

RP 263(A)

PRELIMINARY REPORT ON JOHAN-BEETZ AREA (EASTERN HALF), DRUCOURT AND JOHAN-BEETZ TOWNSHIPS, SAGUENAY COUNTY

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PROVINCE OF QUEBEC, CANADA
DEPARTMENT OF MINES
GEOLOGICAL SURVEYS BRANCH

PRELIMINARY REPORT

ON

JOHAN BEETZ AREA
(EASTERN HALF)

DRUCOURT AND JOHAN BEETZ

TOWNSHIPS

SAGUENAY COUNTY

BY

GERALD E. COOPER



QUEBEC
1951

PRELIMINARY REPORT

ON

JOHAN BEETZ AREA (EASTERN HALF)

Drucourt and Johan Beetz Townships

Saguenay County

by

Gerald E. Cooper

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

The eastern half of the Johan Beetz area, which was mapped during the summer of 1951, is bounded by longitudes 62°30'W. and 62°45'W., and by latitudes 50°15'N. and 50°30'N. The southwest corner of the area is 2½ miles east of Johan Beetz, a small settlement on the north shore of the gulf of St. Lawrence, 440 miles below Quebec city.

Means of Access

Boats of Clarke Steamship Co., Ltd., sailing from Montreal and Quebec, make regular stops at Johan Beetz. From this village a fishing barge is the best means of reaching the southern part of the area.

To reach the interior, two canoe routes may be followed. One, which follows Piashtibaie river to Bellanger lake, gives access to the western part of the map-area. The second route follows Watshishou river to a point 2½ miles north of Véronique lake. From here the west branch of the river gives access to Théodule and Prudent lakes in the northeastern part of the area. Both rivers contain many rapids and chutes, there being 11 portages between the sea and Bellanger lake and 21 portages to reach Prudent lake. However, all the portages are short, the longest being slightly more than one-half mile.

Several large lakes, notably in the northern half of the area, are suitable for landings by seaplanes. The nearest seaplane base is at Sept Isles, 165 miles west of Johan Beetz.

TOPOGRAPHY

Topographically, the land rises from a low flat irregular shore to a height that, with the exception of a few hills, is less than 400 feet above sea level. The coastline is indented by many bays. The structure of the underlying rocks is the most important factor in determining the shape of those bays. In the western part of the coast, they are long narrow bays running parallel to the structure in a northeast direction while in the eastern part, due to variations in the trend of the structure, they are more open. There are also numerous low barren islands along the coast, particularly in the eastern half of the map-area.

Inland the country is more rugged. Long narrow ridges with fairly steep slopes alternate with narrow valleys, many of which have lakes and small streams. The ridges trend northeasterly in the southern half of the map-area and northerly in the northern part of the area. Inasmuch as the metasedimentary rocks are more easily eroded than the gabbro, they underlie the valleys, whereas the ridges are formed of gabbro or gabbro and quartzite. In the vicinity of the west shore of Villeneuve lake, however, there is no gabbro, and low ridges have been formed on resistant beds of quartzite.

GENERAL GEOLOGY

All the consolidated rocks of the area are of Precambrian age. Metamorphosed sedimentary rocks, as well as sills and dykes of gabbro, are the predominant rocks, but there are also some gneisses, biotite granite and some pegmatite. Of the sedimentary rocks, quartzites of variable composition are most abundant. These rocks are best exposed south of Bellanger lake and on each side of Villeneuve lake and Villeneuve river. Elsewhere they form bands of irregular thickness between sills and dykes of gabbro.

Gabbro in places crosses the bedding of sedimentary rocks at a small angle, but more commonly it is as sills between beds of quartzite or quartzite and schist.

South of Little Watshishou river, granite gneisses are abundant. It is quite possible that these gneisses have resulted from the recrystallization of metasedimentary rocks accompanied by the infiltration of much pegmatitic material.

A small stock of granite outcrops west of the north end of Villeneuve lake. Two smaller bodies are exposed on the coast. One is 1,000 feet east of the west boundary of the map, and the other is on the east side of Watshishou knoll. Several large pegmatite dykes cut the sedimentary rocks and gabbro in the southern part of the area. There are also many irregular zones of pegmatite and innumerable small pegmatite dykes, particularly in the area underlain by gneissic rocks.

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Table of Formations

Cenozoic (Pleistocene)	Clay, sand, gravel, erratic boulders	
Great unconformity		
Precambrian	Intrusive rocks	Pegmatite dykes Biotite granite
		Intrusive Contact
		Dykes and sills of altered gabbro
	Intrusive Contact	
	Composite gnoisses	Augen gneiss, banded gneiss
Metasedimentary rocks	Grey quartzite, mica schist, quartz biotite gneiss, calcareous quartzite, phyllite, lenses of crystalline limestone	

Precambrian

Metasedimentary Rocks

Metamorphosed sedimentary rocks are the oldest rocks in the area. Individual beds vary from a fraction of an inch to three feet thick. An impure grey quartzite is the most common of the sedimentary rocks. Mica schist, quartz biotite gneiss, calcareous quartzite, phyllite, and small lenses of crystalline limestone are interbedded with it.

Lenses of a coarsely crystalline limestone outcrop in grey quartzite on the northwest side of Quetachou bay. These lenses are 6 to 8 inches thick and up to 20 feet long. The limestone contains much dark mineral and has a rough surface due to the solution of carbonate.

South of Bellanger lake a few exposures of phyllite were observed. The rock is light grey in colour and very fine-grained. It occurs as thin beds intercalated in the massive grey quartzite.

Exposures of calcareous quartzite occur in several places, such as, on the west side of Quetachou bay, west of the foot of Théodule lake, and south of Bellanger lake. The quartzite, which is light grey in colour and fine-grained,

contains irregular blebs and lenticles of carbonate. The matrix of the rock effervesces with hydrochloric acid, especially the quartzite from Quetachou bay. Owing to solution of the carbonate, the weathered surface is pitted.

Quartz biotite gneiss and mica schist, interbedded with grey quartzite, are exposed between Piashtibaie river and Villeneuve lake. Both types are very fine-grained. In the gneiss, bands composed almost entirely of biotite alternate with bands rich in quartz. The rock is finely laminated; individual bands average four millimeters thick. The schist is siliceous in character, fine-grained and black coloured. All gradations from quartzite to schist were observed. In some regions alternate bands of schist, quartzite, and gneiss were observed, the width of individual bands varying from two to eight feet.

Grey quartzite is the principal sedimentary rock of the map-area. Its composition is variable. In most places, it is tough, massive, fine-grained, and light grey in colour. Quartz is the major constituent; feldspar, magnetite, and epidote also occur. Where the rock is associated with the mica schist and the quartz biotite gneiss, quartz and biotite occur in almost equal amounts. Garnet is sometimes present also. East of Villeneuve lake and north of Bruló lake, the quartzite contains some black bands that have high percentages of hematite and rutile. These black bands, averaging $1/32$ of an inch in thickness and alternating with bands of grey quartzite that are one-half to six inches wide, are to be found in zones one-half to three feet thick. There may be two or three such zones in about 20 feet of impure grey quartzite. The zones are lenticular, seldom exceeding 30 feet in length, but the widest, three-foot zone has a length of slightly more than 100 feet.

Composite gneisses

These gneisses are exposed along the coast from Watshishou knoll and extend beyond the eastern boundary of the map-area. Away from the sea they occur, in a few places, interbedded with grey quartzite. The approximate boundary between the latter and the gneisses can be followed in an east-northeast direction from the bay east of Watshishou knoll as far as Little Watshishou river, which it follows for about a mile. From there it follows an eastern direction for about three miles and then turns northeast to keep that direction as far as the eastern boundary of the area.

In the vicinity of the mouth of Little Watshishou river the rock shows well defined banding caused by quartz and feldspar-rich layers separated by thin layers rich in biotite. Away from the sea, this banding becomes less apparent and the rock resembles a recrystallized impure quartzite. East of Pontbriand bay and on some of the islands to the west of this bay, the gneiss has been injected to a great extent by pegmatitic solutions which have formed lenticles of quartz and feldspar resembling large augen.

Intrusive Rocks

Exposures of altered gabbro are found in all parts of the map-area. In most places this rock tends to form sills. However, in some places the sills branch, and thus dykes are formed between two sills. The most common variety of altered gabbro is a heavy, black, massive, medium-grained rock composed of abundant

amphibole, feldspar and two black metallic minerals, one of which is magnetite. Some biotite, pyrite, and, in a few places, chalcopyrite were also observed. The larger gabbro masses are coarse-grained, and an ophitic to sub-ophitic texture can be seen on the weathered surface where the feldspar has turned white. In some places, the gabbro is very fine-grained, particularly near the contact with quartzite or in the smaller bodies. In the southern part of the area, the gabbro has been sheared and is composed of needle-shaped amphibole, biotite, and feldspar. This rock is very tough, heavy, and black and has a prominent lineation.

A pink-coloured biotite granite underlies a small area around the north-west bay of Villeneuve lake. The rock is medium-grained and very massive. Pink feldspar, quartz, and biotite are easily distinguished in hand specimen. Dykes of granite are common from Watshishou knoll to Pontbriand bay. They range in size from a few inches to several feet wide. The smaller dykes are fine-grained, almost aplitic, but the majority are medium-grained. The contact between these dykes and the gneisses is not always sharp, the granite often feathering along the planes of the gneissic structure.

Pegmatite dykes are common in the southern half of the map-area but are most numerous along the coast. The largest dykes occur in the region from Quetchou bay to Watshishou knoll. These have intruded the quartzites and gabbro nearly parallel to the layer structures. Quartz and feldspar are the major constituents and mica is widespread as small irregular crystals. Many small irregular zones of pegmatite, innumerable small dykes of pegmatite, and much infiltrated pegmatitic material occur in the area underlain by the gneisses. These, as well as the larger dykes, pinch and swell along their strike.

Cenozoic

The Pleistocene glaciers, which crosses the area in a south-southwest direction, eroded the valleys and ridges but left few deposits. The summits of the hills are generally bare, and the valleys have thin coverings of grey sandy clay. A large band of sandy clay occurs along Villeneuve river, where, in some places, it is 20 feet thick. The clay is light grey and massive.

Recent deposits consist of glacial clays, sands, and gravels reworked by present streams. Such deposits are small although fairly numerous in the larger rivers. The slopes of some of the higher gabbro ridges are flanked by blocks of gabbro.

STRUCTURE

The structural trends of the area are clearly reflected in the topography. The general strike of the bedding in the northern two-thirds of the region is about due south, except west of Bellanger lake where the strike is southeast. This direction changes very quickly in the southern third of the map-area to southwest and in some places almost due west.

Dips are variable throughout the area, in direction and amount. Westerly dips predominate except on the north side of Bellanger lake and the west side

of Quetachou bay. Cross bedding and ripple marks observed in grey quartzite, particularly in the northern part of the area, are well enough preserved to indicate the tops of some beds. In a few places, such as south of the east bay of Bellanger lake, these indicate that at least some of the beds are overturned.

In the area underlain by the gneisses, there is a considerable variation of strike and dip of the gneissic structure. East of Pontbriand bay the shape and trend of the points and islands, as well as the strike and dip of the gneisses, indicate an overturned syncline plunging north.

ECONOMIC GEOLOGY

Copper

On the northwest tip of a small point in Quetachou bay, three-quarters of a mile southwest of the mouth of Piashtibaie river, chalcocite was observed filling a fracture in impure quartzite. The fracture, which is one-quarter of an inch wide, is exposed for a length of eight feet and is mineralized along the whole length. Chalcocite was also observed disseminated in the quartzite for a distance of two inches on each side of the fracture. Some malachite and azurite occur with the chalcocite. A grab sample assayed in the laboratories of the Quebec Department of Mines yielded 7.59 per cent copper.

Three-quarters of a mile west of Watshishou river on the northwest corner of a small island a gabbro dyke is cut by a thin dyke of pegmatite. At the contact, bornite with some chalcopyrite occurs in small irregular pockets and fractures in the pegmatite; no mineralization was found in the gabbro. The zone of mineralization is exposed for twelve feet and is two feet thick. This mineralization does not continue either to the north or south. A grab sample from this showing yielded 6 per cent copper and 0.742 oz. silver per ton. (1)

Very small quantities of chalcopyrite in fine grains disseminated through the gabbro were observed at several localities, particularly in the sheared gabbro near the coast. Some chalcopyrite in scattered specks and irregular small patches was seen in massive and sheared granite on the east side of Watshishou knoll.

Disseminated pyrite is common in the gabbro, particularly in the fine-grained facies. The pyrite occurs as small irregular grains or as cubes, but the quantity is small.

Lead

On the southeast shore of a small bay in Quetachou bay, $1\frac{1}{2}$ miles southwest of the mouth of Piashtibaie river, some galena was observed in a one-foot quartz vein and at the contact between the vein and carbonate-bearing quartzite. It was not possible to determine the trend or possible extent of the mineralized zone as it is exposed only at low tide and, then, only in a small round patch of about four square feet. A grab sample from this zone, assayed in the laboratories of the Quebec Department of Mines, yielded 17.55 per cent lead.

(1) Longley, W.W., North Shore of St. Lawrence from Mingan to Aguanish, Saguenay Co.: Que. Dept. Mines, G.R. 42, Pt. 1, 1950.

Iron

Some occurrences of iron, though not of immediate economic interest, are worthy of mention.

Noticeable quantities of magnetite in small dykes of pegmatite were found in the vicinity of Pontbriand bay.

On the east side of the head of Quetachou bay, magnetite as well defined crystals is disseminated through impure grey quartzite. In some places this mineral makes up 20 per cent of the rock.

Hematite is an abundant constituent of the thin black bands which, with average thicknesses of $1/32$ of an inch, occur in the quartzites at several localities. There is also some magnetite, in small amount, in these bands.

See the next paragraph for a further description of these occurrences.

Titanium

As already mentioned, black bands in impure grey quartzite have been observed at several places in the map-area. The best known exposures are east of Villeneuve lake and north of Brulé lake. Rutile and hematite are abundantly present in these black bands, and there is also some magnetite. The black bands range in width from $1/64$ to $1/4$ of an inch in thickness and they alternate with layers of grey quartzite that are from one-half to six inches thick. They occur in zones that vary in thickness from six inches to three feet; two or three such zones may occur in about 20 feet of quartzite. Most of these iron- and titanium-bearing zones are lens-shaped and do not extend, along their strike, for more than 25 or 30 feet. One three-foot zone, two miles north of Brulé lake, was observed, however, to have a length of more than 100 feet.

Beryl

The writer observed crystals of beryl previously reported by Claveau and Longley (1) on the point east of the mouth of Watshishou river. More than a dozen crystals were found on the tip of the point and several others were observed on an island composed of pegmatite on the west side of the river. These crystals, which average a half inch in diameter, occur in a muscovite-rich band in pegmatite. No other occurrences of beryl were observed in the larger pegmatites.

Feldspar

The largest pegmatite dykes of this area are found between Watshishou river and Quetachou bay. As mentioned above, these consist mainly of microcline, orthoclase and quartz with some mica. Attempts have been made to quarry feldspar from a large pegmatite on the east side of Quetachou bay. These have been unsuccessful due to the high percentage of quartz which occurs as a graphic intergrowth with the feldspar. Other pegmatites observed in the area have this same characteristic.

(1) Longley, W.W., op. cit.

Mica

The largest exposure of mica is situated on the tip of a point east of the mouth of Watshishou river. The mica, muscovite which once occurred as large crystals, has been shattered to such an extent that it is impossible to obtain a sheet of more than four inches across. In no place where it occurs is the mica found in sufficient quantity to be mined, even as a low-grade mica.

Silica

From Watshishou knoll a series of low hills striking northeast is composed, in part, of a large pegmatite dyke. At the southwest end the pegmatite has been highly brecciated and recemented with a milky white quartz, which makes up as much as 50 per cent of the rock in places. Farther northeast, however, the percentage of quartz increases until at Watshishou hill, two miles northeast of the "knoll", it is a body of fairly pure quartz more than 2,000 feet long and 200 feet wide at its widest point. There are indications of a large tonnage of high-grade silica being available at this locality.¹

¹

See also:

Longley, W.W., op. cit.

Claveau, J., Quartz Deposit at Watshishou Hill, Lower St. Lawrence River; the Mining Industry of the Province of Quebec in 1944, pp. 43-45, 1945.