depth of 1,500 feet. In 1952, a shipment of 85,000 tons of ore containing 7.7 per cent zinc, 0.17 ounce of gold per ton, and about 2.5 ounces of silver per ton was made to the McWalters mill. Production was re-instated in 1969 by Delbridge Mines Limited; in the two year period ending in August 1971, the mine produced over 4 million pounds of copper and 68 million pounds of zinc, and 26,000 ounces of gold, 780,000 ounces of silver from 397,000 tons of ore milled.

Road log from Rouyn:

Mile 0 Proceed north along rue Perrault from its intersection with Highway 59.

3.1 Junction; turn right.

3.6 D'Eldona Mine.

Refs: 13 p. 59: 118 p. 228; 165 p. 295; 203 p. 66; 225 p. 106

Maps (T): 32 D/7W Clericy
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
635A Clericy, Abitibi and Témiscamingue Counties, Quebec (G. S. C., 1 inch to 1 mile)

Mile 63.15 Rouyn, at intersection rue Iberville

Stadacona Mine

PYRITE, NATIVE GOLD, PETZITE, ARSENOPYRITE, CHALCOPYRITE, GALENA, TOURMALINE, AMPHIBOLE, TALC, MICA, EPIDOTE, CALCITE

In quartz-carbonate veins in volcanic rocks

The mine formerly produced gold and silver. The ore consisted of pyrite, native gold, petzite, arsenopyrite, chalcopyrite, galena, and tourmaline in a quartz-ankerite-calcite gangue. Talc and chrome mica were also present. Specimens collected from the dumps include: black massive tourmaline, brown prismatic "micro" crystals of amphibole in calcite, grey fibrous aggregates of amphibole, buff-coloured massive and foliated talc, epidote in quartz, pink massive calcite and coarsely crystalline white calcite; the white calcite fluoresces pink when exposed to ultraviolet rays.

The deposit is near the east shore of lac Pelletier where a quartz-carbonate vein carrying native gold was discovered in 1923. Stadacona Mines Limited (name changed later to Stadacona Rouyn Mines Limited) undertook underground development of the deposit in 1928 by sinking a shaft to a depth of 300 feet. After several years of underground exploration, an economic orebody was outlined, and production began in 1936. When operations ceased at the end of 1957, gold and silver valued at $16,532,527 was extracted from a total of about 3 million tons of ore milled. The mine was serviced by a 4,050-foot shaft with 23 levels, and by a cyanide mill with a capacity of 450 tons per day.

Road log from Rouyn:

Mile	0	Highway 59 at intersection rue Iberville; proceed west onto rue Iberville.
	0.4	Turn left onto Avenue Dallaire.
	0.7	Junction; turn left onto gravel road.
	1.0	Junction; continue straight ahead.
	1.7	Stadacona Mine.

Refs.: 30 p. 98-99; 33 p. 161-162; 176 p. 69-74; 208 p. 248-249

Maps (T): 32 D/3E Rouyn
(G): 1107A Southwest Rouyn Township, Témiscamingue County, Quebec G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 63.4 Junction road to Granada.

Granada Mine

NATIVE GOLD, ARSENOPYRITE, PYRITE, GALENA, SPHALERITE, PYRRHOTITE, CHALCOPYRITE, MOLYBDENITE, TOURMALINE

In quartz veins in conglomerate, greywacke, and syenite porphyry

The Granada Mine was the area's first gold producer. Coarse native gold occurred with chlorite or sericite in fractures in quartz along the vein walls. The most abundant

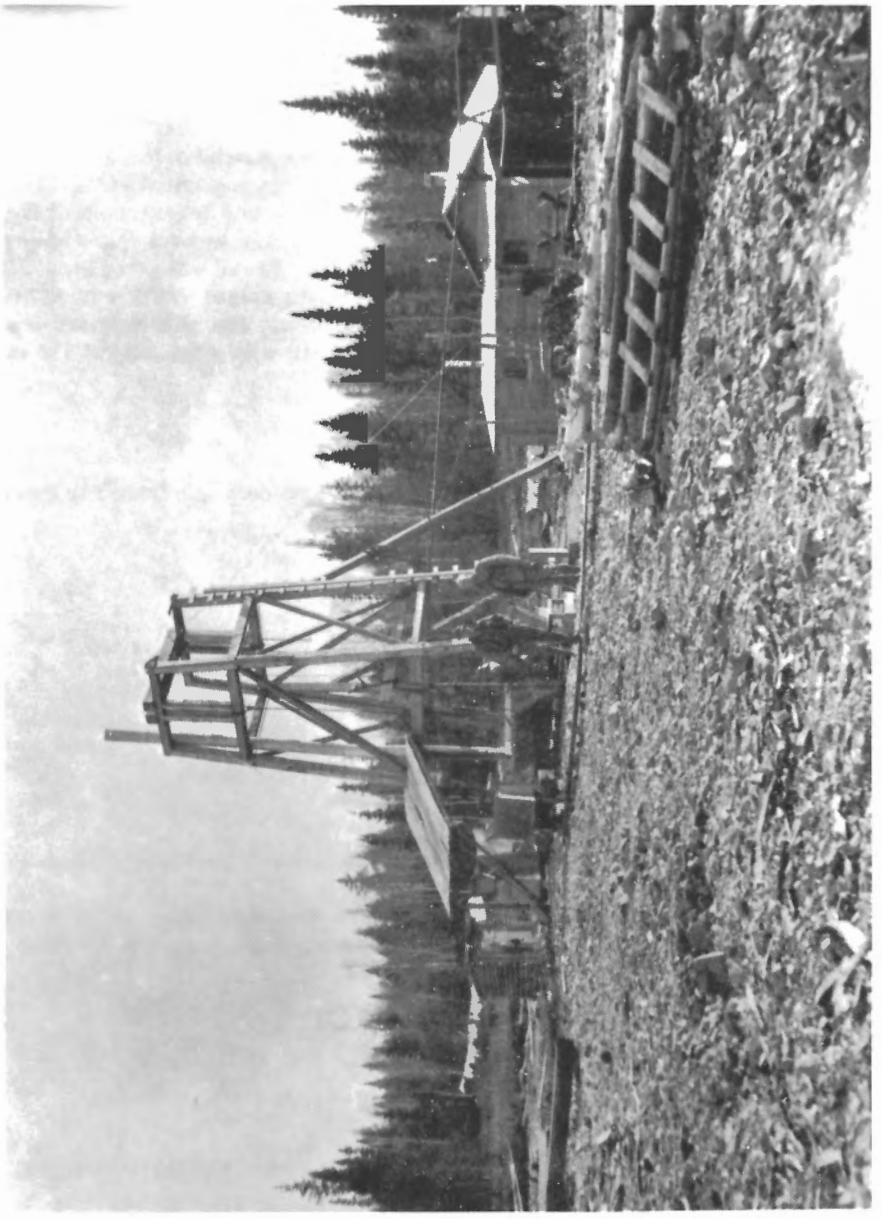


Plate X. Granada Mine, October, 1927. (Public Archieves of Canada photo PA-13762)

metallic minerals were pyrite and arsenopyrite. Minor amounts of galena, sphalerite, pyrrhotite, chalcopyrite, and molybdenite were present in the ore. The veins were composed chiefly of quartz with less abundant carbonates, chlorite, sericite, and black tourmaline.

The property was staked for R. C. and W. A. Gamble by Thomas Bathurst in 1922 during the prospecting rush in the Rouyn region. In 1923, gold-bearing veins on which a shaft was later sunk were discovered by W. A. Gamble and Robert C. Gamble. The deposit was regarded as the most important discovery of the early days of the camp. Underground exploration was undertaken in 1927 by Granada-Rouyn Mining Company Limited (name later changed to Granada Gold Mines Limited). The mine became, in 1930, the first producer in the Rouyn-Noranda camp. Production ceased in 1935 when the 100-ton-per day mill and other mine buildings were destroyed by fire; a total of 51,476 ounces of gold was extracted from 181,679 tons of ore milled, an average recovery of 0.283 ounce gold per ton. The mine was developed by three shafts: No. 1 is 657 feet deep with a winze extending to a depth of 1,225 feet, No. 2 (inclined) is 1,465 feet deep, and No. 3 (located 5,000 feet north of No. 1 and No. 2) is 450 feet deep.

Road log from Highway 59 at Rouyn:

Mile 0 Proceed west onto road to Granada.

3.3 Granada, at church.

4.0 Junction mine road on left.

4.5 Granada Mine.

Refs.: 33 p. 170; 59 p. 7, 26-39; 176 p. 77-80; 191 p. 106

Maps (T): 32 D/3E Rouyn
(G): 1107A Southwest Rouyn Township, Témiscamingue County, Quebec (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 68.2 McWatters Mine on right.

McWatters Mine

NATIVE GOLD, HESSITE, ARSENOPYRITE, PYRITE, TOURMALINE, PYRRHOTITE, CHALCOPYRITE, MOLYBDENITE, GALENA, SPHALERITE, SCHEELITE, MICA, ALBITE, ANKERITE

In quartz veins in schistose conglomerate

Native gold and hessite occupied fractures in quartz, ankerite and arsenopyrite, at this former gold mine. Crystals of pyrite and of arsenopyrite were associated with black tourmaline in quartz. Other minerals comprising the ore were pyrrhotite, chalcopyrite, molybdenite, galena, sphalerite, scheelite, green mica, and albite.

The gangue consisted chiefly of black tourmaline and grey to blue quartz with some ankerite. Tourmaline crystals also occurred commonly in the schist.

The property was originally staked in 1922. Ten years later, a quartz vein rich in native gold was revealed by stripping an outcrop of schistose conglomerate. The property was acquired by Dave McWatters, and McWatters Gold Mines Limited was formed in 1932 to develop it. Production was obtained from 1934 until 1944 amounting to 368, 013 tons of ore valued at $3, 946, 752 and containing 0. 33 ounce of gold per ton. The underground workings reached a depth of 1, 500 feet; the mine was equipped with a 150-ton per day cyanide mill.

The mine is located on Highway 59 at Mile 68. 2.

Refs.: 33 p. 162-165; 60 p. 7, 33-43; 118 p. 228; 176 p. 97-106

Maps (T): 32 D/2W Kinojevis Lake
(G): 1108A Southeast Rouyn Township, Témiscamingue County, Quebec (G. S. C. , 1 inch to 1, 500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour. , 1 inch to 4 miles)

Mile 69. 6 Junction gravel road on left to Rouyn-Merger Mine.

Rouyn-Merger Mine

PYRITE, TOURMALINE, CHALCOPYRITE, PYRRHOTITE, ARSENOPYRITE, NATIVE GOLD, SCHEELITE, TALC

In quartz-carbonate veins at contact conglomerate with tuff

Pyrite, chalcopyrite, with minor amounts of pyrrhotite and arsenopyrite, and native gold occurred in quartz-carbonate stringers and in the wall-rock. Black tourmaline and scheelite were also constituents of the veins. The dumps furnish specimens of massive black tourmaline, pyrite, chlorite, and green talc.

The gold deposit was discovered as a result of a diamond drilling program conducted by East Rouyn (Quebec) Limited in 1938. Underground development began in 1945 with the sinking of an inclined shaft by Rouyn-Merger Gold Mines Limited. The shaft was completed to a depth of 959 feet in 1948. In the seven-month period beginning in June, 1948, a total of 32, 198 tons of ore containing 3, 895 ounces of gold was shipped for treatment at the Noranda smelter.

Road log from Highway 59 at Mile 69. 6:

Mile 0 Proceed north onto gravel road.

0. 1 Crossroad; turn right onto single-lane road.

0. 5 Rouyn-Merger Mine.

Refs.: 28 p. 60-61; 33 p. 175-177; 176 p. 107-112

Maps (T): 32 D/2W Kinojevis Lake
(G): 1108A Southeast Rouyn Township, Témiscamingue County, Quebec (G. S. C., 1 inch to 1, 500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 70. 5 Bridge over Kinojevis River.

74. 6 Junction single-lane road on left.

Heva Mine

PYRITE, NATIVE GOLD, TOURMALINE, CHLORITE, ACTINOLITE

In quartz veins in chlorite schist and in greywacke

The mine is a former small gold producer. Fine native gold occurred in quartz with pyrite. Specimens of quartz containing pyrite, small black prismatic crystals of tourmaline, dark green radiating prismatic aggregates of actinolite, and chlorite are available from the mine dumps.

Gold-bearing veins were intersected by diamond drilling during an exploration campaign conducted in 1944-1945 by Heva Cadillac Gold Mines Limited (name later changed to Heva Gold Mines Limited). An inclined shaft was sunk to a depth of 540 feet and, in 1951 and 1952, small shipments of ore were transported to the mill at the Powell Rouyn Mine for treatment.

Access is via a single-lane road, 0. 7 mile long, leading north from Highway 59 at Mile 74. 6.

Refs.: 28 p. 36-37; 203 p. 86-87

Maps (T): 32 D/2W Kinojevis Lake
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 76. 7 Junction single-lane road on left.

Hosco Mine

NATIVE GOLD, PYRITE, ARSENOPYRITE, TOURMALINE, JAROSITE

In shear zone in greywacke and argillaceous rocks

Coarse native gold was reported to be quite common in quartz veins containing pyrite and arsenopyrite. Grains of pyrite and tiny prismatic crystals of arsenopyrite are

common in quartz and in the host rock occurring on the dumps where specimens are commonly coated with rusty yellow powdery jarosite. Aggregates of dark brown to black microscopic prisms of tourmaline in massive quartz were also noted on the dumps.

From June 1948 until October 1949, the mine produced 50, 567 tons of ore from which 7, 367 ounces of gold were recovered. The mine was serviced by an inclined shaft with levels at depths of 350 and 500 feet; ore was treated at the McWatters mill.

Access to the mine is by a single-lane road, 0.4 mile long, leading north from Highway 59 at Mile 76. 7.

Refs.: 28 p. 37-38; 118 p. 133-134

Maps (T): 32 D/2E Kinojevis Lake
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 78. 7 Joannès, at railway crossing.

84. 1 Junction road to Clériсy.

Mooshla Mine

NATIVE GOLD, PYRITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE, GALENA, MAGNETITE, RUTILE, EPIDOTE, GARNET, TOURMALINE, TITANITE, CALCITE

In alaskite

The deposit is reported to have contained some spectacular concentrations of native gold in white quartz carrying pyrrhotite, pyrite, and chalcopyrite. The main gold-bearing vein consisted of pyrite and pyrrhotite with minor chalcopyrite, sphalerite, galena, and magnetite (rare). Rutile and epidote have been reported to occur in the wall-rock. The gangue consisted of quartz, albite, and calcite; a pale yellow garnet occurred in the vein and in the adjacent wall-rock which contained pyrite, pyrrhotite, and acicular tourmaline. A large dump near the shaft furnishes specimens of pyrite, chalcopyrite, pyrrhotite, chlorite, and epidote in white quartz, and of colourless to white cleavable masses of calcite that fluoresce pink under "long" ultraviolet rays. The epidote was found as greenish yellow and yellowish to greyish green prismatic crystals measuring about 1/8 inch wide and up to an inch long. Small brown crystals of titanite were noted in the calcite.

The deposit was explored and developed by Mooshla Gold Mines Company Limited between 1935 and 1940; a shaft was sunk to a depth of 372 feet. In 1940, a shipment of 4, 901 tons of ore containing 3, 863 ounces of gold was made to the Noranda smelter.

Road log from Highway 59 at Mile 84. 1:

Mile 0 Proceed north onto gravel road to Clériсy.

2. 6 Junction single-lane road; turn left.

Plate XI. Mooshla Mine, 1937. (G. S. C. photo 82395)

Mile 2.7 Mooshla Mine.

Refs.: 33 p. 184-185; 51 p. 82-86

Maps (T): 32 D/7E Clericy
(G): 613A Bousquet-Joannès, Bousquet and Joannès Townships, Abitibi and Témiscamingue counties, Quebec, Sheet 2 (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mic Mac Mine

NATIVE GOLD, PYRITE, PYRRHOTITE, CHALCOPYRITE, MAGNETITE, ILMENITE

In sheared volcanic rocks

The mineralized shear zone contained quartz, sulphide minerals, carbonate, magnetite, and native gold. Ilmenite occurred with native gold and pyrite, pyrrhotite, and chalcopyrite in quartz stringers in andesite.

Gold mineralization was discovered on this property in June, 1936 by Tom Duval. A number of companies were involved in exploration of the deposit but production was not obtained until 1942 after Mic Mac Mines Limited had undertaken operations. The mine was closed in 1947 having yielded about $2\frac{1}{2}$ million pounds of copper, 107,000 ounces of gold and 1,600 ounces of silver. The mine was developed to a depth of 1,350 feet; it was equipped with a 650-ton mill.

Road log from Highway 59 at Mile 84.1:

Mile 0 Proceed north onto road to Clericy.

2.6 Turn-off to Mooshla Mine; continue straight ahead.

2.9 Junction; turn left onto mine road.

3.5 Mic Mac Mine.

Refs.: 95 p. 803-808; 165 p. 58; 199 p. 204-205

Maps (T): 32 D/7E Clericy
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 85.2 Bridge over Bousquet River.

90.8 Bouscadillac Mine on left.

Bouscadillac Mine

NATIVE GOLD, ARSENOPYRITE, PYRITE, PYRRHOTITE, CHALCOPYRITE, TOURMALINE

In sheared porphyritic andesite

The deposit is near the western end of an east-west belt of mineralization in sheared volcanic rocks; the Thompson-Cadillac Mine and the O'Brien Mine to the east share this mineralized zone. The Bouscadillac mineralization consists of native gold with small amounts of arsenopyrite, pyrite, pyrrhotite, chalcopyrite, and tourmaline in quartz veins and in the sheared andesite which has been altered to talc-chlorite schist.

Gold-bearing quartz veins were discovered in the property by P. T. Graham and D. Abrams in 1924. Exploratory work consisting of diamond drilling, trenching, and sinking of a shaft to a depth of 525 feet was performed by Graham-Bousquet Mining Corporation from 1924 to 1929. Further underground exploration was done by Bouscadillac Gold Mines Limited, in 1936 and in 1937.

The property is located on the north side of Highway 59 at Mile 90.8. The large dump is visible from the highway.

Refs.: 30 p. 264-265; 33 p. 192-193; 51 p. 59-65; 118 p. 31

Maps (T): 32 D/1W Malartic
(G): 612A Bousquet-Joannes, Bousquet Township, Abitibi County, Quebec, Sheet 1 (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 90.9 Junction Highway 395.

Cadillac Moly Mine

MOLYBDENITE, BISMUTHINITE, PYRITE, CHALCOPYRITE, FLUORITE, MICA

In pegmatite

The mine is a former molybdenum-bismuth producer. Molybdenite, bismuthinite, and pyrite occur in quartz veins cutting the pegmatite and in pegmatite. Purple to almost black fluorite (massive and crystal aggregates), dark green chlorite, and light to dark green mica are associated with the metallic minerals. The main constituents of the vein are salmon-pink orthoclase and white to grey quartz.

The property comprises two claims, the M. J. O'Brien claim and the Hervey claim, that were staked a few years after molybdenite-bearing quartz veins on the shore of lac Preissac (Kewagama) were reported by J. F. E. Johnston of the Geological Survey of Canada in 1901. Surface exploration was performed on the deposit in about 1911 by the St. Maurice Syndicate; 700 pounds of ore were recovered for testing. Production of molybdenite, bismuth, and silver was obtained by Anglo American Molybdenite

Plate XII. Cadillac Moly Mine on shore of lac Preissac with outcrops of Preissac-Lacorne batholith (granitic rocks) in foreground. (G. S. C. photo 161440)

Mining Corporation (name changed in 1968 to Cadillac Moly Mines Limited) from 1965 until mid-1970. Mining operations were from an open pit and from a 1,255-foot shaft opening 7 levels. The mill operated at a capacity of 100 tons per day.

The mine is on the eastern shore of Indian Peninsula on lac Preissac. The road log is given in the log to the Preissac Mine (see page 71).

Refs.: 116 p. 25-26; 166 p. 35-36; 174 p. 155, 157; 219 p. 62-63; 222 p. 68-69

Maps (T): 32 D/8W La Motte
(G): 1179A Preissac-Lacorne batholith, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Preissac (Indian molybdenum) Mine

MOLYBDENITE, BISMUTHINITE, PYRITE, CHALCOPYRITE, NATIVE BISMUTH, FLUORITE, MUSCOVITE, FELDSPAR, GARNET, BISMOCLITE, SERPENTINE, CALCITE, COLUMBITE-TANTALITE

In quartz veins in granite

Molybdenite, as aggregates of coarse flakes, and bismuthinite, as slender to acicular crystals, occur with some pyrite and chalcopyrite in white quartz. Native bismuth is intergrown with molybdenite and muscovite. Purple fluorite, light green muscovite, pink feldspar, and orange-red garnet (as tiny crystals and grains) are also present in the quartz. These minerals can be found on the dump. In addition, bismoclite was noted as a light green coating on feldspar and quartz, and patches of black massive serpentine were observed in granite. White calcite associated with fluorite fluoresces pink under "long" ultraviolet rays. A mineral belonging to the columbite-tantalite series has been reported from the deposit.

The property includes the Huestis, Sweezey, Doucet claims staked in about 1909. Exploration and development of the deposit was carried out intermittently by various interests including St. Maurice Mines Company Limited (1916-1921) which sank a shaft to a depth of 970 feet, and by Indian Molybdenum Limited (1943-1944); a production of 781, 910 pounds of molybdenite resulted from the latter operations. Ore was hoisted via an inclined shaft sunk to a depth of 250 feet. In 1955, Preissac Molybdenite Mines Limited resumed operations and commenced production in 1964. The production shaft is 615 feet deep and the mill had a capacity of 1, 200 tons per day. Operations ceased in 1971. The mine produced molybdenite and bismuth.

Road log from Highway 59 at Mile 90. 9:

Mile 0 Junction Highway 395 and Highway 59; proceed north onto Highway 395.

7. 3 Junction road on right leading 0. 6 mile to the Cadillac Moly Mine; road log continues straight ahead.
The highway leads along the eastern slope of Burnt Mountain which is composed of granitic rocks that outcrop along the road; the rocks were formed by a batholithic intrusion in Archean time.

9. 0 Junction mine road; turn left.

9. 4 Preissac Mine.

Refs.: 33 p. 415-417; 38 p. 125-127; 164 p. 120-124; 166 p. 36, 38; 169 p. 31, 33; 174 p. 157; 222 p. 307

Maps (T): 32 D/8W La Motte
(G): 1179A Preissac-Lacorne batholith, Quebec (G. S. C. , 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 91. 8 Thompson-Cadillac Mine on left.

Thompson-Cadillac Mine

NATIVE GOLD, ARSENOPYRITE, PYRITE, PYRRHOTITE

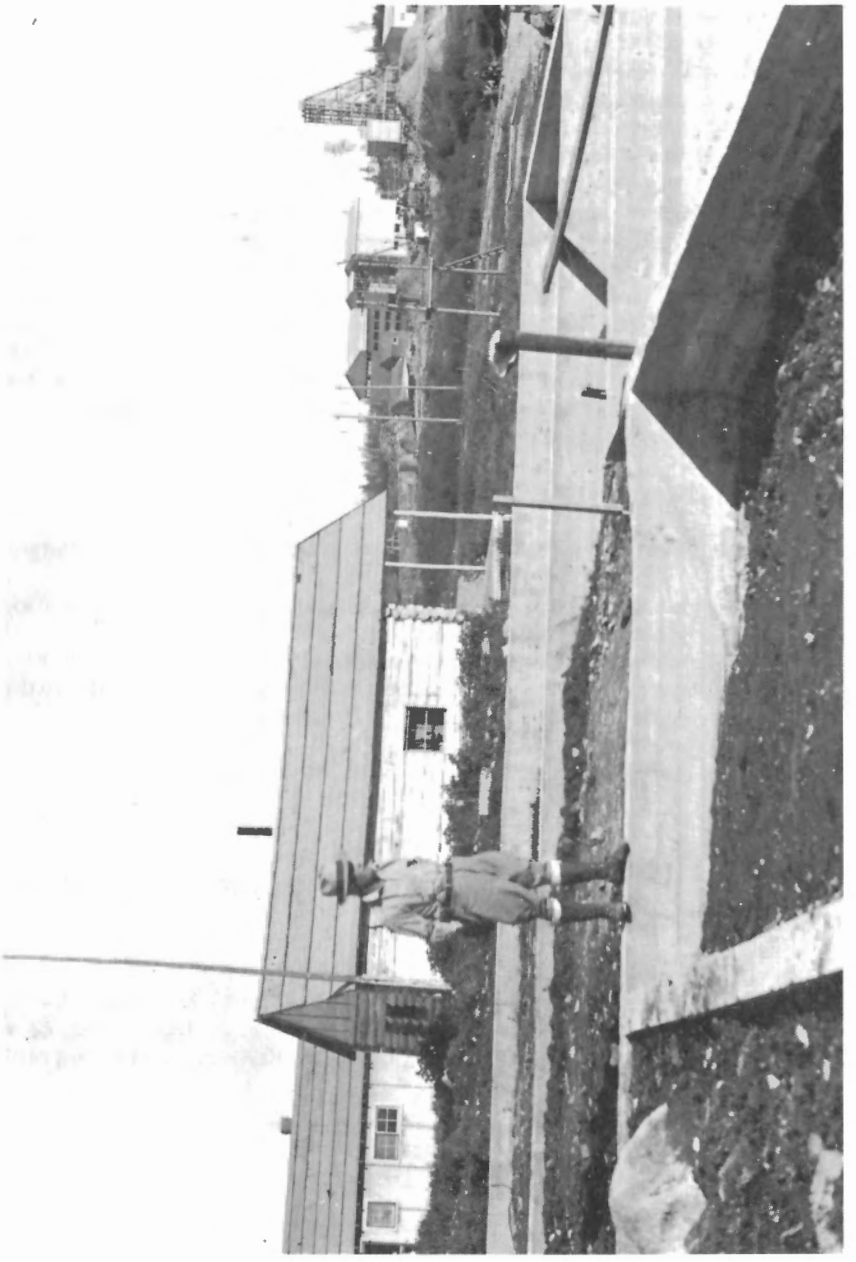


Plate XIII. Thompson-Cadillac Mine, September, 1934. (G. S. C. photo 77378)

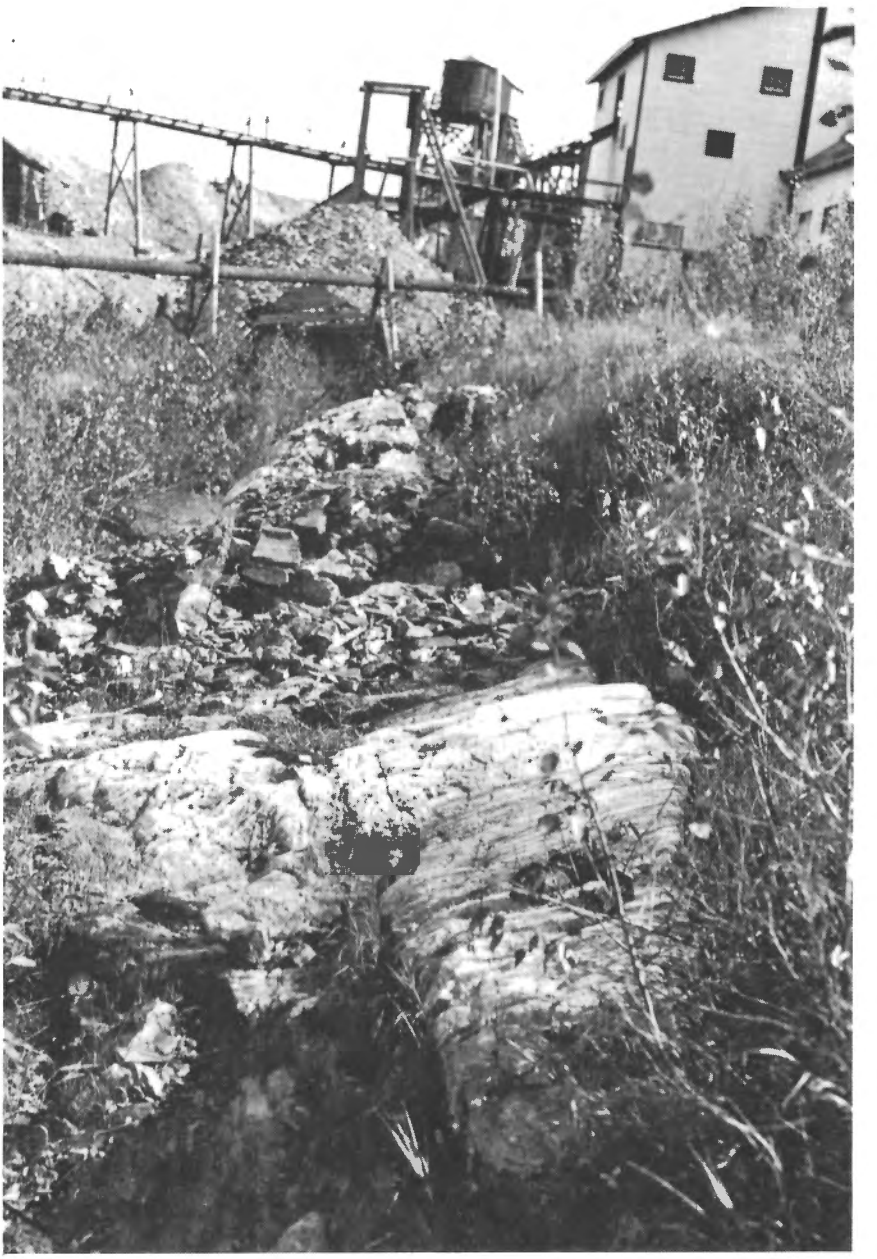


Plate XIV. Discovery vein (No. 1), O'Brien Mine, 1934. The vein, at the contact of conglomerate and greenstone, had a maximum width of 12 feet (as shown in photo) and outcropped on a low knoll west of the mill. (G. S. C. photo 77381)

In veins in porphyritic andesite

Spectacular pockets of native gold in quartz were encountered during mining operations. Arsenopyrite, the most abundant sulphide, was associated with pyrite and pyrrhotite in quartz veins; specimens of these minerals are available from the dumps.

The property was originally staked by E. J. Thompson in the summer of 1924. Subsequent exploration by the Anglo-French Corporation in 1925 resulted in locating a mineralized zone 800 feet north of the discovery zone; this zone was later developed as the Thompson-Cadillac Mine. Development of the deposit began in earnest in 1927 by Thompson-Cadillac Mines Limited; two shafts were sunk, one to a depth of 620 feet, the other (900 feet to the east) to 100 feet. Production from 1936 until 1939 amounted to a recovery of some 15, 040 ounces of gold from 172, 935 tons of ore milled. Further underground exploration resulting in deepening the main shaft to a depth of 1, 100 feet was performed by Alger Gold Mines Limited between 1945 and 1948.

The mine is on the north side of Highway 59 at Mile 91. 8.

Refs.: 11 p. 53-57; 28 p. 16-17; 33 p. 197

Maps (T): 32 D/1W Malartic
(G): 399A Cadillac area, Cadillac Township, Quebec (G. S. C., 1 inch to 1, 500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 92. 9 Junction road to O'Brien Mine.

O'Brien Mine

NATIVE GOLD, ARSENOPYRITE, PYRRHOTITE, PYRITE, CHALCOPYRITE, GALENA, SPHALERITE, TOURMALINE, AXINITE, EPIDOTE

In quartz veins in greenstone, greywacke, conglomerate, and porphyry

At one time, this was the richest gold producer in Quebec. Spectacular specimens of native gold in quartz have formerly been obtained from this mine; some were set aside during mining operations for museum specimens. The gold occurred in leaf form and as plates in fractures in quartz. The chief metallic minerals in the veins were arsenopyrite and pyrrhotite; minor amounts of pyrite, chalcopyrite, and galena were present. Sphalerite has been reported. Specimens of quartz containing arsenopyrite, tourmaline (as aggregates of tiny black prisms), light purple massive axinite, epidote, and chlorite were collected from an open-cut on the property.

The property was staked in 1924 by Austin Dumont and W. Hermeston for the M. J. O'Brien Company. Development began immediately, followed by continuous production from 1933 until 1956. Development consisted of three surface shafts (to depths of 2, 040 feet, 1, 500 feet and 100 feet), and an internal shaft that was sunk from the 2, 000-foot level to the 3, 450-foot level. The mill operated at a capacity of 200 tons per day. The mine produced gold and silver valued at 20. 5 million dollars from

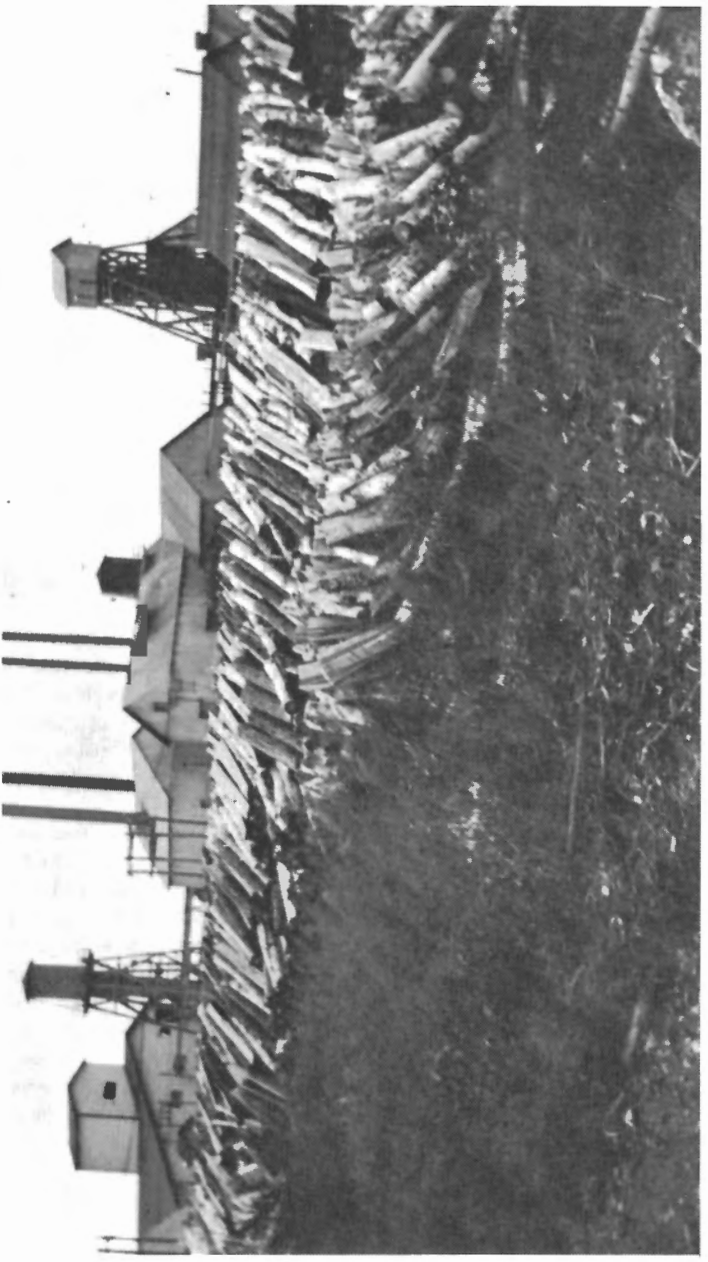


Plate XV. O'Brien Mine, September, 1934. (Public Archives of Canada photo PA-14551)

1.25 million tons of ore; some arsenic was also recovered. The property is being re-opened (1973) by Darius Gold Mines.

The mine is reached by a road, $\frac{1}{2}$ mile long, leading north from Highway 59 at Mile 92.9.

Refs.: 11 p. 47-52; 17 p. 809-811; 33 p. 197-199; 51 p. 49-55; 118 p. 41; 229 p. 1

Maps (T): 32 D/1W Malartic
(G): 399A Cadillac area, Cadillac Township, Quebec (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 93.2 Cadillac, at junction Rapide VII Road.

94.8 Junction road to Wood Cadillac, Central Cadillac mines.

Wood Cadillac Mine, Central Cadillac Mine

NATIVE GOLD, PYRITE, ARSENOPYRITE, TOURMALINE, SCHEELITE

In iron-formation and in veins cutting volcanic tuffs

The two mines are about 350 yards apart; they share an orebody associated with a band of iron-formation. Two types of ore were formerly mined from the property. One was a sulphide ore consisting of pyrite and native gold in iron-formation, the other consisted of quartz veins containing pyrite, arsenopyrite, tourmaline, scheelite, and native gold in tuff. Some coarse gold was encountered during mining operations, but most of it was very fine. Scheelite generally occurred as large crystals. Specimens of calcite obtained from the dumps fluoresce a vivid pink when exposed to "short" ultraviolet rays. The iron-formation is a banded rock containing finely granular magnetite.

The mines were originally operated by Wood Cadillac Mines Limited and by Central Cadillac Mines Limited; from 1945 to 1949 the properties were worked jointly by Central Cadillac Mines Limited (name later changed to Consolidated Central Cadillac Mines Limited). Production began at both mines in 1939. From then until operations closed at the Central Cadillac Mine in 1943, some 31,030 ounces of gold were recovered from 204,565 tons of ore milled; the mine was serviced by two shafts reaching depths of 200 feet and 600 feet respectively. When production was suspended in 1942 at the Wood Cadillac Mine, the total recovery amounted to 27,113 ounces of gold from some 180,000 tons of ore treated; there was some additional production from 1947 to 1949. Silver and scheelite were also recovered. The Wood Cadillac Mine was serviced by a three-compartment shaft from which underground development extended to a depth of 1,000 feet; the mill had a capacity of 400 tons per day.

Access to the Wood Cadillac Mine is via a road 0.4 mile long leading north from Highway 59 at Mile 94.8; the Central Cadillac Mine is about 350 yards west of Wood Cadillac Mine.

Refs.: 33 p. 200-202; 77 p. 816-821; 200 p. 57

Maps (T): 32 D/1W Malartic
(G): 399A Cadillac area, Cadillac Township, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 95.9 Turn-off (right) to Amm Mine.

Amm (Pandora) Mine

NATIVE GOLD, ARSENOPYRITE, PYRITE, CHALCOPYRITE, SPHALERITE, GALENA, TOURMALINE, MAGNETITE, CALCITE

In sheared greywacke

Native gold occurred in fractures in quartz. The most common mineral occurring in the quartz veins was arsenopyrite. Pyrite was less common and chalcopyrite, sphalerite, and galena were relatively rare. The dumps provide specimens of: quartz containing black acicular tourmaline crystals, magnetite as a constituent in black banded iron-formation, pink to white calcite that fluoresces pink when exposed to "long" ultraviolet rays, and arsenopyrite and pyrite.

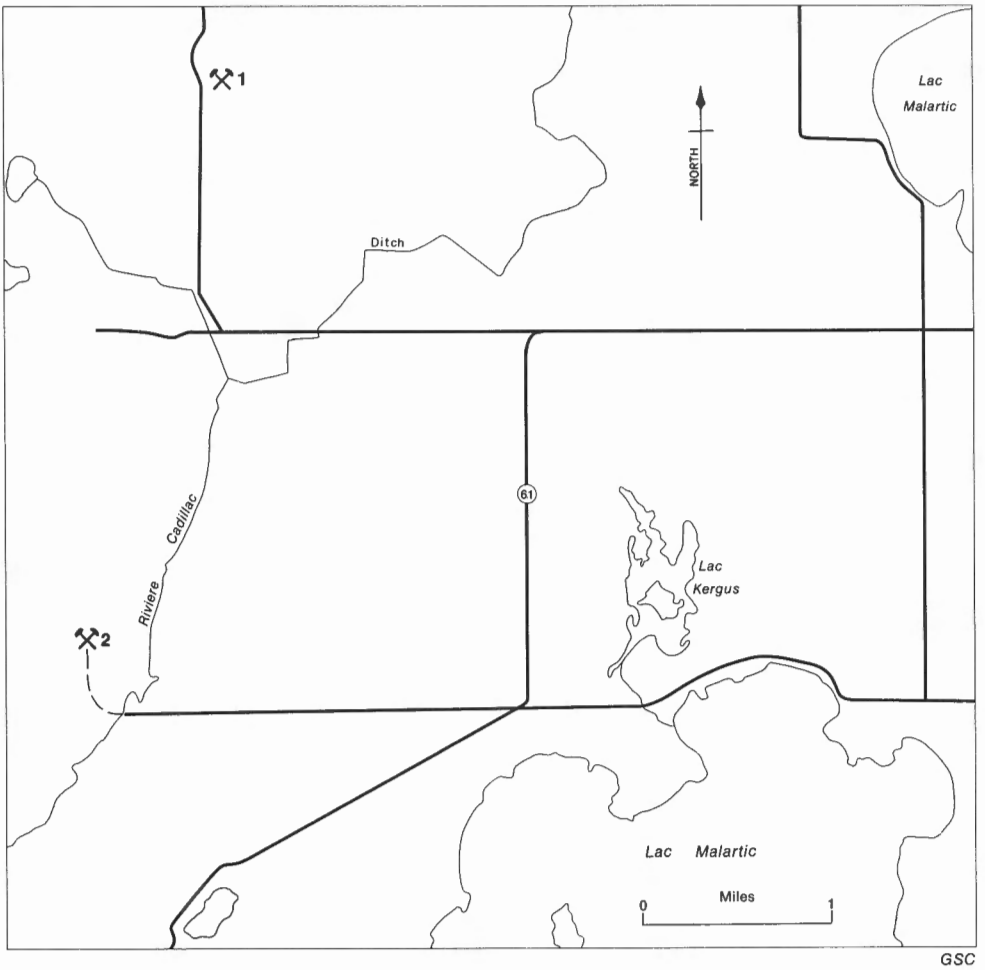
Gold-bearing veins were located on this property as a result of a program of exploration and diamond drilling undertaken by Amm Gold Mines Limited in 1936. A shaft was sunk to a depth of 525 feet and a 150-ton mill commenced operations in 1939. Ore obtained from the mine in 1939 and 1940 yielded 9,296 ounces of gold from 74,138 tons of ore milled. In 1940, the property was acquired by Pandora Limited, which continued to use the Amm mill for treatment of ore from its property located to the northeast.

The Amm Mine is located 0.1 mile south of Highway 59 at Mile 95.9.

Refs.: 33 p. 204-206

Maps (T): 32 D/1W Malartic
(G): 399A Cadillac area, Cadillac Township, Quebec (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 101.5 Junction Highway 61 at Rivière Héva. Highway 61 provides access to the following mines: Moly Hill Mine, Marbridge Mine, New Formaque Mine, Fontana Mine, Claverny Mine, New Goldvue Mine, North Trinity Mine, the mines at Joutel (Joutel Mine, Mines de Poirier Mine, and Eagle Mine), and the mines at Matagami (Orchan Mine, Mattagami Lake Mine, and New Hosco Mine). The description of these mines follow. Visits to operating mines are restricted.



1. Marbridge Mine; 2. Moly Hill Mine.

Map 7. La Motte area.

Moly Hill Mine

MOLYBDENITE, BISMUTHINITE, BISMUTITE, WULFENITE, ACTINOLITE, QUARTZ CRYSTALS, CHLORITE, MICA

In pegmatite

Molybdenite occurs as well-formed hexagonal crystals forming rosettes in white to colourless quartz and in pegmatite. Bismuthinite, as slender crystals and small masses, is associated with the molybdenite. Yellow bismutite was noted as a coating on quartz and on molybdenite, and wulfenite, as a white coating on quartz. Other minerals identified from the deposit are: actinolite, as dark green prismatic aggregates; colourless tiny crystals of quartz in massive quartz, dark green chlorite, and silvery grey mica.

The deposit has been exposed by an open cut on the east side of a prominent white granitic ridge visible for miles from the adjacent countryside. Exploration of the deposit was performed by Dupas Metals Limited in the 1950s, by Utufora Mining Company Limited in 1963, and by Moly Hill Mining Corporation Limited from 1964 to 1968.

Road log from Highway 59:

Mile	0	Junction Highway 61 and Highway 59; proceed north along Highway 61.
	4.1	Junction; turn left onto gravel road.
	4.8	Crossroad; turn left.
	6.1	Moly Hill Mine.

Refs.: 85 p. 9; 100 p. 6; 218 p. 225

Maps (T): 32 D/8E La Motte
(G): 1295 Southwest quarter of La Motte Township, electoral district of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Marbridge Mine

PYRRHOTITE, PYRITE, PENTLANDITE, CHALCOPYRITE, MILLERITE, HEAZLEWOODITE, VIOLARITE, VALERIITE, BORNITE, GERSDORFFITE, SPERRYLITE, MAGNETITE, ILMENITE, MOLYBDENITE, HEXAHYDRITE, GYPSUM, SERPENTINE, TALC, TREMOLITE-ACTINOLITE, EPIDOTE, SOAPSTONE

In serpentinized peridotite

The Marbridge Mine, a former nickel producer, comprised deposits No. 1 and No. 2, $\frac{1}{2}$ mile apart. The ore consisted of massive and disseminated sulphides: the principal

sulphides at the No. 1 deposit were pyrrhotite and pentlandite; at the No. 2 deposit, millerite, pentlandite, and pyrite were the main constituents with millerite accounting for more than 60 per cent of the nickel production. Individual crystals measured up to 6 inches in diameter. Other minerals occurring in the deposits were chalcopyrite, heazlewoodite, violarite, valleriite, bornite, gersdorffite, sperrylite, magnetite, ilmenite, and molybdenite. Secondary minerals including hexahydrite and gypsum occur as encrustations on specimens on the mine dumps; the former occurs as a dull white powder and as light blue botryoidal crusts, the latter as colourless to white platy aggregates. Other minerals found on the dumps are: olive-green massive serpentine; white to light green massive, foliated, and flaky talc; light to dark green prismatic aggregates of tremolite-actinolite; and prismatic crystalline aggregates of epidote. Dark green to almost black sepentinite is extracted from an open cut and shipped to various points in the Arctic for use as a sculpturing stone by the Eskimo. It is commercially referred to as soapstone. The operation is conducted by Mr. R. C. Staveley of Willowdale, Ontario (Pers. comm.; R. C. Staveley).

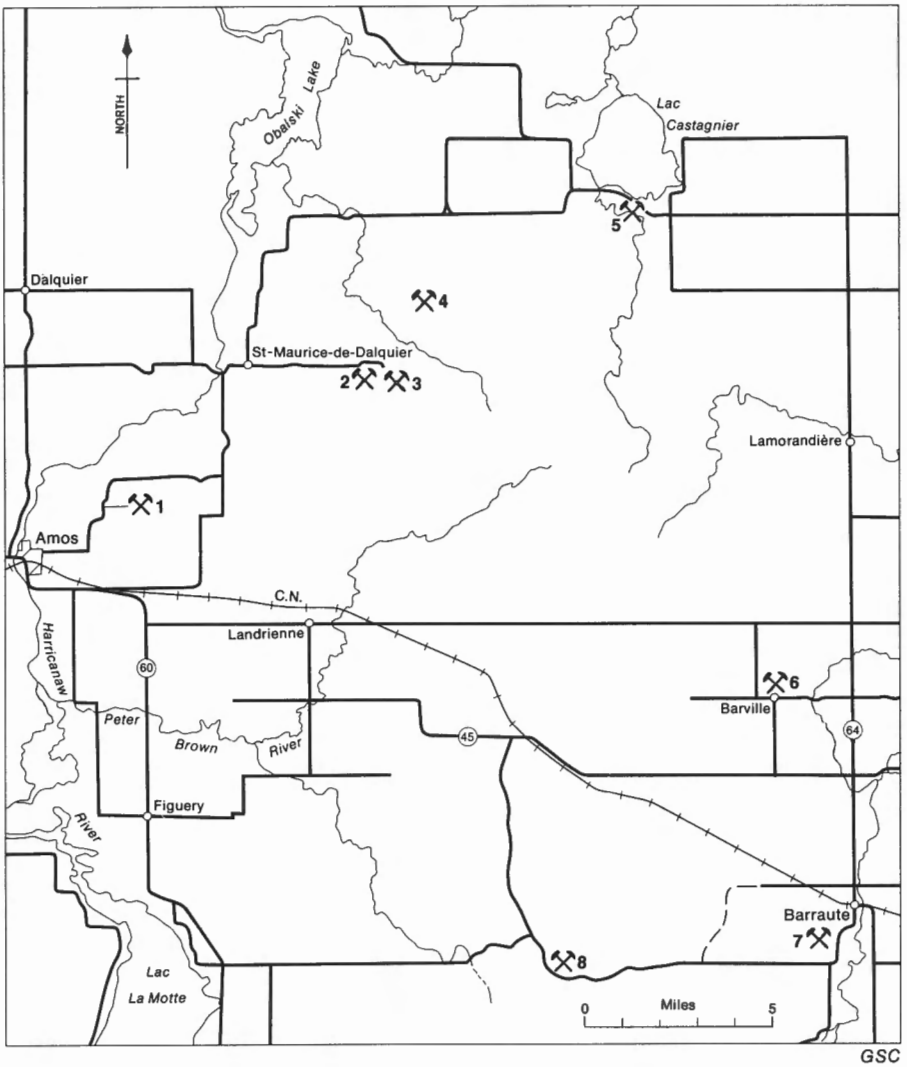
The rusty, massive sulphide-bearing rock was exposed during a log-skidding operation. It was found in May 1957 by Bill Melnik who held the ground for many years as a possible gold prospect. The sulphide orebody was outlined as a result of a program of geophysical surveys and diamond drilling conducted by Marchand Mining Company Limited in 1957. Further exploration was done by Falconbridge Nickel Mines Limited in 1959 and 1960. As a result of an agreement between the two companies, Marbridge Mines Limited was formed in 1960 to develop the deposit. Production began in 1962 as the No. 1 mine; the No. 2 orebody was discovered in 1964. Production to 1968 when operations ceased, amounted to 774, 227 tons of ore grading 2. 28 per cent nickel. The ore was transported to the company's mill at the site of the Canadian Malartic Mine. The underground workings of the No. 1 shaft and winze extend to a depth of 1, 530 feet; No. 2 shaft, sunk to a depth of 774 feet, is located 3, 000 feet southeast of No. 1.

Road log from Highway 59:

Mile	0	Junction highway 61 and 59; proceed north along Highway 61.
	4. 1	Junction; turn left onto gravel road.
	4. 8	Crossroad; road on left leads to Moly Hill Mine. Continue straight ahead.
	6. 8	Junction; turn left.
	7. 2	Junction; turn right.
	8. 5	Junction mine road; turn right.
	8. 6	Marbridge Mine (No. 1); the No. 2 mine is $\frac{1}{2}$ mile to the southeast.

Refs.: 21 p. 529-534; 27 p. 796-805; 48 p. 886-896; 85 p. 7-8; 210 p. 150; 219 p. 224; 220 p. 7; 224 p. 18

Maps (T): 32 D/8E La Motte
(G): 1295 Southwest quarter of La Motte Township, electoral district of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 1, 000 feet)



1. New Formaque Mine;
2. Fontana Mine;
3. Claven Mine;
4. New Goldvue Mine;
5. North Trinity Mine;
6. Barvue Mine;
7. Vendome Mine;
8. Quebec Lithium Mine.

Map 8. Amos - Barraute area.

Maps (G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

New Formaque (Jay) Mine

CHALCOPYRITE, PYRITE, SPHALERITE, SELENIUM, BISMUTH, MALACHITE, CHRYSOCOLLA, LIMONITE

In sericite schist

Chalcopyrite occurs abundantly in quartz and in sericite schist. Pyrite and sphalerite are also present; selenium has been reported from a chalcopyrite-rich sulphide zone, and selenium and bismuth from a sphalerite zone. The secondary minerals, malachite, chrysocolla, and limonite have been reported from the deposit.

The mine produced a small amount of copper several years ago. The chalcopyrite mineralization was discovered in August, 1915 by Joseph Tremblay. Underground development was done by the Campbell and Forbes syndicate in 1916, by North Country Mines Limited in 1928, and by Jay Copper-Gold Mines Limited from 1926 to 1929. Two shallow shafts were sunk in the earlier operations; the Jay Copper-Gold Company sank a shaft to a depth of 525 feet and made a shipment of 32 tons of ore containing 5 per cent copper and 4 ounces of silver per ton. Between 1951 and 1957, New Formaque Mines Limited carried out a campaign of diamond drilling, constructed a head-frame, and brought in some mine buildings from the Buffadison Mine at Val d'Or. The property is held by Amos Mines Limited.

The mine is located northeast of Amos.

Road log from Amos:

Mile	0	Amos, at junction Highway 45 and Highway 61 (west end of bridge of Harricanaw River); proceed east along Highway 45.
	0.35	Highway 45 turns right; continue straight ahead on Highway 395.
	0.8	Junction; turn left.
	1.0	Junction; turn right.
	2.2	Junction; turn left.
	3.7	Junction; turn right.
	4.2	Junction; proceed onto road on left.
	4.5	New Formaque Mine.

Refs.: 33 p. 103; 114 p. 27-28; 145 p. 55-56; 171 p. 49-52

Maps (T): 32 D/9E Amos

Maps (G): 1345 Amos-Barraute area, Amos sheet, County of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 2,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Fontana Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, GALENA, SPHALERITE, ARSENOPYRITE, QUARTZ CRYSTALS

In sheared granodiorite and diorite

Some very spectacular pockets of native gold were encountered in the course of early exploration of this deposit in 1937. The gold was associated with pyrite and with lesser amounts of chalcopyrite, galena, and sphalerite in quartz veins in silicified and carbonatized shear zones in the intrusive rocks. Arsenopyrite was sparingly present in the veins. Small quartz crystals occur in vugs in massive milky quartz on the dumps.

The discovery of this deposit in 1934 by E. St. Onge and J. Bernard was the first gold discovery in the area. It aroused prospecting interest in the district, and subsequently several other gold showings were located. Underground exploration of the Fontana deposit was undertaken in 1937 by Fontana Gold Mines Limited. The high-grade ore uncovered at the surface did not persist at depth and underground exploration from a shaft, 295 feet deep was discontinued in 1939. Additional surface exploration work was done in 1945 and 1946 by Fontana Mines (1945) Limited. A bulk sample of about 60 tons assayed slightly more than 0.22 ounce per ton.

The mine is located on the slope of a prominent ridge surrounded by muskeg.

Road log from Amos:

Mile	0	Amos, at junction highways 45 and 61 (west end of bridge over Harricanaw River); proceed east along Highway 45.
	0.35	Junction; continue straight ahead along Highway 395. Highway 45 turns right.
	3.7	Turn-off (right) to Formaque Mine; continue straight ahead.
	7.5	Junction; continue along Highway 395 which bends to left.
	10.3	Junction; continue along Highway 395.
	11.2	St. Maurice-de-Dalquier, at church; continue straight ahead (Highway 395 turns left).
	14.3	Fontana Mine on right.

Refs.: 33 p. 104, 105-106; 127 p. 16-17; 128 p. 34-35; 147 p. 97; 171 p. 61

Maps (T): 32 C/12W Landrienne
(G): 1346 Amos-Barraute area, Landrienne sheet, county of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 2,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Claverny Mine

The mineralization in this deposit is similar to that of the adjacent Fontana deposit.

The gold-bearing veins on this property were discovered by Leo Ouellette of Amos at about the time of the discovery of the Fontana deposit. Surface exploration was initiated by Claverny Gold Mines Limited in 1937 followed by underground development in 1938. The development consisted of an inclined shaft sunk to a depth of 216 feet, and a prospect shaft, 62 feet deep. In 1939, a 50-ton mill was installed and a recovery of 162.5 ounces of gold was obtained from 700 tons of ore and concentrates. In 1946, an adit was driven 90 feet in a southerly direction at the base of a hill due north of the prospect shaft which had been sunk on the discovery vein.

The mine is located east of the Fontana Mine and on the north slope of a ridge.

Road log from Amos:

Mile 0 Junction highways 45 and 61; proceed east along Highway 45 and follow road log to Fontana Mine.

14.3 Fontana Mine on right; continue straight ahead

14.8 Junction; the prospect shaft is about 300 yards east of this junction, and the main shaft is about 300 yards south of the prospect shaft.

Refs.: 33 p. 104, 106; 127 p. 16; 128 p. 35; 147 p. 97; 171 p. 54-55

Maps (T): 32 C/12W Landrienne
(G): 1346 Amos-Barraute area, Landrienne sheet, county of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 2,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Goldvue (Central Duverny) Mine

NATIVE GOLD, PYRITE, SPHALERITE

In diorite dyke that intruded volcanic rocks

This deposit was formerly developed as a gold prospect. Native gold was associated with pyrite and some sphalerite in quartz veins occupying fractures in diorite. The pyrite occurred as crystals measuring up to $\frac{1}{4}$ inch in diameter.

The deposit was staked in 1935 by the Bouvier brothers, Cesar, George and Marshall following their discovery of gold-bearing quartz veins in an outcrop on a flat, low hill surrounded by a swampy area. The property was known locally as the '1200 acres'. Early surface exploration of the deposit was done by Dubuisson Mines Limited in 1936, and by Central Duverny Gold Mines Limited in 1937. Underground exploration was undertaken in 1946 by Goldvue Mines Limited which sank a 3-compartment shaft to a depth of 1, 250 feet. The highest values were obtained from a bulk sample that averaged 0. 22 ounce of gold per ton for a length of 530 feet. Operations were suspended in 1953.

Road log from Amos:

Mile 0 Amos, at junction highways 61 and 45; follow road log toward Fontana Mine.

11. 2 St-Maurice-de-Dalquier, at church; continue along Highway 395 which turns left (north).

18. 7 Junction mine road; turn right.

20. 7 Junction; continue straight ahead.

23. 1 Goldvue Mine.

Refs.: 10 p. 75; 33 p. 104-105; 128 p. 36-37; 171 p. 62-63

Maps (T): 32 C/12W Landrienne
(G): 1346 Amos-Barraute area, Landrienne sheet, county of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 2, 000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

North Trinity Mine

CHALCOPYRITE, SPHALERITE, PYRITE

In siliceous and chloritic pyroclastic rocks

The sulphides occur in lens-shaped zones in the host rock.

The deposit was explored and developed between 1951 and 1957 as a copper-zinc prospect. Most of the work was done in the early 1950s by North Trinity Mining Corporation Limited. Some of the ore lies beneath lac Castagnier. Development consisted of several trenches and a shaft, 430 feet deep. The deposit was estimated to contain 147, 000 tons of ore grading 1. 18 per cent copper and 0. 74 per cent zinc.

The mine is located on the south shore of lac Castagnier and on the north side of Highway 395 at a point 7. 4 miles beyond (east of) the turnoff to the Goldvue Mine.

Refs.: 165 p. 202; 171 p. 64

Maps (T): 32 C/12W Landrienne
(G): 1347 Amos-Barraute area, Barraute sheet, county of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 2,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Joutel Mine

PYRITE, CHALCOPYRITE, SPHALERITE, PYRRHOTITE

In altered rhyolite

The deposit consists of massive sulphides of which pyrite is the most abundant constitutent. Chalcopyrite, sphalerite, and pyrrhotite are associated with the pyrite.

The deposit was discovered by Prospectors Airways Company Limited in 1959 when the then-remote Joutel district was the scene of intense prospecting activity; this and other deposits were discovered by aerial and ground geophysical surveys followed by diamond drilling. Development of the deposit was undertaken in 1962 by Joutel Copper Mines Limited, and ore shipments to the nearby Mines de Poirier mill began in February, 1967. Copper was produced until August, 1972 when the mill circuit was converted to treat zinc ore. Ore reserves at the end of 1972 were estimated at 72,600 tons of copper averaging 2.02 per cent copper, and 144,600 tons of zinc averaging 11.18 per cent zinc. The mine is serviced by a 3-compartment shaft, 1,228 feet deep.

The mine is located at Joutel, 10 miles west of Highway 61 at Mile 72 (mileage begins at Amos).

Refs.: 115 p. 59; 116 p. 18; 117 p. 59; 214 p. 163; 216 p. 175-176; 225 p. 172; 228 p. 177-178

Maps (T): 32 E/SE Mistawak Lake
(G): 1563 Turgeon-Matagami area, Abitibi-west and Abitibi-east counties (Que. Dept. Natur. Resour., 1 inch to 4 miles)
1600-111 Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mines de Poirier Mine

PYRITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE

In argillite tuff

The ore consists of pyrite with pyrrhotite, chalcopyrite, and sphalerite

The deposit was discovered as a result of an intensive program of geophysical surveys and diamond drilling conducted by Rio Tinto Canadian Exploration Limited in 1959-1960. Rio Algom Mines Limited started underground exploration in 1963 with the sinking of a

shaft. Milling began in 1966. The mine originally produced copper and zinc concentrates; since 1969 only copper has been recovered. The mine has been developed to a depth of 2, 850 feet opening 18 levels.

The mine is located 1½ miles southwest of Joutel which is connected by a 10-mile road to Highway 61 at Mile 72.

Refs.: 116 p. 24-25; 119 p. 149-150; 225 p. 283-284

Maps (T): 32 E/SE Mistawak Lake
(G): 1563 Turgeon-Matagami area, Abitibi-west and Abitibi-east counties (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Eagle Mine

PYRITE, PYRRHOTITE, NATIVE GOLD

In acid volcanics and pyroclastic rocks

Gold is associated with pyrite which occurs with pyrrhotite as disseminations and as massive aggregates.

The orebody carrying high values in copper and minor quantities of silver, gold, and zinc was outlined as a result of a diamond drilling campaign conducted by Equity Exploration Limited in 1963. A shaft was sunk to a depth of 1, 860 feet in 1969 by Eagle Gold Mines Limited which became, in 1972, Agnico-Eagle Mines Limited. A mill was under construction at the property in 1972 and production is scheduled to begin late in 1973. The ore reserves are estimated at 3, 151, 658 tons averaging 0. 29 ounce gold per ton.

The mine is located north of Joutel; access is by a 3-mile road leading from the Joutel Road that leaves Highway 61 at Mile 72. (Mileage on Highway 61 begins at Amos.)

Refs.: 119 p. 67; 218 p. 126; 225 p. 20-22

Maps (T): 32 E/SW Mistawak Lake
(G): 1563 Turgeon-Matagami area, Abitibi-west and Abitibi-east counties (Que. Dept. Natur. Resour., 1 inch to 4 miles)
1600-111 Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Orchan Mine

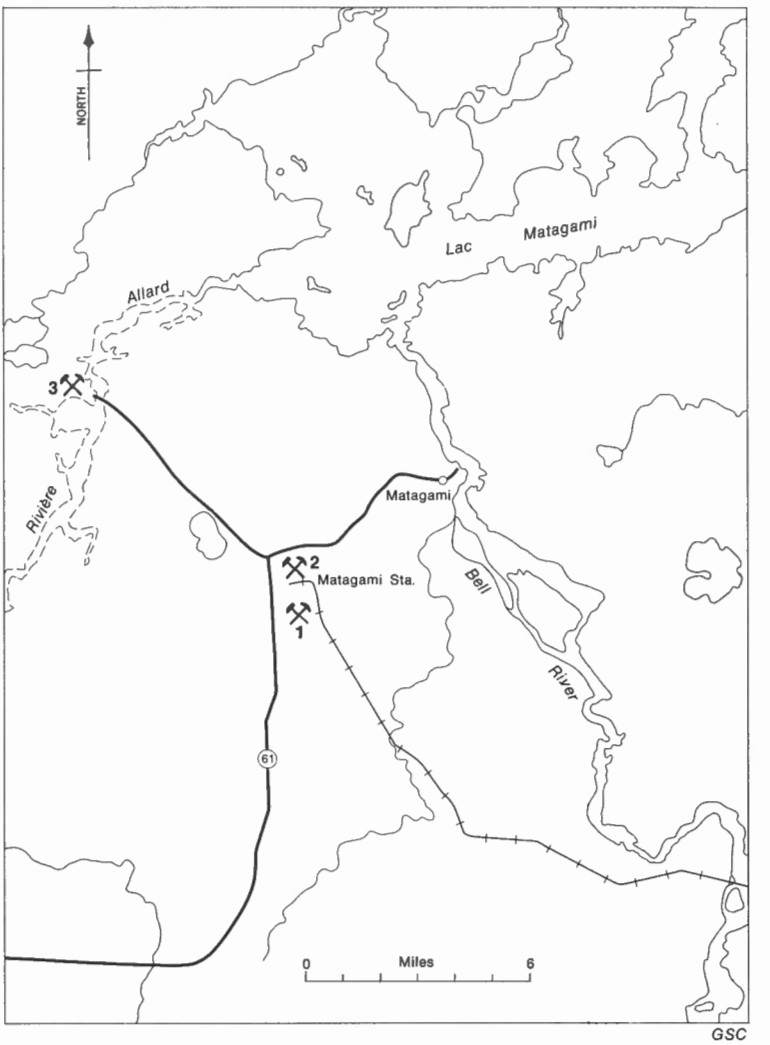
PYRITE, SPHALERITE, PYRRHOTITE, CHALCOPYRITE, MAGNETITE, GALENA, EPIDOTE

In tuffaceous sedimentary rocks

The mine produces zinc, copper, silver and gold. Three copper-zinc orebodies occur on the property. The ore is composed of massive sulphides: pyrite, dark brown sphalerite, pyrrhotite, and chalcopyrite with minor amounts of magnetite and galena. It occurs in a band of sedimentary rocks consisting of chert, carbonate, and argillite. Associated minerals include dark green chlorite and epidote in pink to white calcite.

This deposit is one of several that were discovered in 1957 in the lac Matagami area where intensive prospecting began in 1956. The ore deposits were concealed by overburden and were located by geophysical methods. This deposit was discovered and developed by Orchan Mines Limited. Development consists of an open pit and a shaft opening 10 levels, the deepest at 1,584 feet. A 1900-ton concentrator has been in operation since 1963. At the end of 1972, ore reserves were estimated at 1,897,000 tons averaging 9 per cent zinc, 1.2 per cent copper, 0.93 ounce silver and 0.1 ounce gold per ton.

Plate XVI. Orchan Mine. (G. S. C. photo 161442)



1. Orchan Mine; 2. Mattagami Lake Mine; 3. New Hosco Mine.

Map 9. Mattagami area.

The mine is located 1 mile east of Highway 61 at Mile 106.7, about 7 miles from Matagami.

Refs.: 113 p. 11; 116 p. 15; 132 p. 15; 135 p. 55-61; 225 p. 256; 228 p. 263-264

Maps (G): 32 F Waswanipi
(T): 1563 Turgeon-Matagami area, Abitibi-west and Abitibi-east counties (Que. Dept. Natur. Resour., 1 inch to 4 miles)
1600-111 Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mattagami Lake Mine

SPHALERITE, PYRITE, PYRRHOTITE, CHALCOPYRITE, GALENA, ARSENOPYRITE, MAGNETITE, TALC, TREMOLITE, SERPENTINE, ALTAITE, MATTAGAMITE, TELLURANTIMONY, COBALTITE, HESSITE

In tuffaceous sedimentary rocks

The deposit is similar to that at the Orchan Mine. Massive sulphides including dark brown sphalerite, pyrite, pyrrhotite, chalcopyrite, galena, and arsenopyrite comprise the orebody. Associated minerals are magnetite, talc, tremolite, serpentine, chlorite, carbonate, and quartz. Two new telluride minerals, originally described from this deposit, occur in a telluride zone consisting of altaite with less abundant chalcopyrite, sphalerite, cobaltite, pyrrhotite, pyrite, and hessite in talc or chlorite gangue. The new minerals are mattagamite and tellurantimony; the former occurs as blade-like grains in altaite and as rims on pyrrhotite and chalcopyrite, the latter as lath-shaped crystals in altaite. Both are visible only with the aid of a microscope. The telluride zone occurs at the 825-foot and the 870-foot levels.

The deposit was located in 1957 during a program of geophysical prospecting conducted in the area in 1956-1957 by the Mattagami Syndicate. In 1958, Mattagami Lake Mines Limited was formed to explore and develop the deposit. A 6-compartment shaft was sunk to a depth of 1,185 feet in 1960 and production commenced in 1963. The mill has a capacity of 3,850 tons per day. Zinc, copper, gold and silver are recovered from the ore. At the end of 1972, reserves were estimated at 14,661,927 tons averaging 8.9 per cent zinc, 0.67 per cent copper, 0.012 ounce gold per ton and 1.08 ounces silver per ton.

The mine is located 0.4 mile east of Highway 61 at Mile 107, about 7 miles from Matagami.

Refs.: 116 p. 14-15; 132 p. 14-15; 135 p. 42-55; 156 p. 55-57; 225 p. 201-202; 228 p. 208

Maps (T): 32 F Waswanipi
(G): 1563 Turgeon-Matagami area, Abitibi-west and Abitibi-east counties (Que. Dept. Natur. Resour., 1 inch to 4 miles)
1600-111 Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

New Hosco Mine

PYRITE, CHALCOPYRITE, SPHALERITE, PYRRHOTITE, MAGNETITE

In chlorite tuff and agglomerate

Copper and zinc were recovered from this mine from 1963 until 1970. The massive sulphide ore contained pyrite, chalcopyrite, sphalerite, and pyrrhotite; magnetite, epidote, and calcite were associated with the sulphides.

The deposit was located in 1958 by drilling an anomaly that was indicated by geophysical surveys conducted by New Hosco Mines Limited which brought the mine to production five years later. It was developed by an open pit and by a shaft to a depth of 1,060 feet. The ore was treated at the Orchan mill.

The mine is located on the west shore of Allard River, northwest of Matagami. Access is via a 6.5-mile road leading west from Highway 61 at Mile 107.7.

Refs.: 116 p. 8-9; 133 p. 10-11; 135 p. 65-71; 225 p. 238

Maps (T): 32 F Waswanipi
(G): 1563 Turgeon-Matagami area, Abitibi-west and Abitibi-east counties (Que. Dept. Natur. Resour., 1 inch to 4 miles)
1600-111 Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

The descriptions of occurrences along Highway 59 follows; the main road log is resumed.

Mile 101.5 Junction Highway 61 and Highway 59.

104.5 Junction road to West Malartic Mine.

West Malartic Mine

PYRITE, ARSENOPYRITE, PYRRHOTITE, NATIVE GOLD, MAGNETITE, CHALCOPYRITE, MOLYBDENITE, TOURMALINE

In sheared volcanic rocks

Pyrite was the chief metallic mineral in this deposit; some arsenopyrite and pyrrhotite were associated with it. These minerals occur sparsely in quartz on the mine dump. Magnetite, chalcopyrite, molybdenite, and tourmaline have been reported from this deposit.

The property was staked in the mid-1930s by J. W. Davis for Pan-Canadian Gold Mines, Limited, which subsequently explored it by surface cuts and a shaft. Native gold was obtained by panning weathered schist from some of the trenches. In 1939, West Malartic Mines Limited acquired the property, later sank a shaft to a depth of 1,231 feet, and obtained a production of 305,295 tons of ore valued at $1,353,778 from 1942 until the end of 1945 when operations were terminated. A 300-ton mill operated at the mine-site.

Access is via a road leading south from Highway 59 at Mile 104.5 for a distance of 2.5 miles to the Canadian National Railway line; a trail leads 500 yards from the railway to the mine.

Refs.: 33 p. 210; 52 p. 103-105; 198 p. 327

Maps (T): 32 D/1E Malartic
(G): 572A Malartic (Sheet 1) Malartic, Fournière, Cadillac and Surimau Townships, Abitibi County, Quebec (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 111.5 Malartic, at Abitibi Avenue.

Canadian Malartic Mine

PYRITE, NATIVE GOLD, CHALCOPYRITE, GALENA, SPHALERITE, TOURMALINE, FLUORITE, RUTILE, GARNET, MOLYBDENITE, SCHEELITE, SELENITE, HEMATITE

In silicified greywacke and in porphyry

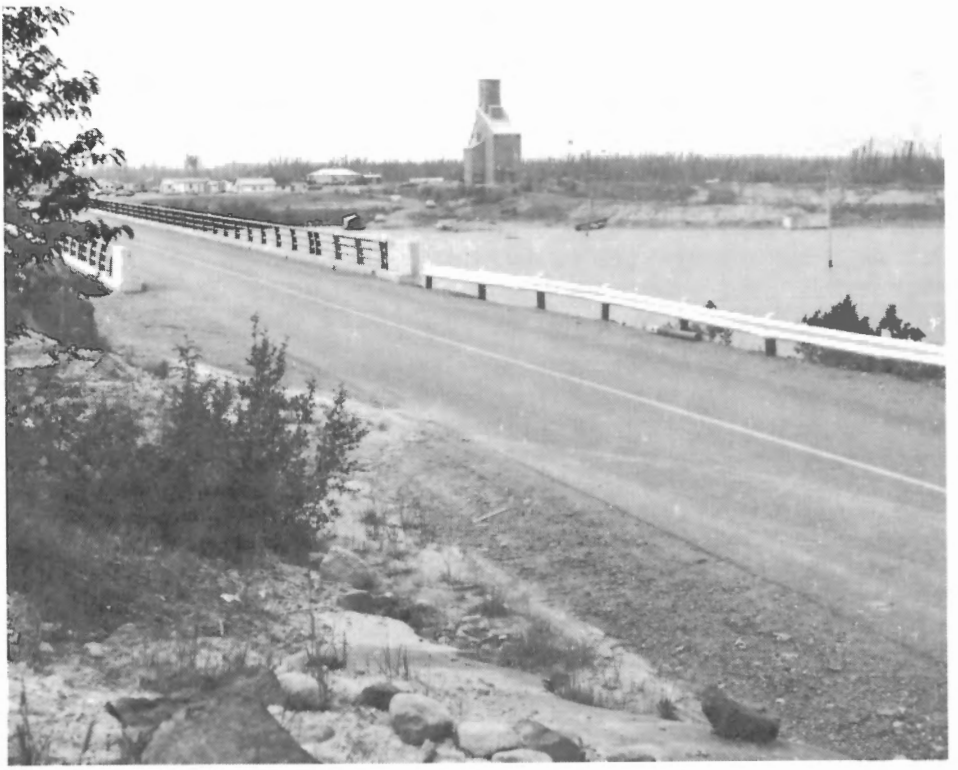


Plate XVII. New Hosco Mine on shore of Allard River. (G. S. C. photo 161441)

Two types of ore comprised this deposit. In one, native gold was associated with pyrite in quartz stringers in greywacke; chalcopyrite, galena sphalerite and tourmaline were present in small amounts. The other type of ore consisted of porphyry cut by gold-bearing quartz veins that contained mica, chlorite, pyrite, chalcopyrite, purple fluorite, black rutile, tourmaline, garnet, molybdenite, scheelite, selenite, and specular hematite along with visible gold. The gold in the greywacke ore had a higher silver content than the ore in the porphyry.

The property was staked in 1923 by St. Barbe Sladen, H. S. Kennedy, and J. C. Carrol. Early exploration was done by Porcupine Goldfields Development and Finance Company (1924-1925), and by Malartic Gold Mines Limited (1925-1929). From 1933 until 1965, when mining and milling ceased, the mine was operated by Canadian Malartic Mines Limited. Total production from 1935 until the mine was closed amounted to a recovery of 1, 076, 125 ounces of gold and 645, 466 ounces of silver from 10, 947, 270 tons of ore milled. The property was developed by three shafts, the deepest extending to 1, 625 feet.

The mine is located in Malartic, 0.4 mile south of the junction of Highway 59 and Abitibi Avenue.

Refs.: 30 p. 278-282; 33 p. 213-217; 52 p. 68-71; 214 p. 63

Maps (T): 32 D/1E Malartic
(G): 573A Malartic (Sheet 2), Malartic and Fournière Townships, Abitibi County, Quebec (G. S. C., 1 inch to 1, 500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 112.6 East Malartic Mine on right; Barnat Mine on left.

East Malartic Mine

PYRITE, NATIVE GOLD, MAGNETITE, HEMATITE, PYRRHOTITE, GALENA, CHALCOPYRITE, SPHALERITE, MOLYBDENITE, RUTILE, TOURMALINE, GRAPHITE, SCHEELITE, BERYL, BIOTITE, FELDSPAR

In diorite, greenstone, greywacke

The ore occurs in quartz veins in diorite, greenstone and greywacke. Visible gold occurs sparingly. Pyrite, in massive form and as aggregates of grains and crystals, is the most abundant mineral. Small amounts of magnetite, specular hematite, pyrrhotite, galena, chalcopyrite, sphalerite, and molybdenite are present. Pegmatitic quartz veins in diorite and greywacke contain rutile, tourmaline, graphite, scheelite, beryl, biotite, and feldspar.

The gold-bearing veins were discovered in 1934 by John Partaven for East Malartic Gold Mines Limited, two years after the property was re-staked by J. P. Norrie and L. K. Coffin, and ten years after it had originally been staked. Shaft-sinking began in 1936. Development consists of four surface shafts and one internal shaft that reaches a depth of 4, 941 feet. Production from 1938 to the end of 1971 totalled 2, 407, 549 ounces of gold and 468, 771 ounces of silver from 15, 396, 494 tons of ore milled and valued at $88, 314, 736.

The mine and mill are located on the south side of Highway 59 at Mile 112.6. Since the mine is in operation, visits are restricted.

Refs.: 33 p. 220-226; 52 p. 81-88; 225 p. 120

Maps (T): 32 D/1E Malartic
(G): 573A Malartic (Sheet 2), Malartic and Fournière Townships, Abitibi County, Quebec (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Barnat (National Malartic) Mine

PYRITE, CHALCOPYRITE, PYRRHOTITE, MICA

In carbonatized volcanic rock

The mineralization consisted of finely granular pyrite with minor amounts of chalcopyrite and pyrrhotite. Chlorite and bright green chrome-bearing mica formed lenses and streaks in the rock.

Sulphide mineralization was found on the property by trenching in 1934. Underground exploration by a shaft that reached a depth of 725 feet was done by National Malartic Gold Mines Limited in 1941-1942; operations were suspended during the remainder of World War II. In 1948, the property was acquired by Barnat Mines Limited; the shaft was deepened to 2,385 feet and production started in the same year. Operations ceased in 1970.

The mine is on the north side of Highway 59 at Mile 112.6.

Refs.: 33 p. 219; 52 p. 75-76; 196 p. 123; 201 p. 24-25; 221 p. 44-45

Maps (T): 32 D/1E Malartic
(G): 573A Malartic (Sheet 2) Malartic and Fournière Townships, Abitibi County, Quebec (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 115.8 Junction road (on left) to Camflo Mine.

Camflo Mine

NATIVE GOLD, PYRITE, SCHEELITE, FLUORITE, TELLURIDES

In feldspar porphyry

Small specks of native gold occur in quartz, in fractures in porphyry, and on pyrite crystals. Scheelite is an uncommon constituent of the ore, and tellurides are rare. Calcite and fluorite are also present.

This mine began production in 1965, two years after gold ore was discovered by diamond drilling on the property. Mining is from a shaft, 2,307 feet deep. The mine is equipped with a 1,000-ton mill; it produces gold and silver and is operated by Camflo Mines Limited. To the end of 1972, the total recovery of precious metals amounted to 673,241 ounces of gold and 9,176 ounces of silver from 2,683,983 tons of ore and valued at $28,509,258.

The mine is 1.6 miles north of Highway 59 at Mile 115.8. As it is currently in operation visits are restricted; enquiries should be directed to the Tourist Bureau at Val d'Or.

Refs.: 94 p. 1406-1408; 225 p. 61; 228 p. 59-60

Maps (T): 32 D/1E Malartic
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)

Mile 117.3 Junction road (on right) to Malartic Gold Fields Mine.

Malartic Gold Fields Mine

PYRITE, ARSENOPYRITE, NATIVE GOLD, TOURMALINE, CHALCOPYRITE, GALENA

In diorite intruding talc-chlorite schist

The mineralization was associated with white to dark greyish blue quartz. Tourmaline, pyrite, arsenopyrite, and chalcopyrite were the most abundant minerals; galena and native gold were less common. Most of the gold was associated with pyrite in diorite.

Malartic Gold Fields Limited located the orebody in 1938 after diamond drilling an area where gold-bearing float was earlier found. Production began in 1939 and ended in 1965. The mine was serviced by two shafts, the deepest at a depth of 2,700 feet. The mill currently operates on a custom basis treating ore from other mines.

The mill is 0.6 mile south of Highway 59 at Mile 117.3. One shaft is near the mill, the other about $\frac{1}{2}$ mile east of it.

Refs.: 33 p. 228-230; 53 p. 868-870; 225 p. 197

Maps (T): 32 D/1E Malartic
32 C/4W Val d'Or
(G): 573A Malartic (Sheet 2) Malartic and Fournière Townships, Abitibi County, Quebec (G. S. C., 1 inch to 1,500 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 118.6 Junction gravel road on left.

Marban (Marbenor Malartic) Mine

PYRITE, NATIVE GOLD, CHALCOPYRITE

In quartz veins in sheared volcanic rocks

A program of diamond drilling was carried out on this property by Marbenor Malartic Mines Limited between 1941 and 1952 after two large boulders of auriferous diorite and albitite float were found on the property. Three oreshoots were outlined. The property was inactive until 1960 when shaft-sinking was started by Marban Gold Mines Limited. Production from 1061 to the end of 1971 resulted in a recovery of 274, 863 ounces of gold and 26, 316 ounces silver from 1, 726, 136 tons of ore which was treated at the Malartic Gold Fields mill. The mine was serviced by a shaft, 825 feet deep.

The mine is located 1.1 miles north of Highway 59 at Mile 118.6.

Refs.: 69 p. 39-41; 118 p. 80; 201 p. 125; 210 p. 153; 225 p. 198-199

Maps (T): 32 C/4W Val d'Or
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)

Norbenite Malartic Mine

PYRITE, CHALCOPYRITE, NATIVE GOLD, SPHALERITE, CHLORITE, ACTINOLITE, CALCITE, CLINOZOISITE

In sheared diorite and syenite

Pyrite, chalcopyrite, sphalerite (rare), and native gold occurred in quartz stringers that cut the sheared rocks, and in the host rocks. Dumps near the shaft contain specimens of coarse flaky chlorite in calcite, actinolite as massive aggregates of slender prisms, small cubes of pyrite in quartz and in calcite, and prismatic aggregates of dark yellowish green clinozoisite in white quartz. The calcite fluoresces pink under ultraviolet rays.

The deposit was brought into production in 1959 following a program of diamond drilling and underground exploration initiated in 1943 by Norbenite Malartic Mines Limited (name changed in 1949 to Malartic Mines Limited). Ore was hoisted via a 1, 050-foot shaft, and was processed at the Malrtic Gold Fields mill. When mining ceased in 1966, the total recovery of precious metals amounted to 145, 610 ounces of gold and 15, 189 ounces of silver from 1, 139, 443 tons of ore milled. The property was acquired by Willroy Mines Limited in 1966.

The mine is on the shore of Keriens Brook, north of the Marban Mine.

Road log from Highway 59 at Mile 118.6:

Mile 0 Proceed north onto gravel road.

1.1 Marban Mine on right.

1.8 Junction; continue straight ahead.

2.3 Junction, continue straight ahead. Road on left leads to Malartic Hygrade Mine (description follows).

2.4 Norbenite Malartic Mine.

Refs.: 28 p. 65-67; 118 p. 259; 218 p. 347

Maps (T): 32 C/4W Val d'Or
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)

Malartic Hygrade Mine

NATIVE GOLD, PYRITE

In quartz veins cutting volcanic rocks

The ore at this former producer was of an exceptionally high grade. During its short period of production (March 1962 to April 1963) ore valued at approximately $951,131 was treated at the Malartic Gold Fields mill. The deposit was mined by Malartic Hygrade Gold Mines Limited from a shaft, 430 feet deep opening two levels.

Access to the mine is via a road, 2.4 miles long, leading west from Mile 2.3 on the road to the Norbenite Malartic Mine.

Refs.: 118 p. 179; 119 p. 114-115; 214 p. 191-192

Maps (T): 32 D/1E Malartic
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)

Mile 121.4 Junction road on left to Kiena Mine

Kiena Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, SPHALERITE, GALENA, PYRRHOTITE

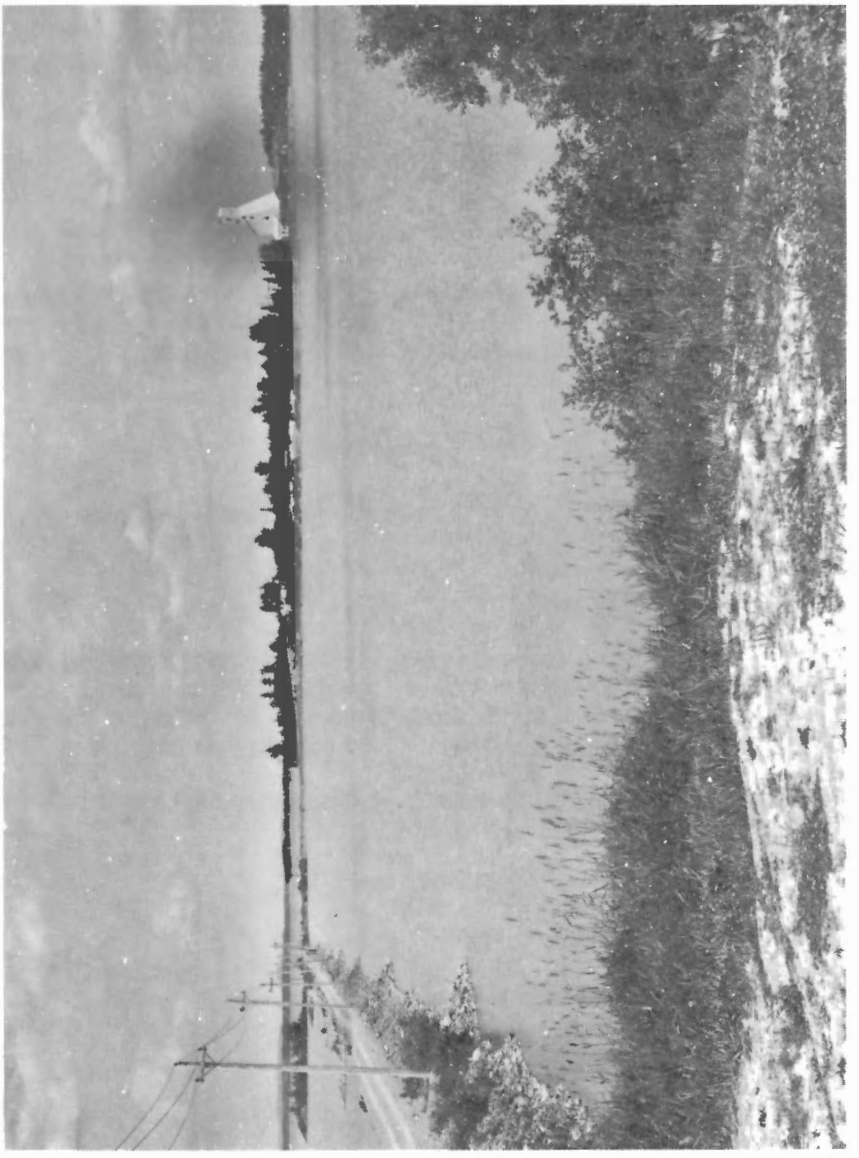


Plate XVIII. Kiena Mine on Parker Island, lac de Montigny. (G. S. C. photo 161437)

In sheared volcanic rocks

The gold occurred with the sulphides in quartz.

The property was explored in the 1930s by a shaft put down by Kiena Gold Mines Limited. In 1961, a new orebody was found and was explored using a 1,250-foot shaft with 9 levels. Operations were suspended in 1965.

The mine is located on Parker Island in lac de Montigny. A causeway connects the island to the shore of the lake. Access is via a road, 1.3 miles long, leading north from Highway 59 at Mile 121.4.

Refs.: 30 p. 245-246; 33 p. 255-256; 118 p. 80; 215 p. 177

Maps (T): 32 C/4W Val-d'Or
(G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)
47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)

Mile 122.1 Elmac Malartic Mine on right.

Elmac Malartic (Crossroads) Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, PYRRHOTITE, TOURMALINE, EPIDOTE

In quartz vein in chlorite-biotite schist

Visible gold was reported from this prospect; it was found in association with the sulphides and with tourmaline in bluish grey quartz. Specimens of epidote and pyrite in quartz were found on the dumps.

The deposit was explored by Crossroads Gold Mines Limited in 1935 when a shaft was sunk to a depth of 100 feet. Further underground exploration was conducted by Elmac Malartic Mines Limited in 1945-1946.

The mine is located on the south side of Highway 59 at Mile 122.1. There is a large dump near the shaft that is behind an old mine building visible from the highway.

Refs.: 33 p. 257; 192 p. 324; 198 p. 106

Maps (T): 32 C/4W Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 122.6 Junction gravel road on left.

Shawkey Mine

NATIVE GOLD, PYRITE, PYRRHOTITE, CHALCOPYRITE

In quartz veins in volcanic rocks

During mining operations, native gold was found in spectacular amount in places in the quartz, and along slip planes in the vein walls. Pyrite, pyrrhotite, and chalcopyrite were present in small amounts in the veins. Pyrite crystals averaging $\frac{1}{4}$ inch across are common in volcanic rocks on the dumps.

The deposit is located on the south shore of lac de Montigny where it was staked in 1911 by Fred La Palme. Underground exploration was done in 1917-1919 by the Martin Gold Mining Company Limited. Development was renewed in 1934 by Shawkey Gold Mining Company Limited; a shaft was sunk to a depth of 725 feet and a mill erected. Production from 1936 until 1938 amounted to a recovery of 25,414 ounces of gold from 137,978 tons of ore milled.

Road log from Highway 59 at Mile 122.6:

Mile 0 Proceed north along gravel road.

0.8 Junction; continue straight ahead.

1.3 Shawkey Mine. There is a large dump at the shore of the lake.

Refs.: 9 p. 42-49; 33 p. 249

Maps (T): 32 C/4W Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 123.6 Bridge over Thompson River.

124.0 Junction single-lane road on left.

Gale Mine

NATIVE GOLD, PYRITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE, MAGNETITE, ACTINOLITE, EPIDOTE, CHLORITE, TOURMALINE, HORNBLENDE

In quartz veins occupying fractures in volcanic rocks

Visible gold occurred in fractures in quartz containing sulphide minerals and magnetite. Other minerals present in the quartz were actinolite, epidote, chlorite, tourmaline, and hornblende.

Plate XIX. Sullivan Mine. (G. S. C. photo 161438)

The property was originally staked in 1912 by J. B. Mosso as the J. W. Callinan claim, and later re-staked by J. A. Gale as the St. Germain-Gale claim. Between 1935 and 1937, Gale Gold Mines Limited explored the deposit on two levels from a 250-foot shaft. In 1938, the property was acquired by the Provincial Government for operating as a mining school. The shaft was deepened to 450 feet and gold valued at $21, 789 was recovered in the period 1941-1942.

Access is via a rough single-lane road, 0.5 mile long, leading north from Highway 59 at Mile 124.0.

Refs.: 9 p. 49-52; 33 p. 249-251; 118 p. 81

Maps (T): 32 C/4W Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Mile 127.9 Val d'Or, at junction Highway 60 (Sullivan Road).

Road log to occurrences and mines accessible from Highway 60 (Descriptions follow the road log):

Mile 0 Junction highways 60 and 59; proceed onto Highway 60.

2.6 Sullivan, at turn-off (left) to Sullivan Mine.

5.4 Junction road on left to Siscoe Mine on Siscoe Island.

19.1 Lacorne Mine on right.

23.8 St. Benoit-de-Lacorne, at junction (opposite church) road to Massberyl property, Valor lithium property.

27.9 Junction road on right to Mont Video and Quebec Lithium Mine.

Sullivan Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, SPHALERITE, GALENA, TOURMALINE, TELLURIDES

In quartz veins in fractures and in shear zones in granodiorite

Native gold occurred as small flakes in the quartz. Pyrite, the chief metallic mineral, was associated with chalcopyrite, sphalerite, galena, and tourmaline. Tellurides have been reported.

The discovery by J. J. Sullivan in July, 1911, of auriferous quartz veins on the eastern shore of lac de Montigny was the first recorded gold discovery in the Harricanaw district. Claims staked by J. J. Sullivan and Hertel Authier in 1911 were later developed as the Sullivan Mine. Initial underground exploration of the deposit was done by Sullivan Gold Mines Limited between 1928 and 1932. The company, reorganized as Sullivan Consolidated Mines Limited, continued development and started production in 1934 with a 50-ton mill which was eventually increased to a capacity of 750 tons per day. Operations were terminated in 1967. Development consisted of two shafts extending to depths of 3,110 feet and 3,187 feet respectively. The mill treated 5,802,687 tons of ore valued at $40,683,568 from 1934 until 1967. Silver and scheelite were also recovered.

The mine is located in Sullivan at Mile 2.6 on Highway 60.

Refs.: 9 p. 32-42; 30 p. 253-255; 33 p. 247-248; 118 p. 79; 218 p. 320, 322

Maps (T): 32 C/4W Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

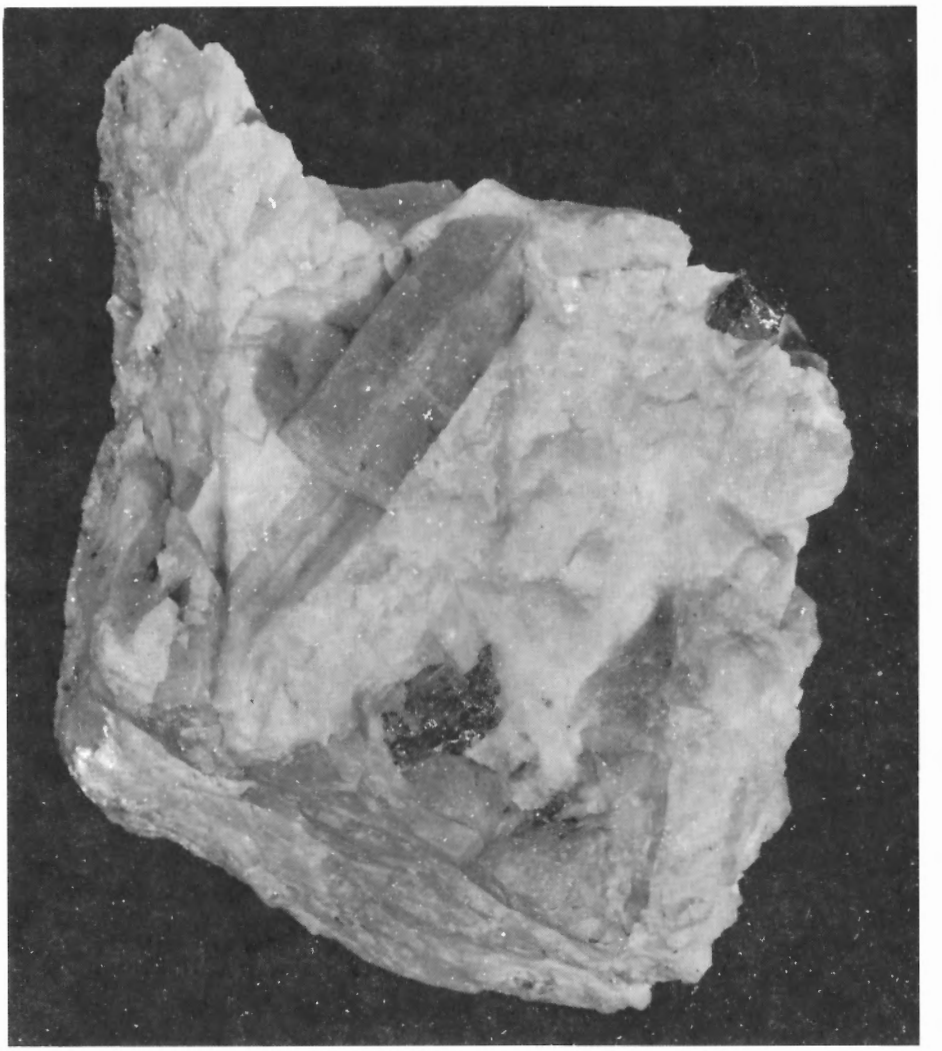


Plate XX. Beryl crystal and massive beryl (grey) with molybdenite (lower edge) and pyrite in white pegmatite, Lacorne Mine. Specimen (actual size) is from the National Mineral Collection. (G. S. C. photo 202294)

Siscoe Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, PYRRHOTITE, TOURMALINE, SCHEELITE, MAGNETITE, PETZITE, TALC

In quartz veins in granodiorite and in sheared greenstone

Native gold occurred as specks barely visible to the unaided eye, and as coarse irregular masses occupying pockets that contained up to 1,000 ounces of gold. Native gold was also present in disseminated, wiry, and platy forms. Other minerals

comprising the ore were pyrite, chalcopyrite, pyrrhotite, tourmaline, scheelite, magnetite, and petzite. Massive apple-green talc contained ribbons of finely disseminated native gold and gold leaf plating along slip planes. Black massive tourmaline and radiating prismatic masses of actinolite are common on the dumps.

This deposit, on Siscoe Island, was discovered by Stanley Siscoe a few years after gold-bearing quartz veins were found on the north shore of lac de Montigny in 1911. In 1923, Siscoe Gold Mines Limited was formed to develop the deposit. Production began in 1929, the earliest date of production of any gold mine in the area. The mine was closed in 1949 having produced gold valued at some 30 million dollars. The property was developed by several shafts, the deepest level being at 2,475 feet; the mill had a capacity of 900 tons per day. The mine buildings have been removed; there are several dumps on the property.

The mine is located on Siscoe Island, on the south side of the road leading west from Highway 60 to the golf course; it is 1.4 miles from Mile 5.4 on Highway 60 (see page 102).

Refs.: 6 p. 467-475; 33 p. 240, 243-247; 74 p. 876-882; 159 p. 39-40; 201 p. 183-184

Maps (T): 32 C/4W Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

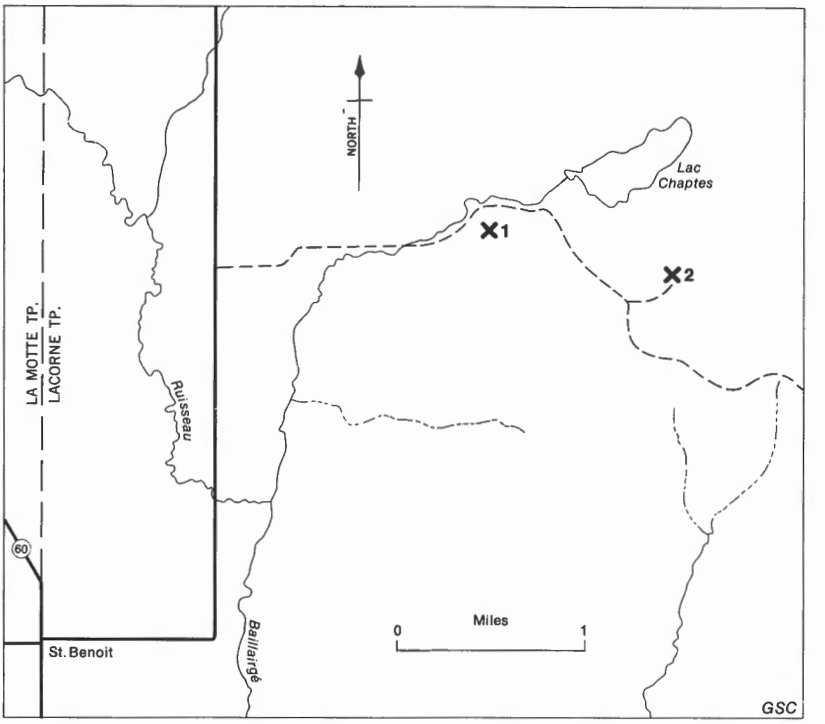
Lacorne Mine

MOLYBDENITE, NATIVE BISMUTH, BISMUTHINITE, TOURMALINE, BERYL, FLUORITE, APATITE, EPIDOTE, HEMATITE, SCHEELITE, POWELLITE, CALCITE, SERPENTINE, PYRITE, CHALCOPYRITE, PYRRHOTITE, COLUMBITE, RUTILE, MOLYBDITE

In pegmatitic quartz veins cutting granodiorite and biotite schist

The ore minerals were molybdenite (as crystals and as aggregates of crystals), native bismuth, and bismuthinite. They occurred in veins composed predominantly of quartz with plagioclase and microcline feldspar, and light green muscovite. Accessory minerals included; tourmaline (as black prismatic aggregates), beryl (as light green, blue and greenish blue crystals, and aggregates of crystals), purple, pink and white fluorite, green and blue apatite, epidote, specular hematite, scheelite, powellite, calcite, amber serpentine, pyrite, chalcopyrite, pyrrhotite, columbite (as black metallic platy masses), and rutile (as a yellow powder). Granular patches of epidote occurred in granodiorite. Molybdite has been reported from the deposit.

The deposit was staked in 1915 by Hugh Gilligan of Cobalt. In 1923, about 200 tons of ore were shipped by L. N. Benjamin to Ottawa for testing, and between 1927 and 1929, the Molybdenite Reduction Company produced some concentrates at a mill installed on the site. Subsequent operations were intermittent until 1951, when Molybdia Corporation



1. Massberyl property; 2. Valor lithium property

Map 10. Beryl, spodumene occurrences

resumed mining and began production of molybdenite and bismuth. In 1954, mining and milling were taken over by Molybdenite Corporation of Canada Limited which continued operations until February, 1971. For a one-year period beginning in September, 1971, the mine was operated by the Quebec Department of Natural Resources. It was serviced by a shaft that reached a depth of 1, 000 feet.

The mine is located on the east side of Highway 60 at Mile 19. 1 (see page 102).

Refs.: 30 p. 292-301; 58 p. 109-118; 161 p. 78-87; 164 p. 107-112; 225 p. 229; 228 p. 234-235

Maps (T): 32 C/5W Barraute
(G): 999A Fiedmont, Quebec (G. S. C. , 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Massberyl Property

BERYL, GARNET, MOLYBDENITE, COLUMBITE-TANTALITE

In perthitic pegmatite

Light blue to yellowish green beryl crystals measuring up to 3 inches in diameter and several inches long occur in white pegmatite. Red garnet, molybdenite, and columbite-tantalite are present in small amounts. The pegmatite is composed of perthite, plagioclase, quartz, and muscovite.

The beryl-bearing rock outcrops along the north slope of a ridge where it was exposed by several trenches. The surface exploration was done by Massberyl Lithium Company Limited in the 1950s.

The road log to this occurrence is given in the log to the Valor Lithium property.

Refs.: 98 p. 83-84; 129 p. 15-16; 161 p. 89; 209 p. 166

Maps (T): 32 C/5W Barraute
(G): 999A Fiedmont, Quebec (G. S. C. , 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Valor Lithium Property

SPODUMENE, BERYL, TOURMALINE, GARNET, POLLUCITE, LEPIDOLITE

In pegmatite and aplite

Pale green to white spodumene crystals measuring up to 4 feet long are embedded in cleavelandite-quartz-lepidolite aggregates associated with aplite and pegmatite stringers

and masses in granitic country rock. Some of the spodumene is a faint pink colour. Light yellowish green beryl crystals are associated with muscovite, black tourmaline, and quartz. Orange-red garnets are scattered through the aplite. Massive white to greyish white pollucite occurs with quartz, cleavelandite, spodumene, beryl and lepidolite. The pollucite contains veinlets and patches of white spodumene and purplish lepidolite; its weathered surface is dull greyish white resembling limestone.

Surface exploration by stripping and trenching was done in the 1950s by Valor Lithium Mines Limited.

Road log from Mile 23.8 on Highway 60 (see page 102) at St.-Benoit-de-Lacorne:

Mile	0	Proceed east from Highway 60 onto gravel road.
	2.9	Junction; turn right.
	4.4	Trail on right leads 300 yards south to the Massberyl property. To reach the Valor lithium property, continue straight ahead; this portion of the road becomes rough and may not be accessible by automobile.
	5.3	Junction; proceed along road on right.
	5.5	Valor lithium property on south slope of hill.

Refs.: 96 p. 4; 97 p. 48-49; 98 p. 84; 130 p. 145-147

Maps (T): 32 C/5W Barraute
(G): 999A Fiedmont, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Quebec Lithium Mine

SPODUMENE, BERYL, FLUORITE, COLUMBITE-TANTALITE, MOLYBDENITE, NATIVE BISMUTH, SPHALERITE, GARNET, POLYCRASE, HOLMQUISITE

In pegmatite dykes intruding amphibolitized greenstone and granodiorite

This mine was the only producer of lithium in Canada. Spodumene was the ore mineral; it occurred as white to light green and greenish yellow granular and prismatic masses in a pegmatite composed of white feldspar, quartz, and muscovite. Accessory minerals occurring in small amounts included beryl, fluorite, columbite-tantalite, molybdenite, native bismuth, yellow garnet, and polycrase. Holmquistite occurs as purplish blue columnar, lamellar, or fibrous pods, as sheaf-like aggregates, or as disseminated acicular crystals within or near the contact of the pegmatite dykes and the amphibole-bearing rock; the pods are small, rarely measuring up to 2 inches across. The holmquistite is found in open cuts on the property (Pers. comm.: D. D. Hogarth).

The mine was a producer of lithium carbonate and lithium hydroxide monohydrate between 1955 and 1965. Mining was from a shaft, 560 feet deep; a mill operated at the mine.

The property belongs to the Sullivan Mining Group Limited, Montreal.

Road log from Highway 60 at Mile 27.9 (see page 102):

Mile 0 Proceed east onto road to Mont Video.

8.6 Junction; turn right.

9.7 Quebec Lithium Mine on left.

Refs.: 97 p. 43-46; 99 p. 506-507; 216 p. 277; 225 p. 312

Maps (T): 32 C/5W Barraute
(G): 999A Fiedmont, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Vendome Mine

PYRITE, PYRRHOTITE, SPHALERITE, CHALCOPYRITE, GYPSUM, ROZENITE, GOETHITE, EPIDOTE, CALCITE

In silicified and sheared andesite

The ore consists of massive and disseminated pyrite, pyrrhotite, and dark brown sphalerite with some chalcopyrite. The dumps are a source for specimens of these minerals and specimens of epidote as yellowish to brownish green prismatic aggregates in quartz and in calcite. Under "long" ultraviolet rays, the white calcite fluoresces an orange-pink colour. Secondary minerals that coat the ore specimens include colourless to white crystalline gypsum, white rozenite, and rusty brown goethite.

The discovery of several sulphide-bearing boulders on this property instigated a campaign of diamond drilling that outlined a base metal orebody. Underground investigation of the deposit was done by Vendome Mines Limited between 1953, when the property was acquired from Mogador Mines Limited, and 1958; exploration was conducted from a 525-foot shaft opening three levels. The ore contains values in zinc, copper, lead, gold, and silver.

The mine is located southwest of Barraute.

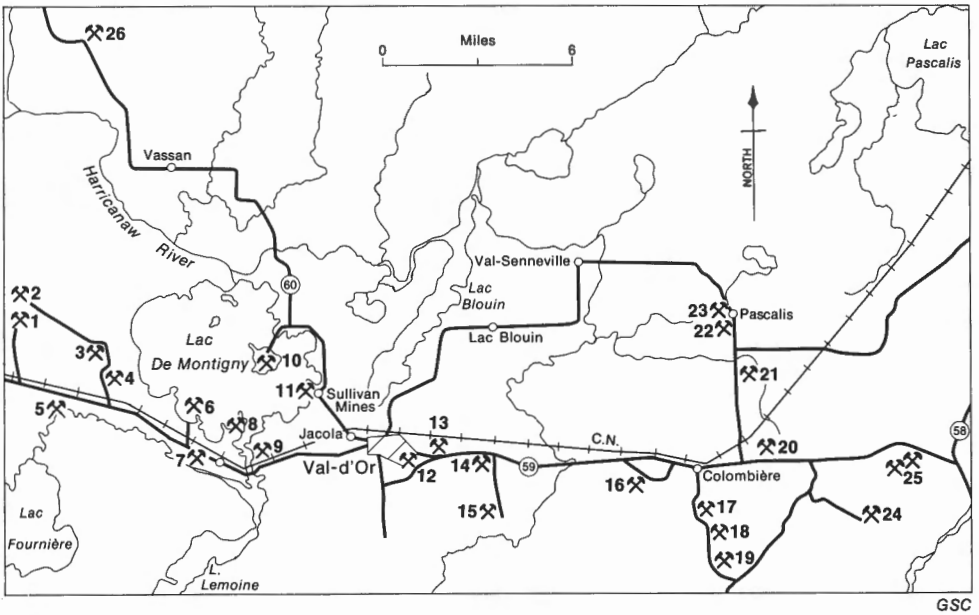
Road log from Quebec Lithium Mine:

Mile 0 Proceed east along road to Barraute.

8.7 Junction; turn left. (This junction is 0.7 mile south of the junction of highways 45 and 64 at Barraute.)

9.9 Vendome Mine.

Refs.: 18 p. 10; 41 p. 180-186; 165 p. 150; 214 p. 317



1. Camflo Mine;
2. Malartic Hygrade Mine;
3. Norbenite Malartic Mine;
4. Marban Mine;
5. Malartic Goldfields Mine;
6. Kiena Mine;
7. Elmac Mine;
8. Shawkey Mine;
9. Gale Mine;
10. Siscoe Mine;
11. Sullivan Mine;
12. Lamaque Mine;
13. Sigma Mine;
14. Aumaque Mine;
15. East Sullivan Mine;
16. Manitou - Barvue Mine;
17. Rainville Mine;
18. Louvicourt Goldfield Mine;
19. Akasaba Mine;
20. Louvem Mine;
21. Cournor Mine;
22. Pascalis Mine;
23. Perron, Beaufor mines;
24. Vicour Mine;
25. Bevcon Mine;
26. Lacorne Mine.

Map 11. Val d'Or area.

Maps (T): 32 C/5E Barraute
(G): 999A Fiedmont, Quebec (G. S. C., 1 inch to 1 mile)
1218 Northeast quarter of Fiedmont Township, electoral district of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 2, 000 feet)

This completes the description of occurrences accessible from Highway 60; the main road log along Highway 59 is resumed.

Mile 128.4 Val d'Or at junction Highway 59 and Highway 64. The Barvue Mine is reached via Highway 64.

Barvue Mine

SPHALERITE, PYRITE, CHALCOPYRITE, GALENA, RUBY SILVER, ARSENOPYRITE, SIDERITE, RHODOCHROSITE, MAGNETITE, TALC, GUNNINGITE, LEONHARDTITE, BEUDANTITE, ANGLESITE

In chloritic tuff-agglomerate

Sphalerite and pyrite, the chief ore minerals, were associated with chalcopyrite, galena, ruby silver, arsenopyrite, siderite, rhodochrosite, and magnetite. Gangue minerals included talc, epidote, and calcite (fluoresces pink under ultraviolet light). Layers of bright green mica occur in rocks on the dumps. Secondary minerals have formed coatings and encrustations on specimens on the mine dumps; included are white gunningite, white leonhardtite, brown beudantite, and grey anglesite.

Sphalerite-pyrite mineralization was discovered on this property in 1950 by a geological survey field party of the Quebec Department of Mines. Exploration by diamond drilling began immediately after the discovery was reported, and an economic orebody was penetrated by Barvue Mines Limited. Production began in 1952 and continued to 1957 resulting in a recovery of 144, 952 tons of zinc and 3, 971, 194 ounces of silver from 5, 601, 278 tons of ore. Some lead was also produced. Mining was from an open pit until the end of 1956; in 1957, a spiral tunnel was driven from the bottom of the pit (250 feet deep) to the 500-foot level. The mine was equipped with a mill which had a capacity of 5, 300 tons per day. All mine buildings have been removed and the pit is water-filled.

The mine is located as Barville, 38. 5 miles (via Highway 64) from Val d'Or.

Refs.: 170 p. 419-422; 171 p. 43-44

Maps (T): 32 C/12E Landrienne
(G): 1347 Amos-Barraute area, Barraute sheet, County of Abitibi-east (Que. Dept. Natur. Resour., 1 inch to 2, 000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Road log to mines along Highway 59, east of Val d'Or (Descriptions of the occurrences follow the road log);

Mile	0	Val d'Or, at junction Highway 59 and Highway 60; proceed east along Highway 59.
	0.5	Junction Highway 64.
	1.3	Junction rue St-Jacques leading to Lamaque Mine.
	1.6	Turn-off (left) to Sigma Mine.
	3.8	Junction road on right leading to Aumaque Mine and to East Sullivan Mine.
	6.3	Bridge over Bourlamaque River.
	8.1 9.8	Junction roads (on right) to Manitou-Barvue Mine.
	10.4	Colombiere, at junction road on right to Rainville Mine, Louvicourt Goldfields Mine, and Akasaba Mine.
	11.7 11.9	Junction road on left to Perron, to Cournor Mine, and to Perron Mine, Beaufor Mine.
	12.5	Junction road on left to Louvem Mine.
	14.0	Junction road on right to Vicour Mine.
	17.5	Bevcon (Bevcourt) Mine on right.
	18.6	Junction; Highway 59 joins Highway 58.
	19.1	Junction; Highway 59 ends.

Lamaque Mine

PYRITE, CHALCOPYRITE, NATIVE GOLD, HESSITE, CALAVERITE, KRENNERITE, TELLURBISMUTH, TOURMALINE, SCHEELITE, ANKERITE, SELENITE, FLUORITE

In veins in diorite and granodiorite

Pyrite, the most abundant metallic mineral in the deposit, has been found as cubes measuring several inches in diameter. Chalcopyrite is relatively uncommon, and native gold, tellur-bismuth, and the tellurides, hessite, calaverite, and krennerite are rare. The most common constituents of the veins are black tourmaline, quartz, carbonates (ankerite and calcite), and scheelite. Selenite, fluorite, and green mica (fuchsite) are also present. Quartz crystals have been found lining cavities in the veins; they were studded with coarse native gold and with tellurides.

The original claim was staked in 1923 by R. C. Clark who found a quartz vein containing a pocket of coarse gold. The deposit was drilled by Read-Authier Mines Limited in 1929, and by Teck-Hughes Gold Mines Limited in 1932; the encouraging results of the latter work led to the formation in 1933 of Lamaque Gold Mines Limited to develop the deposit. The mine has been a producer since 1935. Development consists of seven shafts, the deepest level being 3, 600 feet. The mill has a capacity of 2, 100 tons per day. Since production began (to September 1972), the mine has yielded gold valued at $149, 235, 000. It is operated by Lamaque Mining Company Limited.

The mine is in Val d'Or. Tours of surface operations are arranged for visitors during the summer months; enquiries should be directed to the Tourist Bureau in Val d'Or.

Refs.: 33 p. 258-264; 47 p. 15-16; 118 p. 24; 172 p. 511-516; 173 p. 882-891; 225 p. 318; 228 p. 328

Maps (T): 32 C/4W Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C. , 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Sigma Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, TELLURIDES, TOURMALINE, SCHEELITE

In shear zones in volcanic rocks and in feldspar porphyry

The mineralization consists of native gold (rare) and pyrite with minor chalcopyrite and tellurides in veins composed chiefly of quartz and tourmaline with smaller amounts of carbonates and scheelite.

This mine has been a gold producer since 1937. The deposit was discovered in 1933 by Heber Bambrick on claims owned by Read-Authier Mines Limited. Exploration of the deposit was done by Dome Mines Limited which, in 1934 formed a subsidiary company, Sigma Mines Limited (now Sigma Mines (Quebec) Limited) to develop the orebody and bring it into production. The mine is serviced by two shafts with underground workings from the production shaft developed to a depth of 5, 000 feet. Approximately 1, 300 tons of ore are milled per day. Production from 1937 to 1972 amounted to 14, 256, 511 tons of ore valued at $96, 331, 243. Some scheelite was produced during World War II.

Surface tours are arranged for visitors during the summer months; enquiries should be directed to the Tourist Bureau in Val d'Or. The mine is on the north side of Highway 59 at Mile 1. 6 (see page 111).

Refs.: 33 p. 264-265; 68 p. 12-13; 225 p. 298-299; 228 p. 307

Maps (T): 32 C/4W Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi Company, Quebec (G. S. C. , 1 inch to 1 mile)

Maps (G): 1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Aumaque Mine

PYRITE, GALENA, SPHALERITE, CHALCOPYRITE, NATIVE GOLD, FUCHSITE, SZOMOLNOKITE, ROZENITE

In quartz veins in shear zones in chlorite schist and in sericite schist

The mineralization consisted of pyrite with small amounts of galena, sphalerite, and chalcopyrite; the gold occurred in the quartz veins and in the massive sulphides. Patches of bright green mica (fuchsite) occur in sericite schist on the rock dumps which also contain pyrite crystals in quartz and in chlorite schist, and ore-bearing specimens encrusted with white powdery szomolnokite and white botryoidal rozenite.

The deposit was investigated during a diamond drilling campaign carried out in the 1930s by Lamaque Contact Gold Mines Limited and by the Herbin Lake Gold Syndicate. From 1944 until 1952, Aumaque Gold Mines Limited explored the deposit but the results were not encouraging. A shaft was sunk to a depth of 525 feet. The shaft has been fenced; it is surrounded by large dumps.

Road log from Highway 59 at Mile 3.8 (see page 111):

Mile 0 Proceed south onto gravel road.

0.6 Junction; turn right onto single-lane road.

0.8 Aumaque Mine.

Refs.: 69 p. 16-18; 197 p. 15; 203 p. 14

Maps (T): 32 C/4E Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

East Sullivan Mine

PYRITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE, GALENA

In chloritized and brecciated volcanic rocks

The ore consisted of massive and disseminated sulphides, galena being a minor constituent. Low values in gold and silver were associated with the sulphides. The mine is a former producer of copper, zinc, gold, and silver. Production from 1949 until 1966 was valued at $124,619,800 from nearly 16 million tons of ore milled. The mine

was serviced by a 3,950-foot shaft and a 2,800-ton-per-day mill. It was initially operated by East Sullivan Mines Limited; from 1960 until closure in 1966, mining and milling were conducted by Sullico Mines Limited.

Access is via a road, 1.8 miles long, leading south from Highway 59 at Mile 3.8 (see page 111).

Refs.: 70 p. 27-30; 118 p. 25; 218 p. 127, 320

Maps (T): 32 C/4E Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 4 miles)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Manitou-Barvue (Golden Manitou) Mine

PYRITE, SPHALERITE, GALENA TENNANTITE, CHALCOPYRITE, ARSENOPYRITE, PROUSTITE, PYRARGYRITE, NATIVE SILVER, NATIVE GOLD

In sericite schist

The mine produces zinc, gold, silver, lead, and copper. The ore consists of pyrite and sphalerite, and minor amounts of galena, chalcopyrite, arsenopyrite, tennantite, proustite, pyrargyrite, native silver, and native gold. Native silver occurs in wire and in leaf forms in vugs in quartz-calcite-filled fractures.

The property was originally explored for copper by Caribou Copper Corporation between 1926 and 1928. The zinc orebody was discovered in 1937 by Quebec Manitou Mines Limited which sank a shaft to a depth of 386 feet and did a considerable amount of exploration of the deposit. In 1941, Golden Manitou Mines Limited undertook preparations for production which began in the following year. In 1958, Manitou-Barvue Mines Limited, the current operator, acquired the property. The mine has been developed to a depth of 4,200 feet; it is equipped with a concentrating mill.

The mine is 1 mile south of Highway 59 at Mile 8.1 or 9.8 (see page 111).

There are no facilities for visitors to the mining operations.

Refs.: 33 p. 441-442; 120 p. 19-20; 225 p. 197-198

Maps (T): 32 C/4E Val-d'Or
(G): 47-20 Dubuisson-Bourlamaque-Louvicourt, Abitibi County, Quebec (G. S. C., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Rainville Mine

PYRITE, CHALCOPYRITE, SPHALERITE, NATIVE GOLD, PYRRHOTITE, TOURMALINE, BROCHANTITE, MALACHITE, SIDEROTIL

In sheared volcanic rocks and diorite

The ore is composed of pyrite, chalcopyrite, and sphalerite with some native gold and pyrrhotite. Pyrite, as crystals and aggregates of crystals, and chalcopyrite are common on the mine dumps. Tourmaline, as smoky brown prismatic aggregates in quartz, was also found on the dumps where secondary minerals have formed coatings and encrustations on ore-bearing specimens; included are bright green brochantite and malachite, and bluish white siderotil.

The deposit was explored by various companies intermittently from 1932 until 1951 when underground development was undertaken by Rainville Copper Mines Limited. Production was obtained from 1956 to 1958; copper, gold, and silver were recovered. The production shaft was developed to the 700-foot level; another shaft 2,200 feet to the west was sunk to a depth of 1,135 feet. The mill had a capacity of 500 tons per day.

The mine is 1.2 miles south of Highway 59 at Mile 10.4 (see page 111).

Refs.: 118 p. 25, 173; 134 p. 41-42; 165 p. 231; 208 p. 227

Maps (T): 32 C/4E Val-d'Or
(G): 1623 Northwest quarter of Louvicourt Township, Abitibi-east County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Louvicourt Goldfield Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, PYRRHOTITE, TELLURBISMUTH, TOURMALINE

In quartz veins in diorite

Native gold occurred as fine specks in fractures lined with chlorite in quartz and in the sulphides. The most abundant metallic mineral in the ore was pyrite; chalcopyrite and pyrrhotite were minor constituents, and tellurbismuth was rare. Pyrite and black tourmaline (in massive form and as aggregates of acicular crystals) are common in quartz on the mine dumps.

The original claims, the Simkar claims, were staked in 1939 when a vein carrying free gold was discovered on the surface. Exploration and development of the deposit was done by Louvicourt Goldfield Corporation from 1944 until 1949 when the mine was closed. In the final two years of operations, a total of 31,915 ounces of gold was recovered from 261,590 tons of ore milled. The mine was serviced by a mill and a four-compartment shaft sunk to a depth of 975 feet.

The mine is 2.2 miles south of Highway 59 at Mile 10.4 (see page 111).

Refs.: 118 p. 174; 134 p. 43-45; 148 p. 91

Maps (T): 32 C/4E Val-d'Or
(G): 1625 Southwest quarter of Louvicourt Township, Abitibi-east County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Akasaba (Obaska) Mine

NATIVE GOLD, PYRITE, PYRRHOTITE, CHALCOPYRITE, SPHALERITE, MOLYBDENITE, TOURMALINE, EPIDOTE

In amphibolite and diorite

Gold was associated with sulphides occurring as disseminations in the amphibolite and diorite. Molybdenite has been reported from the deposit. Black tourmaline occurred in quartz veins. Specimens of epidote in volcanic rock are found on the dumps.

The original claims were staked by Messrs Rickaby and McNiven; they were prospected in 1926 by the Victoria Syndicate and at various times thereafter. The orebody was outlined as a result of underground exploration from a shaft sunk by Obaska Lake Mines Limited in 1951 and 1952. Production was obtained by Akasaba Gold Mines Limited from 1960 to 1963 resulting in a recovery of 43,485 ounces of gold and 12,746 ounces of silver from 289,428 tons of ore. The mine was serviced by a 320-foot shaft. The ore was processed at the Bevcon mill.

The mine is 2.2 miles south of Highway 59 at Mile 10.4 (see page 111).

Refs.: 58 p. 93; 118 p. 173; 134 p. 26-28; 211 p. 5

Maps (T): 32 C/4E Val-d'Or
(G): 1625 Southwest quarter of Louvicourt Township, Abitibi-east County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Cournor Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, TOURMALINE, CALCITE

In quartz veins in granodiorite

Native gold occurred as films on pyrite crystals and in fractures in pyrite and in quartz. Pyrite, as friable aggregates and as cubes measuring up to a foot in diameter, was the chief sulphide. The highest gold values were obtained from the pyrite cubes.

Chalcopyrite was a minor constituent of the veins. Massive aggregates of microscopic prisms of black tourmaline occurred as layers up to one inch wide in the veins; this tourmaline is common in the mine dumps which also contain pyrite crystals (commonly $\frac{1}{2}$ inch in diameter) in quartz, and pink calcite layers (fluoresces pink when exposed to ultraviolet rays) on pink granodiorite.

The property, staked as the Buissières claims, was originally investigated by the Treadwell Yukon Company in 1931. Initial production of some 15,000 ounces of gold was obtained between 1932 and 1935 by Bussières Mining Company Limited which had installed a mill on the premises and sank a shaft to a depth of 677 feet. Mining was continued by Cournor Mining Company Limited from 1937 until 1942 when operations were suspended due to wartime conditions. The total value of gold produced from the two operations was approximately three million dollars.

Road log from Highway 59 at Mile 11.7 (see page 111):

Mile 0 Proceed north along road to Perron.

2.3 Road-cut on left exposes chrysotile asbestos veinlets (1/8 inch wide) in green serpentinite. Magnetite is present in the rock.

2.8 Junction single-lane road; turn right.

3.2 Cournor Mine.

Refs.: 33 p. 272-274; 118 p. 173-174; 134 p. 38-39.

Maps (T): 32 C/4E Val-d'Or
(G): 1623 Northwest quarter of Louvicourt Township, Abitibi-east County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Perron Mine, Beaufor (Cournor) Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, PYRRHOTITE, TETRADYMITE, SCHEELITE, TOURMALINE

In granodiorite

These two former gold-producing mines shared a vein system mineralized with quartz, scheelite, calcite, tourmaline, sulphides, and native gold. Pyrite was the most common sulphide; it occurred as crystals and as finely granular aggregates. Native gold occupied fractures in pyrite and in quartz; in the latter, it was sometimes found as coarse grains. Gold was also associated with a telluride believed to be tetradymite. Scheelite and black massive tourmaline were constituents of some of the veins. The dumps furnish specimens of: black massive tourmaline; black "micro" prisms of tourmaline in white calcite and in quartz; granular, massive pyrite; pyrite crystals (commonly $\frac{1}{2}$ inch in diameter) in quartz, in calcite, and in the granitic rock; and bright green mica in chlorite schist. The granodiorite host rock is composed of white

Plate XXI. Camp at Pascalis Mine, 1935. (G. S. C. photo 79039)

to slightly greenish feldspar, quartz of a distinct bluish mauve colour and dark green to almost black ferromagnesian minerals; the rock takes a good polish.

The deposit was worked as the Beaufor (Cournor) Mine and as the Perron Mine. The Perron property is the more northerly and one of its shafts was sunk on Beaufor ground. The original claim on the Perron property was staked in the spring of 1931 by Jack Matthews of Amos; some spectacular showings of native gold were found in the course of prospecting the claim. Original exploration was performed by Matthews Gold Mines Limited; a shaft was sunk to a depth of 200 feet and a small amount of gold was extracted from surface workings. Perron Gold Mines Limited was formed in 1934 to mine the deposit; from 1935 to 1951, gold valued at 16 million dollars was recovered from the deposit. Some scheelite was also produced. The mill and mine buildings were sold to Bevcourt Gold Mines Limited.

The Beaufor property was initially developed in the 1930s by Beaufor Gold Mines Limited which sank a shaft to a depth of 450 feet; production of about 40, 000 ounces of gold was obtained by Cournor Mining Company Limited from 1939 to 1942, the ore being milled at the Cournor Mine. The properties have been developed by a number of shafts to a maximum depth of 2, 250 feet.

Road log from Highway 59 at Mile 11. 7 (see page 111):

Mile 0 Proceed north along road to Perron.

Plate XXII. Louvem Mine. The remarkably even skyline is characteristic of the Abitibi Upland, the physiographic region of which the Val d'Or-Kirkland Lake area is a part. (G. S. C. photo 161436)

Mile 2.8 Junction road to Cournor Mine; continue straight ahead.

3.5 Junction road to Obaska; continue straight ahead.

4.9 Perron; mine dump on left is that of the Pascalis Mine where a shaft (1,565 feet deep) was sunk in 1940 by Pascalis Gold Mines Limited to explore a vein system similar to that at the adjoining Perron Mine. Work was suspended in 1942 due to wartime conditions. To reach the Perron and Beaufor mines, continue straight ahead.

5.1 Junction at bend in road; turn left.

5.2 Perron Mine; Beaufor Mine property adjoins it to the south.

Refs.: 5 p. 893-895; 33 p. 267-272; 91 p. 13-15; 134 p. 38; 203 p. 154

Maps (T): 32 C/4E Val-d'Or
(G): 859 S.W. quarter of Pascalis Township, county of Abitibi-east, (Que. Dept. Natur. Resour., 1 inch to 1 mile)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Louvem Mine

PYRITE, CHALCOPYRITE, SPHALERITE, RUTILE, COBALTITE, MOLYBDENITE, GALENA, CHLORITE, CHALCOCITE, CHALCANTHITE, SIDEROTIL, ANTLERITE, QUARTZ CRYSTALS

In rhyolitic tuff and agglomerate

This is a new copper producer. The principal ore minerals are pyrite, chalcopyrite, and sphalerite; associated with them are minor amounts of rutile, tetradymite, cobaltite, molybdenite, galena, and chlorite. Minerals collected from the stockpile include: chalcocite, chalcanthite (as light blue translucent crusts on ore-bearing specimens), siderotil (as white coatings on chalcopyrite and associated with chalcanthite), antlerite (as emerald green encrustations on ore-bearing specimens), and quartz crystals ("micro" crystals in cavities in massive quartz).

The deposit was discovered in 1968 by Quebec Mining Exploration Company (SOQUEM). It has been developed by an open pit and by a shaft, 1,160 feet deep. Ore is treated at the Manitou Barvue mill where the first Louvem ore shipment was received in 1970. The mine is operated by Louvem Mining Company Incorporated.

The mine is located 2 miles by road from Highway 59 at Mile 12.5 (see page 111). Enquiries regarding visits to the property should be directed to the Tourist Bureau in Val d'Or.

Refs.: 50 p. 1596-1608; 225 p. 192-193

Maps (T): 32 C/4E Val-d'Or
(G): 1623 Northwest quarter of Louvicourt Township, Abitibi-east County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Vicour Mine

NATIVE GOLD, PYRITE, PYRRHOTITE, ARSENOPYRITE, CHALCOPYRITE TOURMALINE,

In quartz veins in granodiorite

The quartz contained native gold, pyrite, and pyrrhotite with some arsenopyrite, chalcopyrite, and tourmaline. The most common minerals available from the dumps are black massive tourmaline and pyrite.

Initial exploration of the deposit between 1935 and 1942 by Vicour Gold Mines Limited consisted of trenching and sinking a shaft to a depth of 470 feet. In 1945 and 1946, Quebec Gold Mines Limited carried out a diamond drilling investigation of the property.

Road log from Highway 59 at Mile 14.0 (see page 111):

Mile 0 Proceed south along gravel road.

0.1 Junction; continue straight ahead.

1.0 Junction; continue straight ahead (road on right leads to radio tower).

1.3 Junction; continue straight ahead.

1.7 Junction; continue straight ahead.

3.1 Trail on left leads 100 yards to Vicour Mine in wooded area.

Refs.: 33 p. 277-278; 134 p. 44

Maps (T): 32 C/3W Lac Guéguen
(G): 1626 Southeast quarter of Louvicourt Township, Abitibi-east County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

Bevcon (Bevcourt) Mine

NATIVE GOLD, PYRITE, CHALCOPYRITE, SCHEELITE, TELLURBISMUTH, SELENITE, TOURMALINE, EPIDOTE, ANHYDRITE, MAGNETITE

In quartz veins in granodiorite

The chief constituents of the veins were quartz, calcite, tourmaline, chlorite, and pyrite; chalcopyrite, scheelite, tellurbismuth, and selenite occurred sporadically. Native gold was associated with coarsely crystalline aggregates of pyrite, occurring as thin plates along cleavage planes. Minerals collected from the dumps include: epidote with chlorite and magnetite in quartz; pyrite cubes (up to $\frac{1}{2}$ inch in diameter) in quartz; black massive tourmaline; epidote; and mauve, cleavable aggregates of anhydrite in quartz. Specimens of a porphyry composed of white feldspar phenocrysts in a greenish grey matrix are also available from the mine dumps.

The property comprises the former Bevcourt Mine and Buffadison Mine. The original discovery of gold mineralization was made in 1931 on the Buffadison property by S. B. Jowsey; exploration of the deposit was conducted intermittently by numerous companies until 1945 when Buffadison Gold Mines Limited undertook a program of diamond drilling followed by underground exploration from a shaft sunk to a depth of 980 feet. Operations on that property were terminated in 1948.

The orebody at the adjoining Bevcourt property was outlined during an extensive campaign of diamond drilling and underground exploration from a shaft conducted by Bevcourt Mines Limited (name changed in 1955 to Bevcon Mines Limited) from 1944 until 1948. Following encouraging results from test-milling of ore shipped to the Perron mill between 1947 and 1950, a mill was constructed on the premises and commenced operations in 1952. The shaft was ultimately deepened to 2,286 feet and ore was mined from 15 levels, from the 500-foot to the 2,225-foot levels. When operations ceased in 1965, the mine had produced 3,493,243 tons of ore from which

407,409 ounces of gold was recovered. In 1959, the Buffadison property was acquired by Bevcon Mines Limited.

The Bevcourt shaft is on the south side of Highway 59 at Mile 17.5 (see page 111); a road, 0.4 mile long leads southwest from the highway (Mile 17.5) to the Buffadison shaft.

Refs.: 28 p. 40-44; 75 p. 416-419; 134 p. 33-36

Maps (T): 32 C/3W Lac Guéguen
(G): 1624 Northeast quarter of Louvicourt Township, Abitibi-east County (Que. Dept. Natur. Resour., 1 inch to 1,000 feet)
1600-V Metallic mineralization in Noranda, Matagami, Val d'Or and Chibougamau areas (Que. Dept. Natur. Resour., 1 inch to 4 miles)

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GLOSSARY

Actinolite — $Ca_2(Mg, Fe)_5Si_8O_{22}(OH)_2$. H=5-6. Bright green to greyish green, fibrous or radiating prismatic aggregates. Variety of amphibole.

Agglomerate — Rock formed by the accumulation of angular fragments ejected by volcanoes.

Alaskite — A granitic rock composed of microcline, orthoclase, and quartz with few or no dark minerals such as amphibole, biotite, or pyroxene.

Albite — $NaAlSi_3O_8$. H=6. Generally white tabular crystals or cleavable masses. Vitreous lustre. Variety of plagioclase feldspar. Used in manufacture of ceramics.

Altaite — PbTe. H=3. Tin-white, yellowish metallic; bronze-yellow. Massive. Associated with gold, tellurides or sulphides in vein deposits.

Amphibole — A mineral group consisting of complex silicates including tremolite, actinolite and hornblende. Common rock-forming mineral.

Amphibolite — A metamorphic rock composed essentially of amphibole and plagioclase feldspar.

Andesite — Dark coloured volcanic rock composed of plagioclase feldspar and amphibole or pyroxene.

Anglesite — $PbSO_4$. H=2.5-3. Colourless to white, greyish, yellowish or bluish tabular or prismatic crystals, or granular. Adamantine to resinous lustre. Characterized by high specific gravity (6.36 to 6.38) and adamantine lustre. Effervesces in nitric acid. Secondary mineral generally formed from galena. Ore of lead.

Anhydrite — $CaSO_4$. H=3-3.5. White, bluish or greyish granular massive with vitreous lustre. Alters to gypsum by absorption of water. Distinguished from gypsum by its superior hardness. Used as a soil conditioner and in the manufacture of portland cement.

Ankerite — $Ca(Fe, Mg)(CO_3)_2$. Variety of dolomite from which it cannot be distinguished in hand specimen.

Antlerite — $Cu_3SO_4(OH)_4$. H=3.5. Emerald-green to light and dark green granular, fibrous, tabular or prismatic aggregates. Vitreous lustre.

Apatite — $Ca_5(PO_4)_3(F, Cl, OH)$. H=5. Green to blue, colourless, brown, red, hexagonal crystals or granular, sugary massive. Vitreous lustre. May be fluorescent. Distinguished from beryl and quartz by its inferior hardness; massive variety distinguished from calcite and dolomite by lack of effervescence in HCl, and from diopside and olivine by its inferior hardness. Used in manufacture of fertilizers and in production of detergents.

Aplite A light-coloured dyke rock with a fine-grained granitic texture and with a composition similar to that of granite.

Argillite A clayey sedimentary rock without a slaty cleavage or shaly fracture.

Arkose A sandstone in which feldspar grains predominate.

Arsenopyrite FeAsS. H=5.5-6. Light to dark grey metallic striated prisms with characteristic wedge-shaped cross-section; also massive. Tarnished to bronze colour. Ore of arsenic; may contain gold or silver.

Asbestos Fibrous variety of certain silicate minerals such as serpentine (chrysotile) and amphibole (anthophyllite, tremolite, actinolite, crocidolite) characterized by flexible, heat- and electrical-resistant fibres. Chrysotile is the only variety produced in Canada; it occurs as veins with fibres parallel (slip fibre) or perpendicular (cross-fibre) to the vein walls. Used in the manufacture of asbestos cement sheeting, shingles, roofing and floor tiles, millboard, thermal insulating paper, pipe covering, clutch and brake components, reinforcing in plastics, etc.

Axinite $(Ca, Mn, Fe)_3Al_2(BO_3)Si_4O_{12}(OH)$. H=7. Violet to brown, yellow, pink wedge-shaped crystals, massive. Vitreous lustre. Occurs in cavities in granite, diabase, in hydrothermal veins.

Barite $BaSO_4$. H=3-3.5. White, pink, yellowish, blue, tabular or platy crystals; granular massive. Vitreous lustre. Characterized by a high specific gravity (4.5) and perfect cleavage. Used in the glass, paint, rubber, and chemical industries, and in oil-drilling technology.

Basalt Fine-grained igneous rock composed essentially of plagioclase feldspar, olivine and pyroxene.

Batholith A very large body of coarse-textured igneous rocks such as granite or diorite.

Beryl $Be_3Al_2Si_6O_{18}$. H=8. White, yellow, green, blue, hexagonal prisms, or massive with conchoidal or uneven fracture. Vitreous, transparent to translucent. Distinguished from apatite, by its superior hardness, from topaz by its lack of perfect cleavage, from quartz by its higher specific gravity. Ore of beryllium which has numerous uses in the nuclear energy, space, aircraft, electronic and scientific equipment industries; used as alloying agent with copper, nickel, iron, aluminium, and magnesium. Includes gem varieties: emerald (bright green), aquamarine (blue or green), morganite (pink), yellow (heliodor).

Beudantite $PbFe_3(AsO_4)(SO_4)(OH_6)$. H=3.5-4.5. Dark green, brown, black rhombohedral crystals; also yellow earthy or botryoidal masses. Vitreous, resinous to dull lustre. Secondary mineral occurring in iron and lead deposits. Difficult to distinguish in hand specimen from other yellowish secondary minerals.

Bismoclite — BiOCl. H=2-2.5. Cream-white to grey, brownish; greasy to silky, or earthy lustre. Massive, earthy, columnar, fibrous or scaly. Soluble in acids. Secondary mineral formed by alteration of bismuthinite or native bismuth.

Bismuth — Bi. H=2-2.5. Light grey metallic reticulated crystal aggregates; also foliated or granular. Iridescent tarnish. Used as a component of low melting-point alloys and in medicinal and cosmetic preparations.

Bismuthinite — Bi_2S_3. H=2. Dark grey striated prismatic or acicular crystals; also massive. Iridescent on tarnished surface. Ore of bismuth.

Bismutite — $(BiO)_2(CO_3)$. H=2.5-3.5. Yellowish white to brownish yellow, light green or grey earthy or pulverulent masses; also fibrous crusts, spheroidal aggregates, scaly or lammellar. Dull, vitreous or pearly lustre. Effervesces in HCl. Uncommon secondary mineral formed by alteration of bismuth minerals.

"Black Granite" — A commercial term used for dark igneous rocks such as gabbro, diorite, anorthosite used as building and monument stones.

Bornite — Cu_5FeS_4. H=3. Reddish brown metallic. Usually massive and tarnished to iridescent blue, purple, etc. Known as peacock ore and variegated copper ore. Ore of copper.

Breccia — A rock composed of angular fragments; may be attractively patterned and coloured and used as an ornamental rock.

Brochantite — $Cu_4(SO_4)(OH)_6$. H=3.5-4. Vitreous emerald green acicular crystal aggregates; massive, granular. Secondary mineral formed by oxidation of copper minerals. Distinguished from malachite by lack of effervescence in HCl.

Calaverite — $AuTe_2$. H=2.5-3. Yellow to light grey metallic bladed, lathlike or striated prismatic aggregates; also massive. Occurs with native gold, pyrite and other tellurides in quartz veins.

Celestite — $SrSO_4$. H=3-3.5. Transparent, colourless, white or pale blue tabular crystals; also fibrous massive. Vitreous lustre. Perfect cleavage. Resembles barite but has lower specific gravity. Ore of strontium.

Chalcanthite — $CuSO_4.5H_2O$. H=2.5. Light to dark blue, short prismatic, tabular crystals; massive, granular. Vitreous lustre. Metallic taste. Secondary mineral formed in copper sulphide deposits. Distinguished from azurite by lack of effervescence in HCl.

Chalcocite — Cu_2S. H=3.5-4. Dark grey to black metallic; massive. Tarnishes to iridescent blue, purple, etc. Also referred to as vitreous copper or sulphurette of copper. Soluble in HNO_3. Black colour and slight sectility distinguish it from other copper sulphides. Ore of copper.

Chalcopyrite $CuFeS_2$. H=3.5-4. Brass-yellow massive, or as tetrahedral crystals. Iridescent tarnish. Brass colour distinguishes it from pyrrhotite. Distinguished from pyrite by its inferior hardness, from gold by its superior hardness and lower density. Also called copper pyrite. Ore of copper.

Chert Massive opaque variety of chalcedony; generally drab coloured (various tints of grey or brown).

Chlorite $(Mg, Fe, Al)_6(Al, Si)_4O_{10}(OH)_8$. H=2-2.5. Transparent green flaky aggregates. Distinguished from mica by its colour and non-elastic flakes.

Chrysocolla $CuSiO_3.2H_2O$. H=2-4. Blue to blue green earthy, botryoidal, or fine-grained massive. Conchoidal fracture. Secondary mineral found in oxidized zones of copper-bearing veins. Often intimately mixed with these minerals, the resultant superior hardness render it suitable for use in jewellery and ornamental objects. Minor ore of copper.

Chrysotile Fibrous varieties of serpentine (asbestos).

Cleavelandite Platy, tabular or lamellar variety of albite; white with pearly lustre.

Clinozoisite $Ca_2Al_3Si_3O_{12}(OH)$. H=7. Pale green to greenish grey prismatic crystals; also granular or fibrous masses. Vitreous lustre. Perfect cleavage. Member of epidote group. Occurs in metamorphic rocks.

Cobaltite CoAsS. H=5.5. Light grey metallic crystals (cubes, pyritohedrons), or massive. Perfect cleavage. Pinkish tinge distinguishes it from other grey metallic minerals. Associated with cobalt and nickel arsenides or sulphides. Ore of cobalt.

Coloradoite HgTe. H=2.5. Dark grey to black metallic granular masses. Soluble in HNO_3. Occurs with gold and silver tellurides.

Columbite-Tantalite Series $(Fe, Mn)Nb_2O_6$. H=5 to 7. Brownish black to black prismatic or tabular crystals forming parallel groups; also massive. Submetallic lustre. Occurs in pegmatites. Ore of niobium which is used in high-temperature steel alloys, and of tantalum which is used in electronics.

Conglomerate A sedimentary rock composed of rounded pebbles or gravel.

Dacite An igneous rock composed mainly of plagioclase with quartz and pyroxene or hornblende.

Devilline $Cu_4(CaSO_4)_2(OH)_6.3H_2O$. H=2.5. Bright green to bluish green transparent platy crystals forming rosettes or tiny masses. Associated with azurite, malachite on copper-bearing rocks. Not readily distinguishable from other copper minerals in hand specimen.

Diabase Dark coloured igneous rock composed mostly of lath-shaped crystals of plagioclase and of pyroxene. Used as a building, ornamental and monument stone.

Diopside $CaMgSi_2O_6$. H=6. Colourless, white to green monoclinic variety of pyroxene.

Diorite A dark coloured igneous rock composed mainly of plagioclase and amphibole or pyroxene.

Dolomite $CaMg(CO_3)_2$. H=3.5-4. Colourless, white, pink, yellow or grey rhombohedral or saddle-shaped crystals; also massive. Vitreous to pearly lustre. Slightly soluble in cold HCl. Ore of magnesium which is used in the manufacture of lightweight alloys.

Dyke A long narrow body of igneous rock that intrudes other rocks.

Electrum Native gold with 20 per cent or more of silver.

Epidote $Ca_2(Al, Fe)_3Si_3O_{12}(OH)$. H=6-7. Yellowish green to deep green prismatic crystals, also fibrous or granular masses. Vitreous lustre. Yellow-green colour is distinguishing feature. Occurs in metamorphic and granitic rocks, and in basalt.

Esker A long stream-deposited ridge or mound formed by the accumulation of sand, gravel, and boulders that were left by retreating glaciers.

Fault Structural feature produced by the movement of one rock mass relative to another; shear zone, brecciated zone, fault zone refer to the region affected by the movement.

Feldspar A mineral group consisting of alumino-silicates of potassium and barium (monoclinic or triclinic), and of sodium and calcium (triclinic). Orthoclase and microcline belong to the first group, plagioclase to the second. Used in the manufacture of ceramics, porcelain-enamel, porcelain, scouring powders, and artificial teeth.

Felsite A dense, fine-grained pink or grey igneous rock composed mainly of feldspar with little or no quartz.

Fluorescence Property of certain substances to glow when exposed to light from an ultraviolet lamp. It is caused by impurities in the substance or by defects in its crystal structure. Two wavelengths are commonly used to produce fluorescence: long wave (3,200 to 4,000 Angstrom units), short wave (2,537 Angstrom units).

Fluorite CaF_2. H=4. Transparent, colourless, blue, green, purple, yellow, cubic or, less commonly octahedral crystals; also granular massive. Vitreous lustre. Good cleavage. Often fluorescent; this property derives its name from the mineral. Used in optics, steel-making, ceramics.

Freibergite A silver-rich variety of the tetrahedrite-tennantite mineral series.

Freieslebenite $Pb_3Ag_5Sb_5S_{12}$. H=2-2.5. Grey metallic striated prismatic crystals. Grey streak. Associated with silver and lead ores.

Fuchsite — An emerald-green chromium-rich muscovite.

Gabbro — A dark coarse-grained igneous rock composed mainly of calcic plagioclase and pyroxene. Used as a building and monument stone.

Galena — PbS. H=2.5. Dark grey metallic cubic crystals or crystal aggregates; also massive. Perfect cleavage. Distinguished by its high (7.58) specific gravity and perfect cleavage. Ore of lead.

Garnet — Silicate of Al, Mg, Fe, Mn, Ca. H=6.5-7.5. Transparent red dodecahedral crystals, or massive granular; also yellow, brown, green. Distinguished by its crystal form. Used as an abrasive. Clear garnet is used as a gemstone.

Gersdorffite — NiAsS. H=5.5. Light to dark grey metallic; octahedral, pyritohedral crystals or granular massive. Associated with other nickel minerals in vein deposits.

Gneiss — A coarse-grained foliated metamorphic rock composed mainly of feldspar, quartz and mica. Used as a building and monument stone.

Godlevskite — Ni_7S_6. Pale yellow metallic. Occurs as microscopic grains and aggregates associated with nickel and copper ores.

Goethite — $HFeO_2$. H=5-5.5. Dark brown, reddish or yellowish brown, earthy, botryoidal, fibrous, bladed or loosely granular masses; also prismatic, acicular, tabular crystals or scaly. Has characteristic yellowish brown streak. Weathering product of iron-rich minerals. Ore of iron.

Gold — Au. H=2.5-3. Yellow metallic irregular masses, plates, scales, nuggets. Rarely as crystals. Distinguished from other yellow metallic minerals by its hardness, malleability, high specific gravity (19.3). Precious metal.

Gossan — A decomposed or weathered rusty covering on masses of pyrite or in upper zone of veins; consists of hydrated iron oxides.

Granite — Grey to reddish coloured relatively coarse-grained igneous rock composed mainly of feldspar and quartz. Used as a building and monument stone.

Granodiorite — An igneous rock that is intermediate in composition between granite and diorite.

Graphite — C. H=1-2. Dark grey to black metallic flaky or foliated masses. Flakes are flexible. Greasy to touch. Black streak and colour distinguish it from molybdenite. Usually occurs in metamorphic rocks. Used as a lubricant, in "lead" pencils, and refractories.

Greenstone — A metamorphosed volcanic rock composed mainly of chlorite.

Greywacke — Sedimentary rock containing large amounts of amphibole or pyroxene and feldspar.

Gunningite $ZnSO_4.H_2O$. H=2.5. White powder occurring as an efflorescence on sphalerite from which it has oxidized. First described from the Keno Hill deposits, it was named for Dr. H. C. Gunning, a former geologist with the Geological Survey of Canada, and later, Head of the Geology Department, University of British Columbia.

Gypsum $CaSO_4.2H_2O$. H=2. White, grey, light brown, granular massive; also fibrous (satin spar), or colourless transparent crystals (selenite). Distinguished from anhydrite by its inferior hardness. Occurs in sedimentary rocks. Used in construction industry (plaster, wallboard, cement, tiles, paint) and as a soil conditioner and fertilizer. Satin spar and alabaster (fine-grained translucent variety) are used for carving into ornamental objects.

Heazlewoodite Ni_3S_2. H=4. Yellow metallic; massive, granular, or platy aggregates. Distinguished from pyrite by its inferior hardness.

Hematite Fe_2O_3. H=5.5-6.5. Reddish brown to black massive, botryoidal, or earthy; also foliated or micaceous with high metallic lustre (specularite). Characteristic red streak. Greasy to dull lustre. Ore of iron.

Hessite Ag_2Te. H=2-3. Grey metallic finely granular, massive. Sectile. Occurs with native gold and with other tellurides in vein deposits.

Hexahydrite $MgSO_4.6H_2O$. Colourless or white, finely fibrous, columnar; also globular encrustations. Pearly to vitreous lustre. Bitter, saline taste. Occurs sparingly as an alteration product of epsomite. Originally found at a Bonaparte River locality in British Columbia. Associated with other sulphates from which it is not readily distinguished.

Holmquistite Lithium amphibole. Violet to light blue columnar, lamellar or fibrous aggregates. Occurs at or near the contact of lithium-bearing pegmatites and the country rock. Distinguished by its colour and habit.

Hornblende $NaCa_2(Mg, Fe, Al)_5(Si, Al)_8O_{22}(OH)_2$. H=6. Member of amphibole group. Dark green, brown or black. Vitreous lustre. Occurs as prismatic crystals and in massive form. Common rock-forming mineral.

Igneous Rocks that have crystallized from magma or from the melting of other rocks; usually composed of feldspar, quartz, and hornblende, pyroxene or biotite.

Ilmenite $FeTiO_3$. H=5-6. Black compact or granular massive; thick tabular crystals. Metallic to submetallic lustre. Black streak distinguishes it from hematite. Source of titanium.

Iron-formation Metamorphosed sediment containing iron minerals and silica.

Jarosite $KFe_3(SO_4)_2(OH)_6$. H=2.5-3.5. Yellow to brownish pulverulent coating associated with iron-bearing rocks and with coal. Distinguished from iron oxides by giving off SO_2 when heated.

Klockmannite CuSe. H=3. Dark grey metallic on fresh surface; dull to blue-black on tarnished surface. Massive, granular.

Krennerite (Au, Ag)Te_2. H=2-3. Light grey to yellow metallic. Prismatic striated crystals. Occurs with other gold tellurides and with native gold in vein deposits.

Kyanite Al_2SiO_5. H=4-5, 6-7. Blue to green or greyish blue, long, bladed crystals and bladed masses. Vitreous to pearly lustre. Hardness is 4 to 5 along length of crystal and 6 to 7 across it. Occurs in schist and gneiss. Colour and variable hardness are distinguishing features. Used in manufacture of mullite refractories.

Lamprophyre A fine-grained dyke rock composed of plagioclase feldspar and pyroxene or amphibole.

Leonhardtite $MgSO_4 . 4H_2O$. Dull white encrustations. Bitter metallic taste. Difficult to distinguish in hand specimen from other sulphates. Also known as starkeyite.

Lepidolite Lithium mica. Lilac-coloured fine flaky aggregates. Ore of lithium; used in manufacture of glass and ceramics.

Leucoxene Yellowish to brown dull alteration product of titanium minerals such as titanite, ilmenite, perovskite, and others.

Limestone Soft white or grey sedimentary rock formed by the deposition of calcium carbonate. Dolomite limestone contains variable proportions of dolomite and is distinguished from the normal limestone by its weaker (or lack of) effervescence in HCl acid. Crystalline limestone (marble) is a limestone that has been metamorphosed and is used as a building and ornamental stone. Shell limestone (coquina) is a porous rock composed mainly of shell fragments.

Limonite Field term referring to natural hydrous iron oxide whose true identity is unknown. Yellow-brown to dark brown earthy, porous ochreous masses; also stalactitic or botryoidal. Secondary product of iron minerals.

Mackinawite FeS. Grey metallic becoming bronze on exposure to air. Occurs as microscopic grains and plates associated with other sulphides.

Magnesite $MgCO_3$. H=4. Colourless, white, greyish, yellowish to brown lamellar, fibrous, granular or earthy masses; crystals rare. Vitreous, transparent to translucent. Distinguished from calcite by lack of effervescence in cold HCl. Used in manufacture of refractory bricks, cements, flooring; for making magnesium metal.

Malachite $Cu_2CO_3(OH)_2$. H=3.5-4. Bright green granular, botryoidal, earthy masses; usually forms coating with other secondary copper minerals on copper-bearing rocks. Distinguished from other green copper minerals by effervescence in HCl acid. Ore of copper.

Marcasite — FeS_2. H=6-6.5. Pale bronze to grey metallic radiating, stalactitic, globular or fibrous forms; twinning produces cockscomb and spear shapes. Yellowish to dark brown tarnish. Massive variety difficult to distinguish from pyrite in hand specimen.

Mattagamite — $CoTe_2$. Grey metallic with violet to pink tinge. Occurs as microscopic grains and bladed aggregates with altaite, pyrrhotite and chalcopyrite. Named for Mattagami Lake Mine where it was originally found.

Melonite — $NiTe_2$. H=1-1.5. Reddish metallic with brown tarnish. Occurs as hexagonal plates as foliated aggregates. Associated with gold tellurides. Soluble in HNO_3 and becomes green.

Millerite — NiS. H=3-3.5. Pale brass-yellow, slender, elongated, striated crystals; acicular radiating or hair-like aggregates. Grey iridescent tarnish. Distinguished from pyrite by its crystal form, and its inferior hardness. Ore of nickel.

Molybdenite — MoS_2. H=1-1.5. Dark bluish grey metallic tabular, foliated, scaly aggregates or hexagonal crystals; also massive. Sectile with greasy feel. Distinguished from graphite by its bluish lead-grey colour and by its streak (greenish on porcelain, bluish grey on paper). Ore of molybdenum.

Molybdite — MoO_3. Very soft yellow fibrous or earthy crusts or coatings. A secondary mineral formed by alteration of molybdenite. Most material called molybdite in nature is probably ferrimolybdite ($Fe_2Mo_3O_{12}.8H_2O$).

Monadnock — A residual hill or mountain that rises conspicuously above a peneplain having resisted the long erosion producing the plain.

Orthoclase — $KAlSi_3O_8$. H=6. Red pink or white feldspar. Short prismatic crystals. Vitreous lustre. Perfect cleavage. Distinguished from plagioclase feldspars by absence of twinning striations.

Ottrelite — Variety of chloritoid. H=6.5. Hydrous Mg, Fe, Al silicate. Grey to black tabular crystals; also scaly, platy or foliated. Lamellar varieties resemble mica or chlorite but are distinguished by their brittleness and hardness. Occurs in metamorphosed sediments.

Pegmatite — A very coarse grained dyke rock.

Pentlandite — $(Fe, Ni)_9S_8$. H=3.5-4. Light bronze-yellow massive, granular aggregates. Octahedral parting distinguishes it from pyrrhotite with which it is commonly associated. Nonmagnetic. Ore of nickel.

Peridotite — An igneous rock consisting almost entirely of olivine and pyroxene with little or no plagioclase feldspar.

Petzite — Ag_3AuTe_2. H=2.5-3. Light to dark grey metallic; massive granular. Associated with other tellurides in vein deposits. Decomposed by HNO_3.

Picrolite — A non-flexible fibrous variety of antigorite (serpentine).

Plagioclase (Ca, Na)(Al, Si)$AlSi_2O_8$. H=6. White or grey tabular crystals or cleavable masses having twinning striations on cleavage surfaces. Vitreous to pearly lustre. Distinguished from other feldspars by its twinning striations.

Pollucite (Cs, Na)$AlSi_2O_6 . nH_2O$. H=6.5. Colourless, white, greyish vitreous massive. Resembles quartz but has inferior hardness. Occurs in pegmatites containing lithium minerals. Ore of caesium.

Polycrase (Y, Ca, Ce, U, Th)(Ti, Nb, Ta)$_2O_6$. H=5.5-6.5. Black with submetallic lustre. Yellowish, brownish streak. Occurs as prismatic crystals, as parallel aggregates of crystals; also massive. Radioactive. Occurs in granite pegmatites.

Porphyry A dyke rock that consists of distinct crystals (phenocrysts) in a fine-grained matrix.

Powellite $CaMoO_4$. H=3.5-4. White, yellow, greenish yellow, brown, blue to almost black. Occurs as pyramidal or tabular crystals; massive, foliated, earthy. Lustre is sub-adamantine (crystal faces), greasy or pearly. Fluoresces yellow in ultraviolet light. Secondary mineral formed by alteration.

Proustite Ag_3AsS_3. H=2-2.5. Red with adamantine lustre. Prismatic crystals or massive. Associated with other silver minerals. Ore of silver. Known as ruby silver.

Pyrargyrite Ag_3SbS_3. H=2.5. Deep red prismatic crystals, massive. Adamantine lustre. Deep red streak. Occurs in veins carrying other silver minerals. Known as ruby silver. Ore of silver. Colour is identifying characteristic.

Pyrite FeS_2. H=6-6.5. Pale brass-yellow metallic crystals (cubes, pyritohedrons, octahedrons) or massive granular. Iridescent when tarnished. Distinguished from other sulphides by its colour, crystal form, and superior hardness. Source of sulphur.

Pyroclastic rocks Rocks composed of fragments of volcanic rocks.

Pyroxene A mineral group consisting of Mg, Fe, Ca and Na silicates related structurally. Diopside, enstatite, aegirine, jadeite, etc. are members of the group. Common rock-forming mineral.

Pyroxenite An igneous rock composed mainly of pyroxene with little or no feldspar.

Pyrrhotite $Fe_{1-x}S$. H=4. Brownish bronze massive granular. Black streak. Magnetic; this property distinguishes it from other bronze sulphides.

Quartzite A quartz-rich rock formed by the metamorphism of a sandstone. Used as a building and monument stone, and, if colour is attractive, as an ornamental stone; high purity quartzite is used in the glass industry.

Rhodochrosite $MnCO_3$. H=4. Pink massive, globular, columnar or botryoidal. Soluble with effervescence in hot HCl. Distinguished by colour, rhombohedral cleavage, and hardness. Resembles rhodonite but has inferior hardness.

Rhyolite Fine-grained volcanic rock with composition similar to granite.

Rickardite Cu_4Te_3. H=3.5. Purplish red metallic; massive. Soluble in HNO_3. Associated with other tellurides from which it is distinguished by the colour resembling tarnished bornite.

Rozenite $FeSO_4 . 4H_2O$. White or greenish white, finely granular, botryoidal or globular encrustations. Metallic astringent taste. Difficult to distinguish in hand specimen from other iron sulphates with which it is associated.

Ruby silver The silver minerals, pyrargyrite and proustite, are known as ruby silver because of their red colour.

Rutile TiO_2. H=6-6.5. Brownish red to black striated prismatic or acicular crystals; massive. Crystals are commonly twinned, forming elbow shapes. Adamantine lustre. Resembles cassiterite, but not as heavy and has light brown streak (cassiterite has white streak). Ore of titanium.

Scheelite $CaWO_4$. H=4.5-5. White, yellow, brownish; transparent to translucent massive. High specific gravity (about 6). Usually fluoresces; this property is used as a method of prospecting for this tungsten ore.

Schist Metamorphic rock composed mainly of flaky minerals such as mica and chlorite.

Selenite See gypsum.

Selenium Se. H=2. Grey metallic, acicular, tube-like crystals; aggregates of crystals forming sheets. Red streak. Associated with pyrite deposits.

Sericite Fine scaly or fibrous muscovite that is an important constituent of some schists and gneisses.

Serpentine $Mg_6(Si_4O_{10})(OH)_8$. H=2-5. Usually massive with waxy lustre. Translucent to opaque in shades of yellow-green to deep green, also bluish, red, brown, black. Often mottled, banded, or veined. Asbestos is the fibrous variety. Formed by alteration of olivine, pyroxene, amphibole, or other magnesium silicates. Found in metamorphic and igneous rocks. Used as ornamental building stone (verde antique) and for cutting and/or carving into ornamental objects (ash trays, book-ends, etc.).

Serpentinite A rock consisting almost entirely of serpentine.

Shear zone A region in which lateral movements along rock planes has produced crushed or brecciated rocks.

Siderite — $FeCO_3$. H=3.5-4. Brown rhombohedral crystals, cleavable masses, earthy, botryoidal. Distinguished from calcite and dolomite by its colour and higher specific gravity; from sphalerite by its cleavage. Ore of iron.

Siderotil — $FeSO_4 . 5H_2O$. White, pale green to bluish fibrous crusts, needlelike crystals, or finely granular encrustations. Vitreous lustre. Metallic, astringent taste. Difficult to distinguish in hand specimen from other iron sulphates.

Silver — Ag. H=2.5-3. Grey metallic arborescent, wiry, leafy, platy or scaly forms; crystals (cubic, octahedral, dodecahedral) rare. Tarnishes to dark grey or black. Hackly fracture. Ductile, malleable. Colour, form and sectility are identifying characteristics.

Slate — Fine-grained metamorphic rock characterized by a susceptibility to split into thin sheets.

Soapstone — Metamorphic rock composed chiefly of talc; has massive fibrous texture and unctuous feel.

Specularite — Black variety of hematite having a high lustre.

Sperrylite — $PtAs_2$. H=6-7. Light grey metallic, cubic or cubo-octahedral crystals. Associated with pyrrhotite-pentlandite-chalcopyrite ores.

Sphalerite — ZnS. H=3.5-4. Yellow, brown or black, granular to cleavable massive; also botryoidal. Resinous to submetallic. Honey-brown streak. Soluble in HCl, and gives off H_2S. Ore of zinc.

Spodumene — $LiAlSi_2O_6$. H=6.5. White, grey, pink, violet, green long prismatic crystals or platy masses. Perfect cleavage. Vitreous lustre. Distinguished by form and cleavage. Occurs in pegmatite. Source of lithium. Used in ceramics.

Stilpnomelane — Fe silicate. Black, greenish black foliated plates, fibrous. Commonly associated with iron ores.

Syenite — An igneous rock composed mainly of feldspar with little or no quartz. Used as building stone.

Sylvanite — (Au, Ag)Te_2. H=1.5-2. Light to dark grey metallic; prismatic or tabular crystals, bladed aggregates, granular. Associated with native gold and other tellurides in vein deposits. Distinguished from other gold tellurides by its inferior hardness.

Szomolnokite — $FeSO_4 . H_2O$. H=2.5. White to pinkish white fine hair-like aggregates or finely granular encrustations; also botryoidal, globular crusts. Vitreous lustre. Metallic taste. Associated with pyrite and other iron sulphates from which it is not readily distinguishable in the hand specimen.

Talc — $Mg_3(Si_4O_{10})(OH)_2$. H=1. Grey, white, various shades of green. Fine-grained massive, foliated. Translucent with greasy feel. Massive varieties are known as steatite and soapstone, and because of their suitability for carving, are used for ornamental purposes. Formed by alteration of magnesium silicates (olivine, pyroxene, amphibole, etc.) in igneous and metamorphic rocks. Used in cosmetics.

Tellurantimony — Sb_2Te_3. Pink metallic lath-like microscopic grains associated with altaite. Originally found in the Mattagami Lake Mine. Named for its composition.

Tellurbismuth — Bi_3Te_3. H=1.5-2. Dark grey metallic platy, foliated aggregates. Laminae flexible; sectile. Triangular striations on cleavage surfaces. Occurs in auriferous quartz veins. Also known as tellurobismuthinite.

Tennantite — See tetrahedrite.

Tetradymite — Bi_2Te_2S. H=1.5-2. Grey with high metallic lustre. Foliated, bladed, massive. Dull or iridescent tarnish. Perfect cleavage. Soils paper. Occurs in gold-quartz veins.

Tetrahedrite — (tetrahedrite-tennantite series) $Cu_{12}Sb_4S_{13} - Cu_{12}As_4S_{13}$. H=3.5-4. (Tennantite harder). Flint grey to iron black, metallic, tetrahedral crystals; also massive granular to compact. Brown, black or deep red streak. Tennantite is less common than tetrahedrite. Ore of copper; contains values in silver, antimony.

Titanite — (sphene) $CaTiSiO_5$. H=6. Brown, wedge-shaped crystals; also massive granular. May form cruciform twins. Adamantine lustre. White streak. Distinguished from other dark silicates by crystal form, lustre and colour.

Tourmaline — $Na(Mg, Fe)_3Al_6(BO_3)_3(Si_6O_{18})(OH)_4$. H=7.5. Black, deep green or blue, pink, brown, amber-coloured, prismatic crystals; also columnar, granular. Prism faces vertically striated. Vitreous lustre. Conchoidal fracture. Distinguished by triangular cross-section in prisms; by striations, fracture. Used in manufacture of pressure gauges; transparent varieties used as gemstone.

Trachyte — A light coloured lava composed essentially of orthoclase with minor biotite, amphibole and/or pyroxene.

Tremolite — $Ca_2Mg_5Si_8O_{22}(OH)_2$. H=5-6. White, grey, striated prismatic crystals, bladed crystal aggregates, fibrous, perfect cleavage. Usually occurs in metamorphic rocks. Fibrous variety is used for asbestos; clear crystals are sometimes cut and polished as a gem curiosity.

Tuff — A rock formed from volcanic ash.

Umangite — Cu_3Se_2. H=3. Red with violet tinge tarnishing to violet-blue. Metallic lustre. Massive, granular. Easily fusible. Soluble in HNO_3. Colour is distinguishing characteristic. Occurs with sulphides and with other selenides.

Valleriite — Cu, Fe sulphide. Massive, platy, bronze-black. Perfect cleavage. Occurs in copper deposits.

Violarite — Ni_2FeS_4. H=4.5-5.5. Violet grey, brilliant metallic; tarnishes to violet grey. Massive. Distinguished by colour. Associated with copper, nickel and iron sulphides in vein deposits. Rare mineral.

Wad — A field term used for substances consisting mainly of manganese oxides.

Wall-rock — The rock forming the walls of a vein.

Wittichenite — Cu_3BiS_3. H-2-3. Grey metallic tabular crystals or columnar, acicular aggregates; massive. Fuses easily. Soluble in HCl and gives off H_2S; decomposed by HNO_3. Alters readily to yellowish brown, red, blue colours, and eventually forms covellite.

Wulfenite — $PbMoO_4$. H=3. Orange-yellow, yellowish grey, olive-green, brown. Resinous lustre. Square tabular crystals, massive, granular. Secondary mineral formed by oxidation of lead and molybdenum minerals. Colour, lustre and crystal form are distinguishing characteristics.

CHEMICAL SYMBOLS FOR CERTAIN ELEMENTS

Ag	-	silver	Mo	-	molybdenum
Al	-	aluminum	Na	-	sodium
As	-	arsenic	Nb	-	niobium
Au	-	gold	Ni	-	nickel
B	-	boron	O	-	oxygen
Ba	-	barium	P	-	phosphorus
Be	-	beryllium	Pb	-	lead
Bi	-	bismuth	Pt	-	platinum
C	-	carbon	R	-	rare-earth elements
Ca	-	calcium	S	-	sulphur
Cb	-	columbium (niobium)	Sb	-	antimony
Ce	-	cerium	Se	-	selenium
Cl	-	chlorine	Si	-	silicon
Co	-	cobalt	Sn	-	tin
Cr	-	chromium	Sr	-	strontium
Cu	-	copper	Ta	-	tantalum
Er	-	erbium	Te	-	tellurium
F	-	fluorine	Th	-	thorium
Fe	-	iron	Ti	-	titanium
H	-	hydrogen	U	-	uranium
K	-	potassium	W	-	tungsten
La	-	lanthanum	Y	-	yttrium
Li	-	lithium	Yb	-	ytterbium
Mg	-	magnesium	Zn	-	zinc
Mn	-	manganese	Zr	-	zirconium

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