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ADVANCE PRELIMINARY REPORT ON JAMES BAY LOWLANDS AREA

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Advance Preliminary Report

on

JAMES BAY LOWLANDS AREA, QUEBEC

Abitibi Territory

by

Jerome H. Remick

May 31, 1961.
QUEBEC

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INTRODUCTION

Purpose and Results of Survey

A brief reconnaissance geological survey was made in the James Bay Lowlands area by the writer during the latter part of July 1960 by canoe along Harricana river and by helicopter along some of the smaller rivers and streams to determine the location of the contact between the Precambrian and Paleozoic rocks and to study the Paleozoic rocks. In addition, some time was spent studying air photos to determine the distribution of outcrop of Paleozoic and Precambrian rock. Paleozoic rock was noted only along the rivers, streams and creeks and never inland whereas the Precambrian rocks occur inland as small rounded hills. This fact enabled us to indicate the maximum extent of the Paleozoic rocks on the attached geological map by drawing a line quite near the last outcrop of Precambrian rock. The probable maximum extent of Paleozoic rock in the James Bay Lowlands area in Quebec is shown on a map at a scale of 8 miles to the inch attached to this report.

Very little prospecting has been carried out in the area. An oil seep has been reported south of lac Solomon. Horizontal veins of gypsum from 1 to 3 inches thick occur on the south of Low Shoal Island (Gordon Island) in Ontario about 1/4 mile west of the Interprovincial boundary. A few cubes of pyrite were noted in one outcrop of Paleozoic rock. No other non-metallic minerals were noted in Paleozoic rock.

Location

The map area comprises about 1400 square miles in Abitibi Territory. It is bounded by latitude 50°30' to 51°00' and longitude 78°39' to 79°31' (the Interprovincial boundary). It includes all or almost all of townships 1101 through 1104, 1201 through 1204, 1301 through 1304, and 1401 through 1404.

Access

Several aviation companies located near Amos, Senneterre, Watson lake and La Sarre provide transportation into the area. Float planes can land on most of Harricana river north of Seven Mile Island. However, there are only a few lakes large enough for float planes.

The area may be reached by canoe from Moosonee, Ontario. The journey is difficult for it is necessary to cross the south part of James Bay at high tide. There are no portages.

A Bell G-2 helicopter equipped with rubber pontoons proved indispensable for travel within the area. The helicopter can land almost anywhere since almost the entire area is covered by muskeg or small ponds.

Access within the area is limited to canoe travel along the larger rivers and streams. Harricana river, Missinabi river, Harricana river basin and Again river are suitable for canoe travel during the entire season. There are many rapids and falls along Harricana river on both sides of Seven Mile Island. The west of Seven Mile Island provides the easiest route as there are fewer rapids.

Field Work

Landings were made to examine a few outcrops noted from air photos or from helicopter traverses. Outcrops along Harricana river and along the mouths of several smaller streams were examined. Outcrops noted from helicopter traverses or from air photo study have been plotted on a geological map at a scale of 1 mile to the inch included with this report. Air photographs covering the entire area at one-half mile to the inch may be obtained from Ottawa.

Acknowledgements

Acknowledgement is given to Mr. Smithy Pruner and Mr. Al Atwell of Autair Helicopter Services Ltd. for their

work in transporting the man and supplies for this mapping operation. R. Grenier drafted the geological map from an uncontrolled air photo mosaic.

Previous Work

A geological map at a scale of 4 miles to the inch (Cooke) was published in 1927 showing the location of the Paleozoic outcrops along Harricana river. No further publications have been issued.

Geological Contacts

The maximum possible extent of the Paleozoic rocks is shown on the attached map. The contact between rocks of Paleozoic and Precambrian ages was seen only along Harricana river at the north tip of Seven Mile Island. There is a gap of at least several miles along the other rivers and streams between outcrops of Paleozoic and Precambrian rocks. Since the Precambrian granite outcrops in small rounded masses and the Paleozoic rocks do not outcrop inland, the maximum possible present extent of the Paleozoic rocks was placed as closely as possible to the granite. It is probably that the actual contact between the Paleozoic and Precambrian rocks is farther from the granite than is shown.

DESCRIPTION OF THE AREA

Topography

The surface of the area is a flat plane sloping gently toward James Bay. It is largely covered by muskeg and small ponds with a few wooded areas. Various types of muskeg in all stages of development are present. An east-west scarp about 100 feet high occurs in the northeast part of the map area.

Drainage

The rivers and streams flow northward emptying into Harricana river and then into James Bay. The rivers and streams rise rapidly after a rainfall.

Resources

Game is very scarce in the area. A few moose, beaver and bear were noted.

Pike and pickrel, the main species of fish in the area, are not abundant in Harricana river as it contains considerable suspended sediment. A limited amount of commercial sturgeon fishing is carried out by the Indians in Harricana river. The fish are flown to Moose Factory and shipped southward by train. Some trapping is carried out in the winter by the Indians from Moose Factory.

A long narrow gorge in a massive jointed granite on Harricana river on each side of the south end of Seven Mile Island provides a potential source of hydroelectric power. The gorge on the east side is about 1/4 mile long, 50 feet wide and 30 feet deep.

Trees occur in a few patches within the area and along all the rivers and streams. Birch and poplar are restricted to the banks of streams and rivers. Spruce occurs in a few dry patches inland and along the river banks. The poor drainage in the area and the resultant swampy conditions prohibits tree growth in almost all the area. A few wild strawberries and a few juniper bushes were noted on the sandy beaches of Harricana river.

GENERAL GEOLOGY

A thickness of up to 120 feet of fluvio-glacial sediments including clay, boulder clay and varved clay overlain by a few feet of sand covers the area and only outcrops of Precambrian rock rise above it. Outcrops of granite occur inland as small rounded hills up to 20 feet above ground level. Outcrops of Paleozoic rock occur only along rivers and streams.

The consolidated rocks in the south and east parts of the area are Precambrian in age and those in the remainder of the area are Paleozoic in age. The Paleozoic rocks are believed to be lower and middle Devonian in age.

Migmatite, gneiss, granitic gneiss, gneissic granite, granite and pegmatite constitute the Precambrian basement. Flat-lying Paleozoic sandstone, limestone and dolomite, in places containing corals, brachiopods, bryozoa, crinoids and other fossils overlie the Precambrian basement. The exact thickness of Paleozoic rock in Quebec is unknown, but it probably ranges between 75 and 250 feet.

Foliation in the granite and layering in the gneiss along Harricana river trends northwest with a moderate to steep dip to the southwest. The Paleozoic rocks are flat lying and show no measurable dip.

TABLE OF FORMATIONS

Cenozoic: Recent	Stream, river and swamp deposits	Muskeg, peat, alluvium
Cenozoic: Pleistocene	Fluvio-glacial Deposits	Boulder clay, clay, varved clay, sand, gravel, boulders

Non-conformity

Paleozoic: Middle Devonian (?)	Abitibi River Formation	Grey fossiliferous crystalline limestone Argillaceous limestone Dolomitic limestone Sandstone
Paleozoic: Lower Devonian (?)	Sextant Formation	Sandstone Mudstone

Angular Unconformity

Precambrian	Complex of Acidic Igneous And Metamorphic Rocks	Pegmatite Granite Gneissic granite Gneiss Migmatite

PRECAMBRIAN

Migmatite, Gneiss, Granite, Pegmatite

General Statement

A complex of migmatite, biotite gneiss, hornblende gneiss, biotite granite and pegmatite of Precambrian age underlies the area to the south and east of the Paleozoic rocks and probably underlies the Paleozoic rocks. Quartz veins cut the Precambrian rocks and blocks of amphibolite occur within the granite and gneiss.

A typical outcrop consists of up to 50% per cent migmatite or biotite gneiss, in a few places hornblende gneiss and or blocks of amphibolite, grey gneissic biotite granite, pink biotite granite, pegmatite and quartz veins. The rock types appear to have formed in the above order with the quartz veins being the youngest. Some of the outcrops consist almost wholly of pink biotite granite with a few per cent gneissic rock. The intermixture of the various rock types in the same outcrop prevents geological separation.

Amphibolite

Rounded blocks of amphibolite up to several feet in diameter occur in a few outcrops. The rock is massive, dark, medium grained and consists of from 40 to 60 per cent hornblende and the remainder feldspar. The contact with

the country rock is sharp. Amphibolite may represent recrystallized remnants of volcanic or sedimentary rocks.

Hornblende Gneiss

Hornblende gneiss occurs interlayered with biotite gneiss and leuco-granite in a few places. The layers are 1 foot to 1/2 inch thick. Hornblende gneiss is darker grey than biotite gneiss. The hornblende gneiss may represent a higher degree of recrystallization of pre-existing volcanic and sedimentary rocks than the amphibolite blocks.

Migmatite, Biotite Gneiss, Granitic Biotite Gneiss, Gneissic Biotite Granite

Migmatite, biotite gneiss, granitic biotite gneiss, and gneissic biotite granite are present in almost every outcrop. The rocks grade into each other through an increase in quartz and feldspar, the more even distribution of biotite throughout the rock and the disappearance of gneissic layering. The layers are usually 1/2 to 1 inch thick. The rock is grey and consists of biotite, quartz, feldspar and accessory sphene. In places the foliation is gently curved. Biotite rich bands weather out more easily leaving bands rich in quartz and feldspar in relief.

Pink biotite granite

Pink biotite granite consisting of about 3 per cent biotite, 25 per cent quartz, pink and white feldspar, and

accessory magnetite is the most common rock type in the southern part of the area. It is usually massive, but in places the biotite is aligned. The rock is well jointed and contains large blocks of gneissic biotite granite or biotite gneiss or hornblende gneiss. Small amounts of disseminated cubical pyrite in local areas give the rock a rusty appearance.

Pegmatite

Veins and masses of grey pegmatite and pink pegmatite occur in most outcrops. The grey pegmatite appears to be older than the pink pegmatite and is related to the grey gneissic granite. The pink pegmatite is younger and is related to the pink granite. The grey and pink pegmatite generally consist of quartz and feldspar. Biotite, and in a few outcrops muscovite and magnetite were noted. Dark brown garnets were noted in one grey pegmatite. Microcline crystals are up to 6 inches in length and show carlsbad twinning in places. Magnetite occurs in clusters up to 1/2 inch in diameter in a few pegmatites. Quartz is concentrated near the center of some pegmatites.

The pegmatites occur as sharp walled dykes and veins crosscutting the mineral alignment in the granite and gneiss and as small bodies showing a gradational contact with the granite. Most of them are only a few inches wide, but a few are as much as 6 feet wide.

Quartz Veins

Quartz veins cut all the above mentioned rock types. Pink feldspar and epidote occur along the joints and fractures in a few outcrops and cut the quartz veins.

Diabase

A diabase dyke, 26 inches wide, was observed on the east shore of Harricana river opposite the south end of Seven Mile Island about a mile south of the map area. The dyke strikes at N. 55° E. and dips 75° N. It appears to follow the jointing in the granite. The diabase is fine grained with white plagioclase needles 1 to 2 mm long showing on the light brown weathered surface. The fresh surface is grey. Two sets of joints are present, the best developed set being normal to the length of the dyke.

PALEOZOIC ROCKS

Precambrian Terrain Before the Deposition of the Paleozoic

The Precambrian basement upon which the Paleozoic sediments were deposited is exposed at several places along the shore of Harricana river at the northern tip of Seven Mile Island. "V"-shaped grooves from 1 to 4 inches deep and 1 to 6 inches wide follow the jointing and foliation in the granite. The granite basement is best exposed when the river is at its lowest level and at this time it is only a few inches to 3 feet above the water level.

The granitic hills bordering the Paleozoic rocks are at a higher elevation than the Paleozoic rocks. This might suggest that the present extent of the Paleozoic rocks is much the same as it was during their formation with the surrounding granite hills now bordering the Paleozoic rocks perhaps being the old shoreline.

General Statement

The Paleozoic rocks in the area may be divided into two groups: the clastic rocks outcropping near the northern tip of Seven Mile Island and the carbonate rocks first outcropping about 2 miles to the north. The clastic rocks are believed to be Lower Devonian and part of the Sextant formation and the carbonate rocks Middle Devonian and part of the Abitibi River Formation.

Most exposures of carbonate rock are only a few feet thick and are widely separated making it difficult to compile a stratigraphic section or estimate the total thickness of Paleozoic rocks. However, several thick sections outcrop on both sides of Harricana river near the mouth of Harricana river basin. The sections are about 15 feet thick and outcrop for about a mile on either side of Harricana river.

Sextant Formation

The Sextant formation comprises a group of clastic rocks composed of fine to medium grained sand grains and

outcrops for about 2 miles north of the north end of Seven Mile Island. It has been divided up into four members on the basis of lithology.

The thickest section of the Sextant Group outcrops on the east shore of Harricana river about one-half mile north of Seven Mile Island. The section consists of:

	Clay
48'	Friable white sandstone with calcite concretions
12'	Grey Sandstone
2'6"	Grey Sandy Mudstone
9'	Red and Grey sandstone
	Precambrian basement

Another section about one mile south consists of:

	Clay
6'	Shale with a few layers of white sandstone
4'	Friable white sandstone with calcite concretions
3'	Grey Limestone
6'	Red Sandstone.
	Water

Grey and Red Sandstone

The mottled grey and red sandstone is massive appearing and breaks into thick rough-surfaced polygonial blocks. It is somewhat crumbly. The upper part of this member consists of red sandstone and the lower part is a grey sandstone with irregular red spots. In places is slabby and breaks into blocks. A few veins of orange calcite 1/4 to 1/2 inch wide occur near the base of this member and also fill small joints in the granite.

Grey Sandy Mudstone

The grey and red sandstone grades upward into a grey sandy mudstone. The rock breaks into blocks parallel to the bedding and this distinguishes it from the more crumbly member below. It is grey and fine grained. Only a few sand grains are visible megascopically.

Grey Sandstone

The grey sandstone is fine to medium grained and is cemented with calcareous cement. The bedding is not well shown, but in places laminae from 2 to 5 mm are evident. Usually the rock breaks into smooth surfaced slabs parallel to the bedding. White calcite concretions from 1 to 6 inches in diameter occur near the top of this member. Some brachiopod casts and plant remains are present.

Friable White Sandstone

A maximum thickness of 48 feet of white friable sandstone is exposed opposite the northern tip of Seven Mile Island. The rock shows bedding and crossbedding. Two vertical sets and one horizontal set of joints are commonly present. It is composed of about 99 per cent sand grains from 1/3 to slightly over 1 mm in diameter. The grains are rounded to subrounded and nearly spherical. The rock is very friable and porous being loosely cemented with calcite. White calcareous concretions from 1/8 inch to nearly three feet in diameter occur in certain

layers within the sandstone. A few sand grains occur in some of the concretions. The concretions show concentric bands from 1 mm to 1 cm of alternating white and grey material and their centers are chalky white. Some concretions are grey and massive. In places two or more calcareous concretions have grown together. A few brachiopod casts were noted in the sandstone.

It seems probable that the large thickness of sandstone exposed near the tip of Seven Mile Island is a near shore feature and that it thins out northward.

Abitibi River Formation

General Statement

The Paleozoic rocks underlying the area north of the clastic rocks of the Sextant formation are temporarily grouped together into the Abitibi River formation. Subdivision of these rocks will be made in the future when paleontological studies have been completed. The thickest section of this formation outcrops on both sides of Harricana river near the mouth of Harricana river basin. The section on the east shore of Harricana river about 1½ miles south of the mouth of Harricana river basin is as follows:

	Overburden
6'6"	Buff carbonate rock with few layers of grey fossiliferous limestone
8"	Grey Fossiliferous limestone
1'3"	Coarse-grained sandstone
1'10"	Medium-grained grey to brown sandstone
1'11"	Fossiliferous grey limestone
3"	Buff carbonate rock
2'	Coarse-grained grey crystalline fossiliferous limestone
	Water

A mile and a half farther north at the mouth of Harricana river basin the section is as follows:

	Overburden
12'7"	Crumbly blocky fossiliferous limestone
6'	Buff Carbonate Rock
	Water

Outcrops between these two sections indicate a thickness of at least 15 feet of buff carbonate rock between the sandstone and blocky crumbly fossiliferous limestone.

Friable White Sandstone

Fine and medium grained fairly friable and porous sandstone outcrops in beds several feet thick near the mouth of Harricana river basin and in thin laminae from a few mm upwards in a few other places. The sand grains are well rounded and sorted and white to dirty brown. The rock is cemented with calcite and is quite friable and porous. A few brachiopods occur in the sandstone.

Limestone and Dolomite

Grey, crystalline, fossiliferous limestone, limestone, argillaceous limestone and buff carbonate rock make up about

99 per cent of the Abitibi river formation.

The limestone is grey, often crystalline and fossiliferous and in places approaches coquina. Corals, brachiopods, bryozoa, crinoid stems and cephalopods are some of the larger fossils present. Brachiopods are most frequently encountered in the crystalline limestone. Buff carbonate rock replaces the fossiliferous crystalline limestone near the mouth of Harricana river basin and the contact between the two types of rocks is irregular.

Buff blocky carbonate rock occurs near the mouth of Harricana river basin and elsewhere. The rock is very homogeneous and contains large colonial hexacorals from 3 to 18 inches in diameter. The hexacorals are silicified or replaced by calcite. Rhombohedral crystals of calcite and prismatic crystals of quartz were noted in the centers of some hexacorals.

The rock is fine-grained, buff, and breaks into slabs 1/2 to 2 inches thick. It has a gritty feel and contains some argillaceous material. It fizzes weakly with hydrochloric acid. Flat, disk-shaped, white calcareous concretions occur in the rock at the mouth of Harricana river basin.

PLEISTOCENE

Sediments

Steep banks of clay and boulder clay over from 20 to over 100 feet in thickness were noted overlying the

Paleozoic rocks along Harricana river. From 5 to 15 feet of bedded sand and gravel overlie the clay. This is in contrast to the area farther south where the glacial sediments from bedrock to surface include 10 to 30 feet of sand, gravel, and boulders overlain by up to 300 feet of clay. No fossiliferous soil horizons were noted and so it seems probable that the sediments were deposited at one time. Varved clay, overlain by 20 feet of boulder clay and topped by 5 feet of fine sand with boulders up to 3 feet was noted on the east shore of Harricana river opposite the south end of Seven Mile Island. Varved clay was also noted at one place slightly south of Seven Mile Island and somethat farther north underlying 50 feet of boulder clay. The clay north of Seven Mile Island is homogeneous, dark grey and shows no varves. Separations were noted every 1 to 2 inches.

Small white clam shells and a few white snail shells from 1/2 to 1 inch in length were first noted in the clay at latitude 50°45'.

Boulders and pebbles in the boulder clay north of latitude 50°45' are from 1/4 to 4 inches in diameter but the average is less than one inch. In some places the boulders are somewhat larger in the overlying sand and gravel. Abundant small slabs of Paleozoic rock were noted in the clay in several places. Usually, however the boulders and pebbles were rounded and of granitic or gneissic composition.

Bedding and sorting were noted in the sand and gravel but not in the clay. Beds of gravel from 1 to 2 inches thick

occurred in a few places within the sand layer.

The exact demarcation between marine and non-marine fluvio-glacial sediments is not known, but it is probably somewhere between the north end of Seven Mile Island and latitude 50°45'. The presence of marine fossils and the absence of varves in the clay are characteristic of marine fluvio-glacial sediments. Varves occur in the non-marine fluvio-glacial sediments.

Topographic Features

Raised beaches and fluvio-glacial features are shown by the good linear alignment of trees and tree covered area in the map area which is generally devoid of trees. Some of the trees and tree covered areas are aligned in an east-west direction in the north part of the area. Patches of tree-covered area reflect a well drained underlying soil.

Glacial Striae

Glacial striae were noted in Paleozoic rocks in 10 different places along Harricana river. Their strike varies between 134° and 146°. Strikes between 143° to 146° were the most common. A strike of 45° was noted in two places.

Glacial History

The glacial striae noted in the area were undoubtedly made during the last advance of the Pleistocene glacier and

the sediments were deposited during its retreat. The linear topographic features are thus later than the glacial striae.

The southeasterly strike of the glacial striae and the presence of slabs of Paleozoic rock in the Precambrian area to the south indicate the direction of the last advance of the glacier was from the northwest.

RECENT

Nearly the entire area is covered by muskeg, moss and peat of Recent origin. Many small shallow lakes, ponds and trapped areas of water are included in the muskeg. Gravel bars, shoals and terraces have been formed during Recent time along the shore of Harricana river. Elevated beaches are present near the shore of James Bay and are evidence that the land has risen since the retreat of the last glacier.

Some areas have no drainage pattern and here the land surface resembles a Chinese rice paddy with a lattice-work of muskeg enclosing small areas of water. Various types of muskeg development are present in the area.

STRUCTURAL GEOLOGY

Precambrian

Foliation and Gneissic Structure

Alignment of minerals, especially biotite, in the

Precambrian granite and gneiss strikes northwesterly and dips moderately to steeply to the south. Mineralogical banding or gneissic structure is present in some outcrops and is parallel to the foliation.

Jointing

Most of the joints in the Precambrian rocks are subparallel. They strike northwest and northeast and dip steeply to vertically.

Paleozoic Rocks

Structural Setting of the Paleozoic Rocks in the James Bay Lowlands Area

The Paleozoic sedimentary rocks of the James Bay Lowlands area in Quebec are the easternmost part of a large gently dipping basin which rests unconformably on the steeply dipping Precambrian basement. The Paleozoic rocks in Quebec are horizontal. The configuration of the Precambrian basement is unknown and so it is difficult to give an estimation of the total thickness of the Paleozoic section and the thickness of Paleozoic rocks now present. Drilling in other Provinces has indicated a thickness of somewhat over 1500 feet of Paleozoic rocks. Since the Paleozoic rocks in Quebec are on the edge of the Paleozoic basin, it is probable that the total thickness is less than that reported elsewhere in the basin.

Rocks of Ordovician, Silurian and Devonian ages and unconsolidated sediments of Cretaceous and Pleistocene ages have been deposited in various parts of the Paleozoic basin in Ontario. "Intermittent rising and sinking of the land surface has given a successively deeper basin for subsequent deposits toward the south and east. Thus the youngest Devonian rocks occur in the southernmost part of the area (Ontario Department of Mines, 1952)". During Pleistocene time the land was covered by marine water as is evidenced by white clam and snail shells in the clay. After the retreat of the last glacier and during Recent time the land has risen slowly to its present level leaving behind successive sea beaches near the present coast of James Bay.

Primary Sedimentary Structural Features in the Paleozoic Rocks

Crossbedding was noted in the white sandstone a little north of the north end of Seven Mile Island.

A large ripple mark striking at 85° was noted in the limestone on the east shore of Harricana river just south of the mouth of Harricana river basin. One side, slightly steeper than the other faces a north.

Bedding in the Paleozoic Rocks

The bedding in most outcrops of Paleozoic rock is poorly shown. The slabby surface of the rock is probably a reflection of the bedding.

Jointing

Two sets of joints nearly at right angles are present in many outcrops of Paleozoic rocks. It is possible that the jointing in the Paleozoic rocks reflects the jointing and structure in the underlying Precambrian gneiss and granite.

ECONOMIC GEOLOGY

A carbonatite dyke with magnetite and pyrite were the only economic minerals noted in the Precambrian granite and gneiss in the map area. Occurrences of molybdenite and beryl were noted in the map area to the south and are described in the report on this area (Remick, 1962). Scattered cubes of pyrite in small rust-stained areas of rock were noted in a few places in the granite.

Gypsum was noted in the Paleozoic rocks on the south end of Low Shoal Island (Gordon Island). A fresh yellow precipitate, possibly sulfur(?) was noted being deposited on the sandstone from water carrying hydrogen sulphide on the east shore of Harricana river just north of Seven Mile Island. A few cubes of pyrite were noted in only one outcrop. No other metallic minerals were noted in the Paleozoic rocks.

It is possible than an economic body of metallic minerals may underlie the area overlain by rocks of Paleozoic age. An airborne magnetic survey of the area would reveal the structure in the underlying Precambrian basement and the presence of any large concentration of metallic minerals.

Carbonatite Dyke

A carbonatite dyke about 12 by 15 feet outcrops in an altered brick red granite west of Seven Mile Island on the west shore of Harricana river. Green amphibole; crystals of magnetite, pyrite and yellowish white apatite; quartz, chlorite, titanite and limonite, and specks of tourmaline and epidote occur in a groundmass of coarsely crystalline orange and white calcite. Calcite makes up over 90 per cent of the dyke and shows striations parallel to the diagonal of the rhombodhedral cleavage. Undigested fragments of the brick red granite occur in the calcite and so the carbonatite dyke appears to have formed by replacement of the pre-existing granite.

Gypsum

Satin spar and selenite varieties of gypsum were noted in five layers each 1 to 2 inches thick and several hundred feet long in the Paleozoic limestone on the shore of the south end of Low Shoal Island (Gordon Island) on Harricana river about 3/8 of a mile west of the Interprovincial boundary. Red hematitic alteration has colored the upper part of the outcrop. Only one small outcrop of Paleozoic rock containing a few thin hematite stained fractures and no gypsum was noted on the Quebec side of the boundary.

Satin spar occurs in flat layers parallel to the bedding and in places crosscuts the bedding. The long axis of the mineral is normal to the bedding. A few remnants of the host rock are contained in the satin spar layers. Brown selenite crystals occur in a few places in cavities near the layers of satin spar.

Petroleum

The Paleozoic rocks in the James Bay lowlands area are part of a gently dipping syncline. No suitable structures for the retention of gas and oil have been noted in Quebec or Ontario. However, good reservoir rocks do exist (Ontario Dept. of Mines, 1952).

An oil seep has been reported slightly south of lac Solomon, but we were unable to investigate the place. A milky white to light green film covers some of the small ponds near lac Solomon.

The best reservoir rock noted was the lower Devonian sandstone just north of the north tip of Seven Mile Island. It is medium grained, friable, porous and over 60 feet thick. A few thin beds of similar porous sandstone were noted interbedded with the limestone farther north.

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