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PRELIMINARY REPORT ON MONTAUBAN-LES-MINES AREA, PORTNEUF COUNTY

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PROVINCE OF QUEBEC. CANADA
DEPARTMENT OF MINES
MINERAL DEPOSITS BRANCH

PRELIMINARY REPORT
ON
MONTAUBAN-LES-MINES AREA
PORTNEUF COUNTY

BY

J. R. SMITH



QUEBEC
1950

P. R. No. 242

P R E L I M I N A R Y R E P O R T

ON MONTAUBAN-LES-MINES AREA

by J.S. Smith

I N T R O D U C T I O N

The mine at Montauban-Les-Mines has been an important producer of lead and zinc in the Grenville sub-province of Canada. Since the mine was acquired and operated successfully by Anacon Lead Mines, Ltd., in 1948, interest in the area has revived. For this reason, an area of approximately 20 square miles around the mine was examined during the field season of 1949, in order to determine the geological structure and to gather data on the possibility of finding other economic mineral deposits.

The geology is being plotted on a base map which is now in preparation and compiled at a scale of one inch equals four hundred feet from existing surveys supplemented by recent aerial photographs.

The writer is indebted to the officers of Anacon Lead Mines, Ltd., particularly to Dr. S.E. Melouf, geologist, for many courtesies extended during the course of the work.

The map-area is 50 miles west of Quebec city. It includes parts of Chavigny and Montauban townships, and of the Seignior of Grondines West.

The Montauban-Les-Mines area forms part of the area mapped geologically at a scale of one inch equals one-half mile by J.A. Bancroft (1) in 1914. In 1938, J.J. O'Neill and F.F. Osborne mapped the Montauban ore zone and accessible underground workings at a scale of 100 feet to the inch. This work was supplemented by Osborne in 1941 and 1943 (2). A description of the ore zone by Osborne was published in "Economic Geology" (3).

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- (1) Bancroft, J.A., The Geology of Parts of the Townships of Montauban and Chavigny and of the Seignior of Grondines; Quebec Bureau of Mines, Report of Mining Operations, 1915, pp. 104-143.
 - (2) O'Neill, J.J. and Osborne, F.F., Tétreault Mine, Montauban-Les-Mines, Portneuf County; Dept. of Mines, Que., P.R., No. 136, Second Edition, 1948.
 - (3) Osborne, F.F., The Montauban Mineralized Zone, Quebec; Economic Geology, Vol. XXXIV, No. 6, Sept.-Oct., 1939, pp. 712-726.

Also, during the summer of 1938, N.L. Wilson examined the continuation of the Montauban ore zone north toward the Batiscan river, mapping it at 100 feet to the inch (1).

G E O L O G Y

The greater part of the area is underlain by a belt of meta-sediments, probably of Grenville age, which lies between two masses of granitic orthogneiss on the east and west. The meta-sediments consist mostly of paragneisses, with some quartzite and two small limestone beds. They are interlayered with numerous sill-like bodies and dykes of several kinds of orthogneiss and pegmatite. Hornblende gneiss in concordant bodies is common. The paragneisses are cut in a few places by small amphibolite dykes. It was found possible to map as a unit a grey composite gneiss, which occurs in rather ill-defined bodies throughout the area.

Quartzites.-

The quartzites occur interbedded with paragneisses. They are, in places, quite massive and pure, but most of them contain a small amount of feldspar and some muscovite. By increase of these constituents, and by the addition of biotite the quartzites grade into paragneisses. A band of quartzite which trends southwest from the bridge at Notre-Dame-des-Anges was found to interfinger with, and finally to be replaced entirely by, paragneiss along the strike.

Paragneisses.-

Paragneisses underlie a large part of the map-area. Most of them are fine grained and schistose. Quartz, feldspar, biotite and disseminated pyrite and pyrrhotite may be distinguished in hand specimens with the naked eye. The oxidation of the disseminated sulphides causes the exposed surface of the rock to be rusty and deeply weathered. Many of the paragneisses contain small garnets, and a few bands have nodules of quartz penetrated by fibres of sillimanite.

Limestone.-

The principal occurrence of Grenville limestone is along the ore zone at Montauban. Another similar, but smaller, body was found north of the Batiscan river near the Notre-Dame-des-Anges, Lac aux Sables road.

The rocks will be described in the paragraphs on "Description of Mineral Deposits".

(1) Wilson, N.L., An Investigation of the Metamorphism of the Orijarvi Type, with Special Reference to the Zinc-Lead Deposits at Montauban-Les-Mines, P.Q.; Unpublished Ph.D. thesis, McGill Univ., 1939.

Hornblende Gneiss.-

Schistose rocks, which consist of a fine-grained aggregate of hornblende, feldspar and quartz and which can be appropriately termed hornblende gneiss, crop out at many places in the area. One homogeneous mass of this gneiss, 1,600 feet in width, is half a mile west of the Anacon mine.

No conclusive evidence of the origin of this rock was found. Perhaps the examination of this section will provide some data.

Grey Composite Gneiss.-

The rock mapped as grey composite gneiss is, in part, a fine-grained biotite gneiss, and usually contains light-colored granitic bands, which probably represent igneous material injected along the schistosity planes.

O'Neill and Osborne (1) concluded that some of the gneisses in the immediate vicinity of the Montauban ore zone had been migmatized. These migmatites were, in part, mapped as grey composite gneiss.

Orthogneisses.-

Grey orthogneiss underlies a large area on the southeast shore of Lac aux Sables. It is medium grained and schistose, and contains feldspar, quartz, biotite, and a dark green amphibole. The contact with paragneiss, where observed, is sharp and parallel to the schistosity planes in the two rocks.

The western edge of a large body of orthogneiss lies within the extreme east-central part of the map-area. This orthogneiss closely resembles that described above. Bancroft (2) termed the rock grano-diorite and considered the two bodies to be cupolas or stocks of the same batholith at depth.

The most common type of orthogneiss forming the sills and dykes in the meta-sediments is fine grained and faintly schistose. These rocks contain very little hornblende and are lighter colored than the orthogneiss of the stocks. The dykes and sills are normally garnetiferous near their contacts.

Amphibolite.-

Some basic dykes have been converted to an amphibolite which consists of hornblende, feldspar, and biotite. In places the dykes have coarsely garnetiferous selvages. Such amphibolites were found only in the vicinity of the Montauban ore zone. They are too small to appear on the preliminary map.

(1) O'Neill, J.J. and Osborne, F.F., Op. cit., pp. 7 - 10.

(2) Op. cit., p. 121.

Just north of the Batiscan river the tenor of amphibole in the orthogneiss stock is very high. The rock may represent an early differentiate of the magma. It is shown as amphibolite to distinguish it from the more acidic facies.

Pegmatite.-

Pegmatite dykes from a fraction of an inch to 100 feet in width are numerous in the area. Most of them are white and very coarse grained. They consist chiefly of white feldspar and some quartz, with a little coarse muscovite and biotite in places. Near the contacts, the dykes tend to be finer grained and garnetiferous.

Structure.-

Schistosity is in general parallel to geologic contacts. Large-scale folding appears to be relatively open and gentle. In many localities, the incompetent paragneisses are very complexly drag-folded.

Local shearing is indicated in many places by intense schistosity, changes in strike and topographic features.

M I N E R A L D E P O S I T S

The area has been extensively explored both on surface and underground for occurrences of metallization of economic value. Detailed descriptions of this work are contained in the annual reports of the Quebec Department of Mines. The results will be summarized here.

Anacon Lead Mines Limited.-

The property of this company covers lots 33 to 41 and part of lot 42, range I; the southwest halves of lots 38 to 42, range II; and lots 12 to 16 and part of Block C, range V S.W., all in Montauban township; the southeast halves of lots 15 to 18, range I S.W., and part of the bed of the Batiscan river, all in Chavigny township; and part of lots 311 to 327, range I Price, St. Ubald Parish.

A zone of zinc-lead metallization on the company's property can be traced for a distance of 8,500 feet on lots 319 to 327, range I Price, St. Ubald Parish, and on lots 39 to 45, range I S.W., and Block C, Montauban township. More than a million tons of ore have been mined since 1913 from the former Tétrault mine on the southern part of the zone. The northern part of the zone has been explored by various mining companies, but to date each attempt at mining has been abandoned and has yielded no production.

Since acquiring the Tétreault mine in 1948, Anacon Lead Mines Limited have been mining ore near the sites of former workings, and at the same time exploring the zone to the north of the workings. Seventeen diamond-drill holes have intersected low grade, but possibly mineable ore over large widths in Block C. New ore discovered by diamond drilling from surface is at present being developed on the northward extension of the fourth level, and the sixth (and lowest) level main drift is being driven north toward a flatly dipping, thin body of good-grade ore intersected by other vertical surface holes.

According to the annual report of the company, ore reserves at the end of August, 1949, were as follows:

1. 129,424 tons of broken ore and available ore averaging 5.493 per cent zinc, 0.95 per cent lead, 0.015 ounces of gold per ton, and 1.95 ounces of silver per ton.
2. 217,000 tons of probably and possible ore, averaging 6.46 per cent zinc, 2.10 per cent lead, 0.013 ounces of gold per ton, and 3.51 ounces of silver per ton.

These figures are exclusive of the ore intersected in Block C, and tailings which the company has been remilling.

Results of the exploration programme have led the company to make numerous improvements in the mine and mill.

The geology of the ore zone is described in detail by Bancroft (op. cit.), O'Neill and Osborne (op. cit.), Osborne (op. cit.), and Wilson (op. cit.). The zone strikes north-south near the mine, north-northeast to the north, and south-southeast to the south. The general dip is 60° to 70° to the east in the Anacon mine. On the south part of the zone, ore occurs mainly in a complexly folded bed of limestone, which has been largely altered to diopside-tremolite rock by the solutions which later replaced the unsilicated carbonate with sphalerite-pyrrhotite-galena-chalcopyrite ore. About 1,400 feet north of the shaft, the zone passes into paragneisses, and it is marked by the alteration of the paragneisses to coarse mica schists and cordierite-anthophyllite rock, and by sphalerite-chalcopyrite-galena-quartz mineralization. Ore in the metasomatized paragneisses is leaner and more erratically distributed than that in the limestone, which at present averages about five per cent zinc, one per cent lead, 0.01 ounces of gold per ton, and 2.2 ounces of silver per ton.

Another constituent of possible value is mica, which occurs in appreciable quantities in the gangue. The company has found it possible to produce, in a pilot plant, a marketable grade of ground mica from the mill tailings. Plans are under consideration for the installation of machinery to put the project into full-scale production.

Laurentide-Adanac Zone:-

A small, but continuous, valley trending a little east of north lies in the north-western parts of lots 7 and 8, range IV S.W., and in the south-

eastern parts of lots 2 to 6, range V S.W., Montauban township. Rusty paragneisses are exposed in trenches and outcrops over a distance of approximately a mile along the valley. The paragneisses are very siliceous, and carry, in places, substantial amounts of pyrite, pyrrhotite and sphalerite.

On lot 7, a vein of sphalerite about 18 inches wide is exposed at the collar of the Laurentide shaft. The dump contains numerous fragments of rock, which are estimated by inspection to contain 5 to 6 per cent of zinc. Only a few crystals of galena were seen. A few needles of tremolite in the siliceous gangue may indicate the presence of some limy bands in the original sediments.

Schistosity in the gneisses along the zone dips about 50° to the east. The intrusive contact lies about 300 feet to the east, and appears to be parallel to the schistosity.

Limestone Band near the Notre-Dame-des-Anges, Lac aux Sables Road.-

A 12- to 20-foot band of silicate-carbonate rock, closely resembling the gangue in the Montauban zone, crops out over a length of about 1,200 feet in lot 10, Range I S.W., Chavigny township. The band and the schistosity in the surrounding siliceous paragneisses strike east-west and dip steeply south. Only a few grains of pyrite, pyrrhotite and sphalerite can be found on surface. Fairly extensive underground workings disclosed only a few small masses of mineable sphalerite and the fact that the limestone pinched out at depth.

Band near Rapids on Batiscan River (lot 1, range V S.W.), Montauban Township.-

The tunnel near the rapids on the Batiscan river above the bridge at Notre-Dame-des-Anges was driven into rusty siliceous paragneiss, just below the contact with massive quartzite. The paragneisses here contain scarcely more sulphide than is normally found in them, so that this locality can hardly be classed as a deposit.

Lot 16, Range I S.W., Chavigny Township.-

In this lot, about 100 feet northwest of the footwall contact of the large body of hornblende gneiss, a small shaft has been started in rusty siliceous paragneiss.

The dump contains numerous fragments of massive pyrrhotite pyrite ore, and some small veins of the same material can be seen in place near the shaft collar, over a width of about 2 feet. A sample of such material taken by the writer assayed nil in gold, and only trace in silver. No sphalerite or galena was seen.

Many pages would be required to describe the scores of small trenches in the area, which show, for the most part, only common sulphides in rusty paragneiss. Minute veinlets of sphalerite and galena found in places are indicative of widespread minor percolation of the metallizing solutions. Deposition in quantity of metallic ores appears to have required the presence of easily replaceable carbonate beds.