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NORTHERN QUEBEC

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Province of Quebec, Canada  
DEPARTMENT OF MINES

Honourable W. M. COTTINGHAM, Minister

A.-O. DUFRESNE, Deputy Minister

GEOLOGICAL SURVEYS BRANCH

I. W. Jones, Chief

GEOLOGICAL REPORT 75

**NORTHERN QUEBEC**

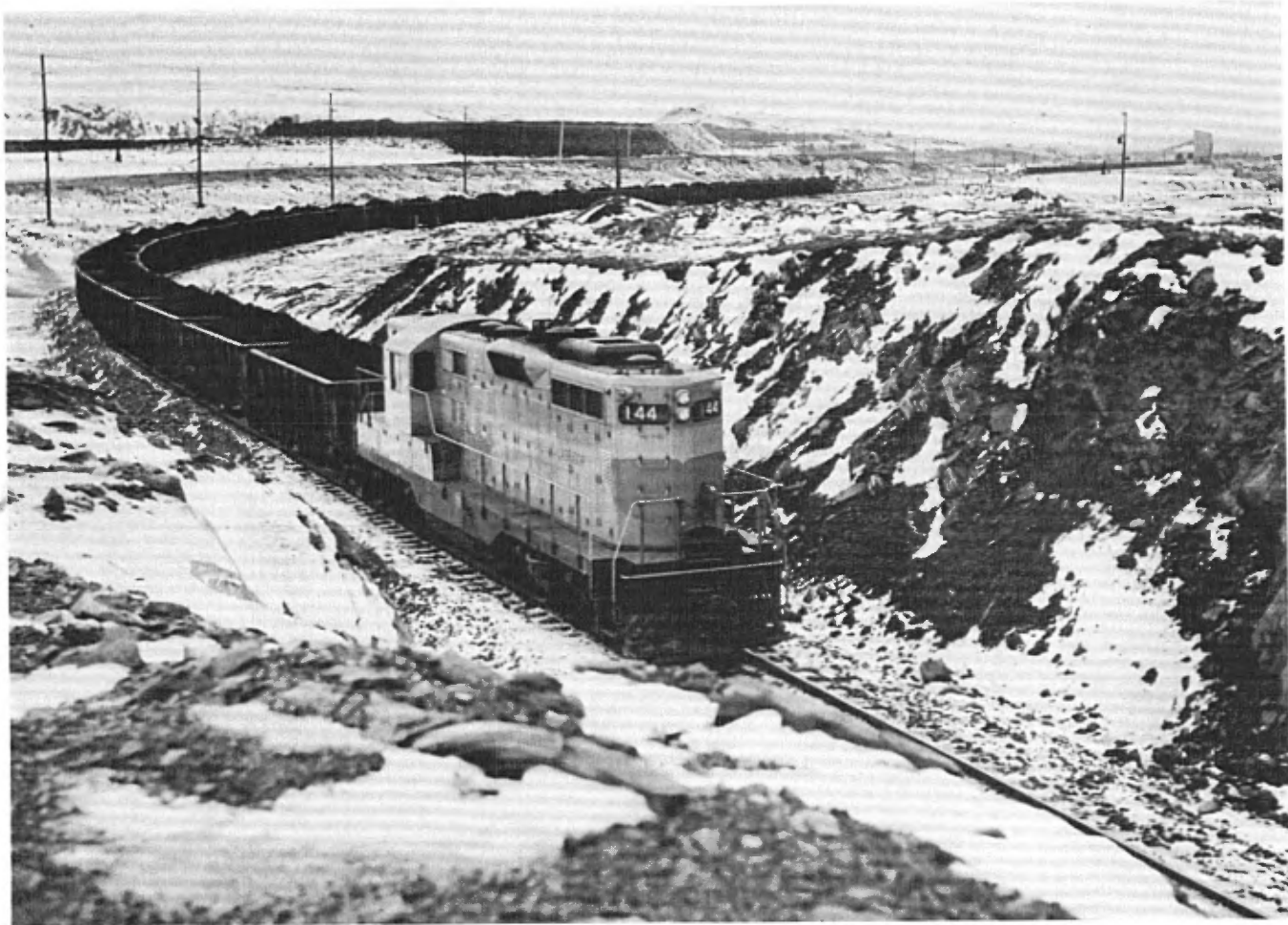
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Josaphat-E. Gilbert and Robert Bergeron

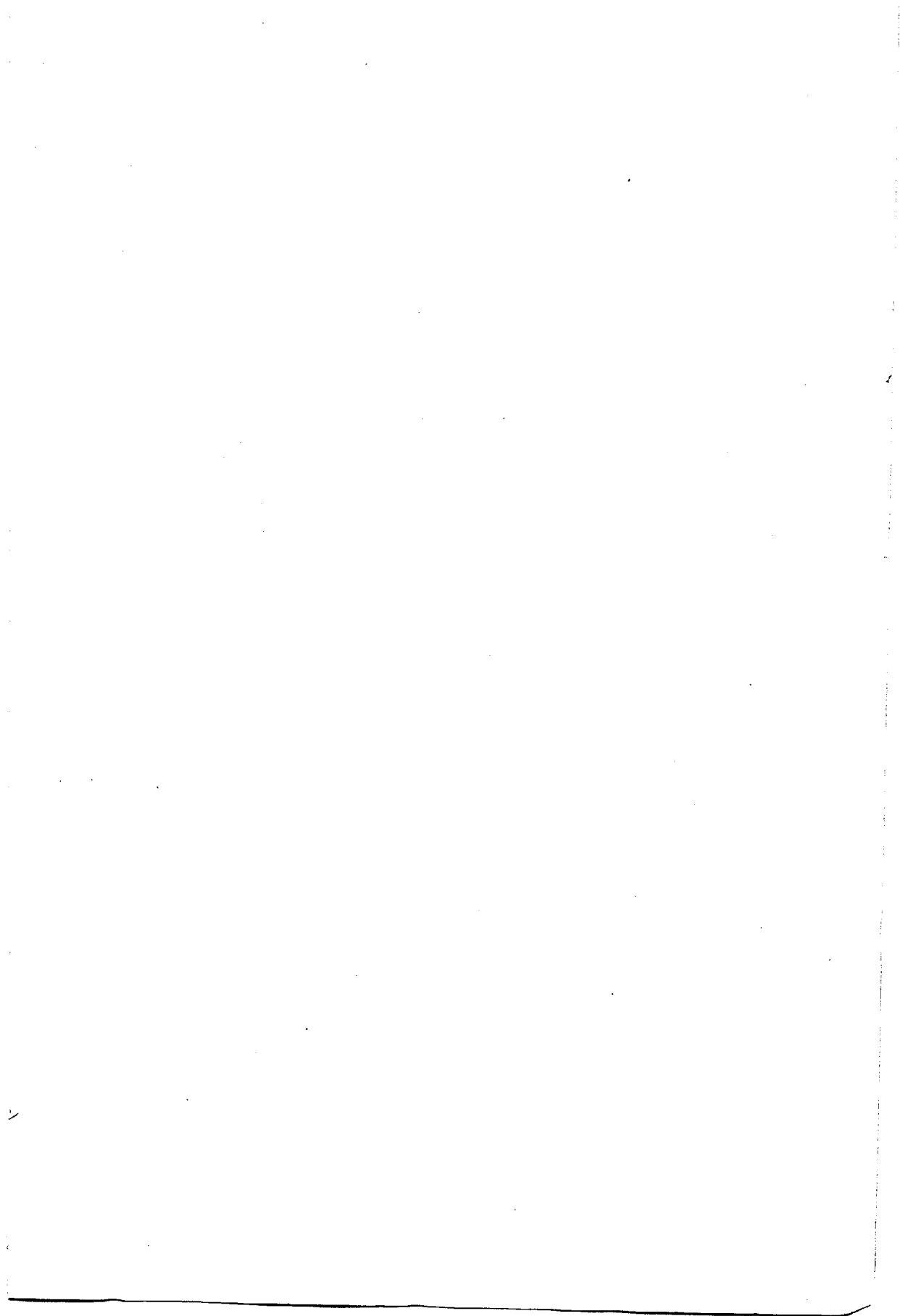


QUEBEC  
RÉDEMPTI PARADIS  
PRINTER TO HER MAJESTY THE QUEEN  
1957

**FRONTISPIECE - FRENCH MINE, SCHEFFERVILLE.**  
**PHOTO, IRON ORE COMPANY OF CANADA, LTD.**



Diesel engine hauling an ore train from the mine to the shunting yard. (Photo, Iron Ore Company of Canada, Ltd.)



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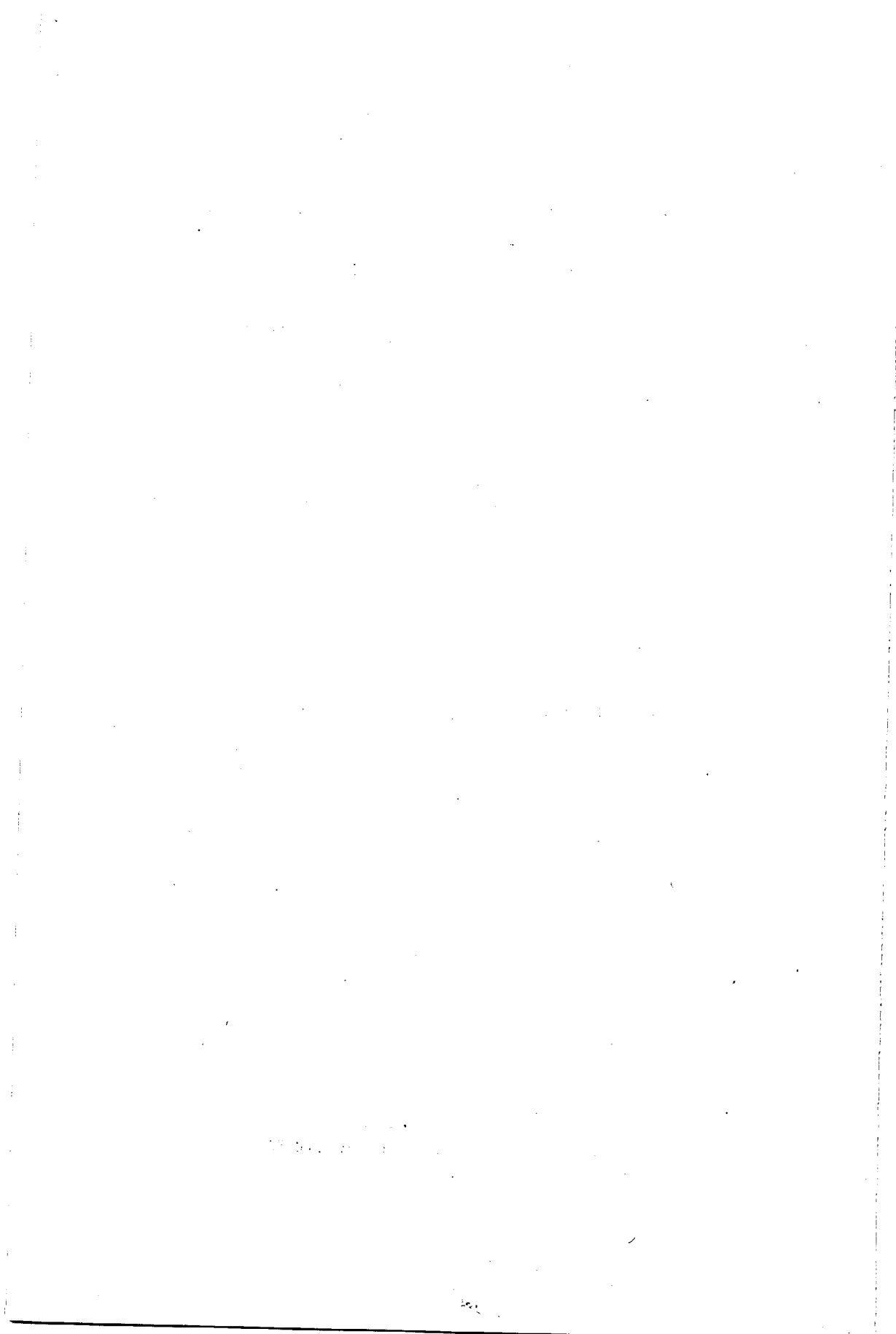
Josaphat-E. Gilbert and Robert Bergeron



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1957  
Ministère des Richesses Naturelles du Québec

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## TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION .....	1
General statement .....	1
Location and extent .....	2
Means of access .....	2
Exploration work .....	3
GENERAL DESCRIPTION .....	4
Physical characters .....	4
Coast-line .....	4
Topography .....	5
Drainage .....	6
Climate .....	6
Flora .....	7
Taïga .....	7
Forest tundra .....	8
Tundra .....	8
Fauna .....	9
Agriculture .....	10
Water power .....	10
Population .....	10
Permanent establishments .....	11
GENERAL GEOLOGY .....	12
Early Precambrian .....	12
Gneissic complex .....	12
Greenstone .....	13
Late Precambrian .....	14
Glacial and post-glacial phenomena .....	16
ECONOMIC GEOLOGY .....	17
Iron ore deposits of the Labrador geosyncline .....	17
Deposits of Iron Ore Company of Canada Limited .....	18
Other companies working in the ferriferous zone of the Labrador geosyncline .....	20
Manganese minerals .....	20
Sulphide mineralization .....	21
CONCLUSION .....	23
BIBLIOGRAPHY .....	24
ALPHABETICAL INDEX .....	30

## MAP AND ILLUSTRATIONS

- Map No. 1060 - Geological map of Territory of New Quebec (in pocket)  
Figure No. 1 - Mining Properties of New Quebec (page 19)

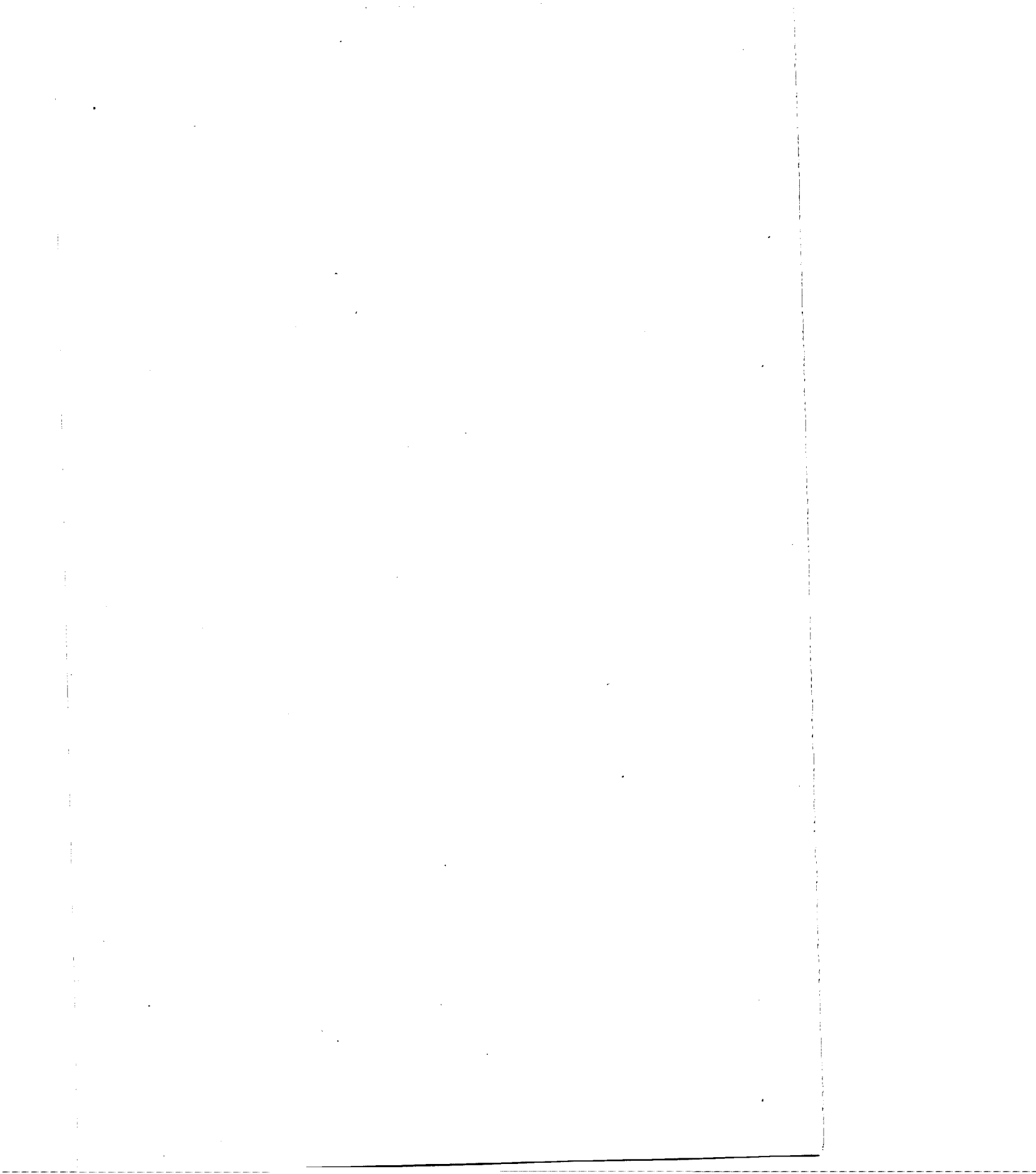
Plates

- Frontispiece - French mine, Schefferville. Photo, Iron Ore Company of Canada, Ltd.
- I. - Diesel engine hauling an ore train from the mine to the shunting yard. Photo, Iron Ore Company of Canada, Ltd.
- II.-A.- The "Nascopie" at Port Burwell. Photo, "The Beaver", Hudson's Bay Co.  
B.- Port Burwell post, now closed, on Killinek island, Ungava bay. Photo, "The Beaver", Hudson's Bay Co.
- III.-A.- Estuary of Payne River and Payne Bay post. Photo, E. Aubert de la Rüe.  
B.- Payne Bay post of Hudson's Bay Co. Photo, E. Aubert de la Rüe.
- IV.-A.- Fort Chimo post on right bank of Koksoak river. Photo, Hudson's Bay Co.  
B.- Port Harrison post on Hudson bay. Photo, Hudson's Bay Co.
- V.-A.- Limestone falls on Caniapiskau river. Photo, Quebec Labrador Development Co. Ltd.  
B.- Pyrite falls on Caniapiskau river. Photo, Quebec Labrador Development Co. Ltd.
- VI. - Aerial view of Schefferville, seen from the east. Photo, Iron Ore Company of Canada, Ltd.
- VII. - Another aerial view of Schefferville looking northeast. Photo, Iron Ore Company of Canada, Ltd.
- VIII. - Aerial view of Late Precambrian formation of the Labrador geosyncline in the Burnt Creek region. Photo, Topographical Surveys of Canada.
- IX. - Burnt Creek camp, Labrador geosyncline. Photo, Hollinger North Shore Exploration Co. Ltd.
- X. - Eclipse deposits, property of Hollinger North Shore Exploration Co., Ltd. Photo, Hollinger North Shore Exploration Co., Ltd.

- XI.-A.- Knob Lake. Photo, Hollinger North Shore Exploration Co. Ltd.
- B.- Lacustrine plateau, southwest of Payne lake. Photo, E. Aubert de la Rüe.
- XII.-A.- Middle valley of Payne river, upstream view. Photo, E. Aubert de la Rüe.
- B.- Payne river, just above its junction with Flaherty river. Photo, E. Aubert de la Rüe.
- XIII.-A.- Bay on north shore of Tasiat lake (Kogaluc River basin). Photo, E. Aubert de la Rüe.
- B.- Thirteenth falls on Kogaluc river. Photo, E. Aubert de la Rüe.
- XIV.-A.- East coast of Ungava bay. Photo, Alexander Forbes; Northernmost Labrador, published by the American Geographical Society of New York.
- B.- East Coast of Ungava bay. Photo, Alexander Forbes; Northernmost Labrador, published by the American Geographical Society of New York.
- XV.-A.- Discharge of Kogaluc river into Tesek lake. Photo, E. Aubert de la Rüe.
- B.- Low, rolling hills surrounding Payne lake. Photo, E. Aubert de la Rüe.
- XVI.-A.- Northward view of George river at 57°29' North latitude. Photo, Jacques Rousseau.
- B.- Cascade and forest tundra on the west bank of George river at 57°48' North latitude. Photo, Jacques Rousseau.
- XVII.-A and XVII.-B.- Eaton canyon along the upper course of Caniapiskau river. Photos, Hollinger North Shore Exploration Co. Ltd.
- XVIII.-A.- Upturned Early Precambrian paragneiss, Fort Chimo. Photo, E. Aubert de la Rüe.
- B.- Falls on Kogaluc river. Photo, E. Aubert de la Rüe.

- XIX.-A.- Big Falls, Caniapiskau river; Late Precambrian sedimentary formations. Photo, "The Beaver", Hudson's Bay Company.
- B.- Little Falls, Caniapiskau river. Photo, "The Beaver", Hudson's Bay Company.
- XX.-A.- Rapid on George river at 55°41' North latitude. Photo, Jacques Rousseau.
- B.- Falls on George river at 55°26' North latitude. Photo, Jacques Rousseau.
- XXI.-A.- Junction of Payne (left) and Flaherty (background) rivers. Photo, E. Aubert de la Rüe.
- B.- North shore of Payne river estuary at low tide. Photo, E. Aubert de la Rüe.
- XXII.-A.- Greenstone "moutonnée", estuary of Payne river. Photo, E. Aubert de la Rüe.
- B.- Polygonal soil, lower valley of Payne river. Photo, E. Aubert de la Rüe.
- XXIII. - Upturned beds of iron formation (quartzite containing hematite), Late Precambrian, Kayak bay, west shore of Ungava bay. Photo, E. Aubert de la Rüe.
- XXIV - Pegmatite dyke cutting paragneiss on the left bank of Koksoak river, Fort Chimo. Photo, E. Aubert de la Rüe.
- XXV.-A.- Stratification along the north bank of Little Whale river. Photo, Gulf Lead Mines, Limited.
- B.- Limestone formations south of Little Whale river. Photo, Gulf Lead Mines, Limited.
- XXVI.-A.- Princess falls (164 feet), Little Whale river. Photo, Gulf Lead Mines, Limited.
- B.- Lower falls of Little Whale river (24 feet). Photo, Gulf Lead Mines, Limited.
- XXVII.-A.- George River post of Hudson's Bay Company, at the mouth of George river. Photo, M.M. Ritchie.
- B.- Abloviak (Adloylik) fiord, westward view, east shore of Ungava bay. Photo, M.M. Ritchie.

- XXVIII.-A.- Abloviak (Adloylik) fiord, eastward view; part of Torn-gats mountains in background. Photo, M.M. Ritchie.
- B.- East shore of Ungava bay, northward view from the mouth of Koroc river. Photo, M.M. Ritchie.
- XXIX.-A.- Koroc river, eastward view from the mouth of Sukaliuk brook; mountains are 2,000 feet above level of river. Photo, M.M. Ritchie.
- B.- "Arctic cotton" (*Eriophorus Scheuchzeri*) at small lake near junction of Sukaliuk brook and Koroc river; artist René Richard. Photo, M.M. Ritchie.
- C.- Camp of National Geographic Society and Royal Ontario Museum expedition, two miles north of New Quebec crater, 1951. Photo, M.M. Ritchie.
- XXX. - Aerial photograph of the New Quebec crater. © National Geographic Society, U.S.A.
- XXXI. - Fort Chimo, Hudson's Bay Company post on the banks of Koksoak river, from Ungava bay. Photo, P.-E. Imbault.
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## NORTHERN QUEBEC

### A New Mining Area

A Study of the Territory between  
Eastmain River and Ungava Bay

by

J.-E. Gilbert and Robert Bergeron

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### INTRODUCTION

#### General Statement

The recent discovery of very large iron ore deposits in the heart of New Quebec qualifies, indeed, as one of the most important events in the history of the mining industry of the whole of Canada. It has aroused world-wide interest and will undoubtedly have a profound effect on our economy as well as on that of the whole of the Western world. It has also brought into light the numerous potentialities of the immense area of the province that is limited to the east and south by Labrador and the gulf of St. Lawrence, and, to the west and north, by Hudson and James bays and Hudson strait.

Concerning those potentialities, our knowledge is very limited indeed. Although the amount of literature that we have about that territory is relatively considerable, its value is extremely variable. Some reports, abundantly detailed, concern only very limited parts whereas others, very sketchy are related to immense areas, and still others are of a restricted interest on account of their inaccuracy and vagueness.

A large proportion of the information that is presented in this report and on the accompanying map had already been collected in a comprehensive manuscript report prepared by Aubert de la R e, in 1949, for the Quebec Department of Mines. About one hundred other pertinent publications, reports, and maps were also consulted. From those sources were gleaned all facts essential to the presentation of a clearer picture of the geography, physiography, climate, and particularly the geology of Quebec's northland. The nature of the subsoil

of the territory has been indicated on the accompanying map as described by the different explorers, and no attempt has been made by the writer to correlate the various formations observed in adjacent traverses except when they were relatively close to each other. It was thought preferable to leave in white the unexplored areas and to avoid an interpretation that stood a good chance to be wrong and would have given the reader the impression that the country is much better known than is the case.

#### Location and Extent

The territory herein described covers the basins of the rivers flowing into Ungava bay, Hudson strait, Hudson bay, and the part of James bay that is north of Eastmain river.

The area is approximately 330,000 square miles, slightly more than half of the total area of the Province of Quebec.

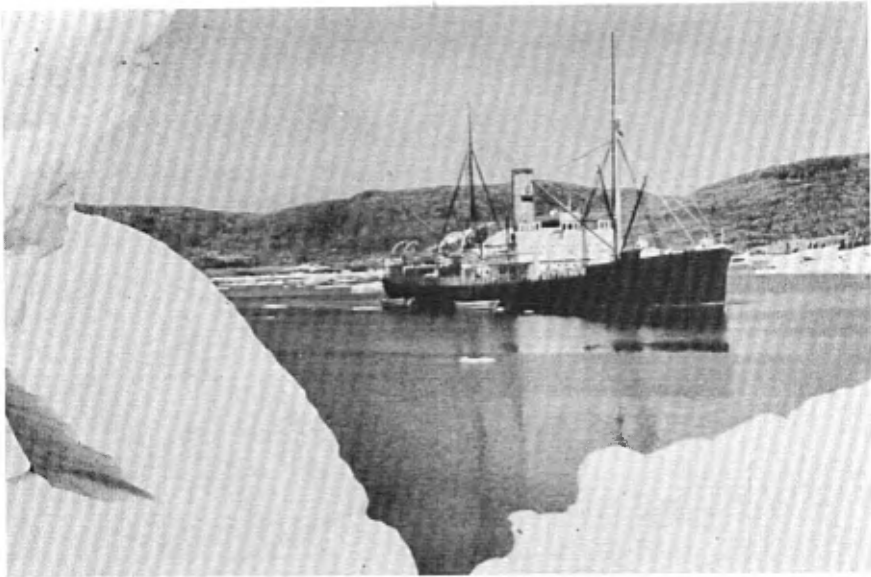
#### Means of Access

Fort Chimo and various stations and trading posts scattered along the coast are visited during the summer by ships belonging to the Federal Government, the Hudson's Bay Company and various shipping firms. Fort Chimo is on the right bank of the lower reaches of Koksoak river, some thirty miles south of its mouth in Ungava bay. An airfield, now partly abandoned, was constructed during World War II approximately eight miles upstream from Fort Chimo, on the west bank of Koksoak river; one of its two landing strips is still in use.

A dirt road connects the airstrip to Stewart lake, a sea plane base four miles to the north.

The fluvial routes in the interior used by the old travelers who entered the territory by canoe from lake St. John, the north shore of St. Lawrence river and gulf, or from James bay were long and tedious. They were, in the last few years, advantageously replaced by air routes through which one can today reach, in a few hours, almost any part of the country. The considerable number of lakes and wide water-ways of the territory permit an easy setting down almost anywhere of the hydroplanes or ski-equipped aircraft of the various flying companies operating from the Lower St. Lawrence, Lake St. John, and Abitibi regions.

Plate II



A - The "Nascopie" at Port Burwell. (Photo, "The Beaver", Hudson's Bay Co.)



B - Port Burwell post, now closed, on Killinek island, Ungava Bay. (Photo, "The Beaver", Hudson's Bay Co.)

Plate III



A - Estuary of Payne River and Payne Bay post. (Photo, E. Aubert de la R e).



B - Payne Bay post of Hudson's Bay Co. (Photo, E. Aubert de la R e).

Plate IV



A - Fort Chimo post on right bank of Koksoak river. (Photo, Hudson's Bay Co.)

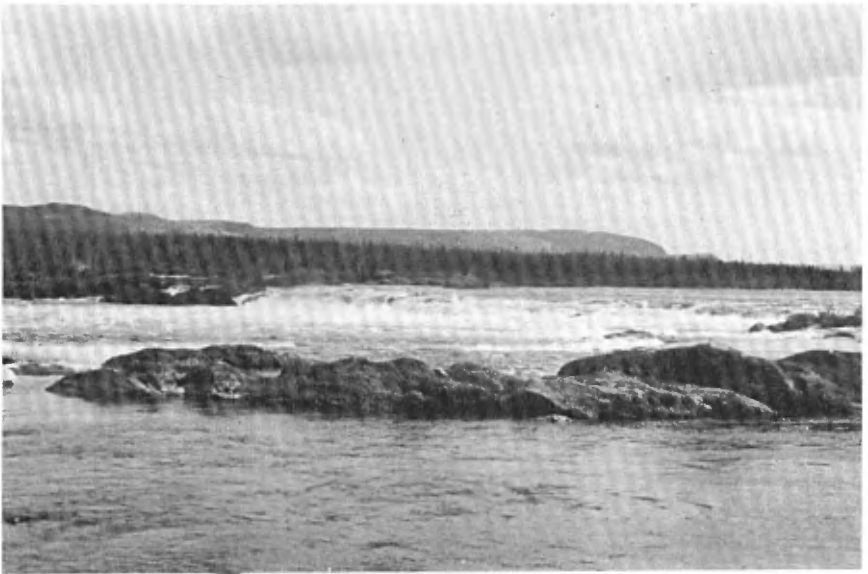


B - Port Harrison post on Hudson Bay. (Photo, Hudson's Bay Co.)

Plate V



A - Limestone falls on Caniapiskau river. (Photo, Quebec Labrador Development Co. Ltd.)



B - Pyrite falls on Caniapiskau river. (Photo, Quebec Labrador Development Co. Ltd.)

There are, however, two periods during the year when, with the exception of the three landing strips built and maintained at Fort Chimo, Knob Lake (latitude  $54^{\circ}50'N.$  and longitude  $66^{\circ}40'W.$ ), and Wacouana (latitude  $51^{\circ}24'N.$  and longitude  $65^{\circ}35'W.$ ), no aircraft can land. One period is in the spring, between May 15 and June 15, during the "break-up", and the other is between September 15 or 30 (depending on the latitude) and November 30 when the surface of the lakes is not completely frozen.

Quebec North Shore and Labrador Railway Company has completed the construction of a railroad linking the iron ore deposits of the Schefferville (Knob Lake) district to Sept-Iles, a seaport on the north shore of the St. Lawrence. The first trainload of ore left Schefferville on the 21st of June, 1954. This railroad furnishes easy access to the southeast part of the area.

#### Exploration Work

The archives of Hudson's Bay Company contain, in all probability, the first reports of exploration journeys into the territory here under study since that company had already established trading posts here and there in the area before the end of the 17th century. It is also probable that a good number of trappers and French explorers ventured into the southern parts of the territory, since maps of Canada published in France during the first half of the 18th century show a "Maison Francaise" or "Maison des Dorval" on the southwest shore of Mistassini lake, approximately 100 miles to the south of the upper reaches of Eastmain river. Numerous missionaries undoubtedly also followed the natives into the region during the 18th and 19th centuries, and one of them, Reverend Father Louis Babel, O.M.I., has left a surprisingly accurate sketch map of the southeast section of the territory which he visited four times in the period between 1866 and 1870.

However, it is to A.P. Low, the great explorer and geologist, that we owe the first detailed description of the character of the coastal regions and of the interior of the territory. His exploration journeys, undertaken for the Geological Survey of Canada between 1885 and 1904, enabled him to gather comprehensive information on the topography, the hydrographic system, the geology, the flora, and the fauna of a large section of the territory.

After fifty years, Low's reports still remain the "Bible" of those who are interested in that region. They contain accurate observations of all types. Some of Low's journeys have not yet been retravelled and, consequently, his writings are, in many cases, the only source of first-hand information that we have at our disposal.

Since Low's time, a good number of explorers have published more or less detailed studies of certain sections of the territory they visited. Among the most important of these voyagers may be mentioned Hubbard, Flaherty, Wheeler, Gunning, Gill, Bannerman, Tolman, Shaw, Kranck, Retty, Rousseau, and Aubert de la R e.

The bibliographic index at the end of this report contains the list of publications of these explorers and those of many others who visited more restricted areas of the territory.

#### GENERAL DESCRIPTION

##### Physical Characters

###### Coast-line

The coast-line of the territory has an extremely variable aspect depending mainly upon the composition and structure of the underlying bedrock and of the arrangement of the unconsolidated sediments of the littoral.

On the west side, along James Bay, the coast-line is low and gently sloping. From Cape Jones, which marks the start of Hudson bay, it forms, to the north, an immense arc widely open to the west. Here, the coast becomes steeper and a large number of elongated islands lie parallel to the shore. North of Portland promontory, the littoral is generally low, the sea is shallow over a wide area skirting the shore, and, although tidal fluctuations are small, navigation is there very difficult even for ships of very shallow draught. The north shore, along Hudson strait, is relatively steep and a good number of islands lie off-shore. Hudson strait is swept by a westward flowing arctic current and navigation is difficult along the coast on account of the heavy tide which increases in intensity towards the east and causes very violent currents in the narrows and over shallows.

In general, the coast-line of Ungava bay is low, but it rises here and there into hills that border the bay at variable distances from the shore, rarely exceeding, however, heights of 300 to

500 feet. Although jagged at certain places, the littoral usually consists of long stretches of grey clay strewn with large erratic boulders. Tidal variations are very considerable and coastal shoals are a serious inconvenience to navigation, even forbidding access to the shore at many places.

### Topography

Broadly speaking, the territory forms a gently rolling plateau without any prominent elevations. Its surface is that of a peneplain rejuvenated after an uplift, during the Pliocene, of some 600 feet above the present mean level (Cooke, 1929, 1930, 1931). The glaciation of the Pleistocene epoch was accompanied, according to Cooke, by a sinking of the land masses which was followed, after the disappearance of the ice, by an uneven resurgence varying between 180 and 900 feet from one part of the territory to another.

Although precise data are still lacking as to the altitudes of the various elevations of the territory, it seems that the highest places lie in the western spur of the Torngats mountains, some 30 miles to the east of the east coast of Ungava bay, at about latitude  $59^{\circ}30'N.$  and longitude  $64^{\circ}28'W.$  A federal government map, at 8 miles to the inch, indicates in that section altitudes of 3,640 feet above sea level. However, the map drawn by Forbes (1933) shows that a small area situated at latitude  $57^{\circ}17'N.$  and longitude  $64^{\circ}34'W.$  stands at least 4,100 feet above sea level.

It is, however, between latitudes  $53^{\circ}$  and  $55^{\circ}N.$  and longitudes  $64^{\circ}$  and  $71^{\circ}W.$  that the widest part of the territory having the highest average altitude is believed to be. Most of the main streams of the territory originate on this lacustrine plateau, the altitude of which varies between 1,700 and 2,000 feet above sea level and in which lies the divide separating the James Bay and Hudson Bay basins from those of Ungava bay and of the Atlantic. The Otish and Wapuskatoo mountains, situated respectively between latitude  $52^{\circ}15'N.$  and longitude  $70^{\circ}30'W.$  and between latitude  $53^{\circ}N.$  and longitude  $67^{\circ}W.,$  border that wide central plateau.

One of the most interesting topographical details of the territory consists of a deep circular depression, approximately 65 miles west of the entrance to Ungava bay, at latitude  $61^{\circ}17'N.$  and longitude  $73^{\circ}40'W.$  This depression, apparently photographed for the first time in June, 1945, by a United States Air Corps flyer, is indicated as being a crater in the 1946 and 1949 editions of the

Povungnituk River Sheet of the Surveys and Mapping Branch, Department of Mines and Technical Surveys, Ottawa.

Meen, who explored the depression in 1950 and 1951, considers it to be a crater of meteoric origin and he reports that its exterior diameter is 11,500 feet; its circumference, 6.8 miles; and its maximum depth, 1,325 feet. It would therefore be the largest meteor crater discovered to date. The lower part of the depression is filled by a lake, 9,100 feet in diameter, surrounded by a ring of granitic rocks approximately 400 feet high. The inside slope of the crater is at an angle approaching 45 degrees.

#### Drainage

The area is strewn with a great abundance of lakes of all shapes, dimensions, and depths. In some sections, such as on the central plateau, lakes occupy nearly fifty per cent of surface of the region. In those parts where the bedrock consists of massive rocks, the lakes are haphazardly distributed and have irregular contours. They show, on the other hand, definitely elongated forms and are arranged in more or less parallel lines where stratified, schistose, or faulted rocks are dominant. In the vicinity of the divides between the different hydrographic basins, many lakes have two outlets, and that increases the already considerable difficulty of tracing the demarkation line between two adjacent fluvial basins.

Rivers are numerous everywhere in the territory except in the extreme northwestern part where the atmospheric precipitation is less. Some of these rivers are of important size. The main streams of the James Bay and Hudson Bay watersheds are, from south to north: the Eastmain, Grande rivière or Fort George, Great Whale, Little Whale, Nastapoca, Kogaluc, Povungnituc, and Kovic. The main rivers of the Ungava Bay water basin, the majority of which have a very large outflow, are, from west to east: the Payne, Leaf, Koksoak, Whale, George, and Koroc.

#### Climate

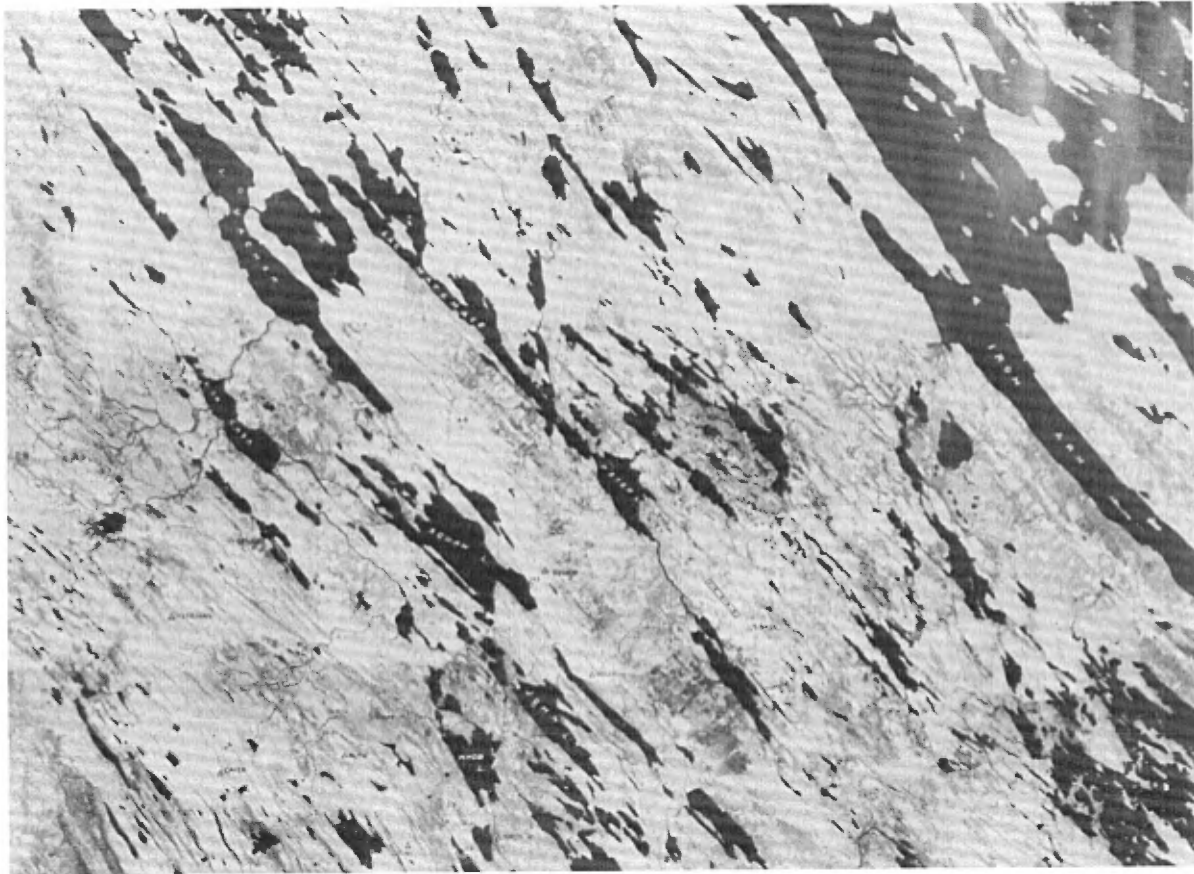
Tanner puts forward, in a report on Labrador published in 1947, the hypothesis that the meteorological conditions of the territory are determined by the conflict of two climatic complexes: first, a continental complex from the interior regions with rainy summers and cold winters, and, second, a maritime complex from the eastern border with rainy autumns and mild winters. Continental



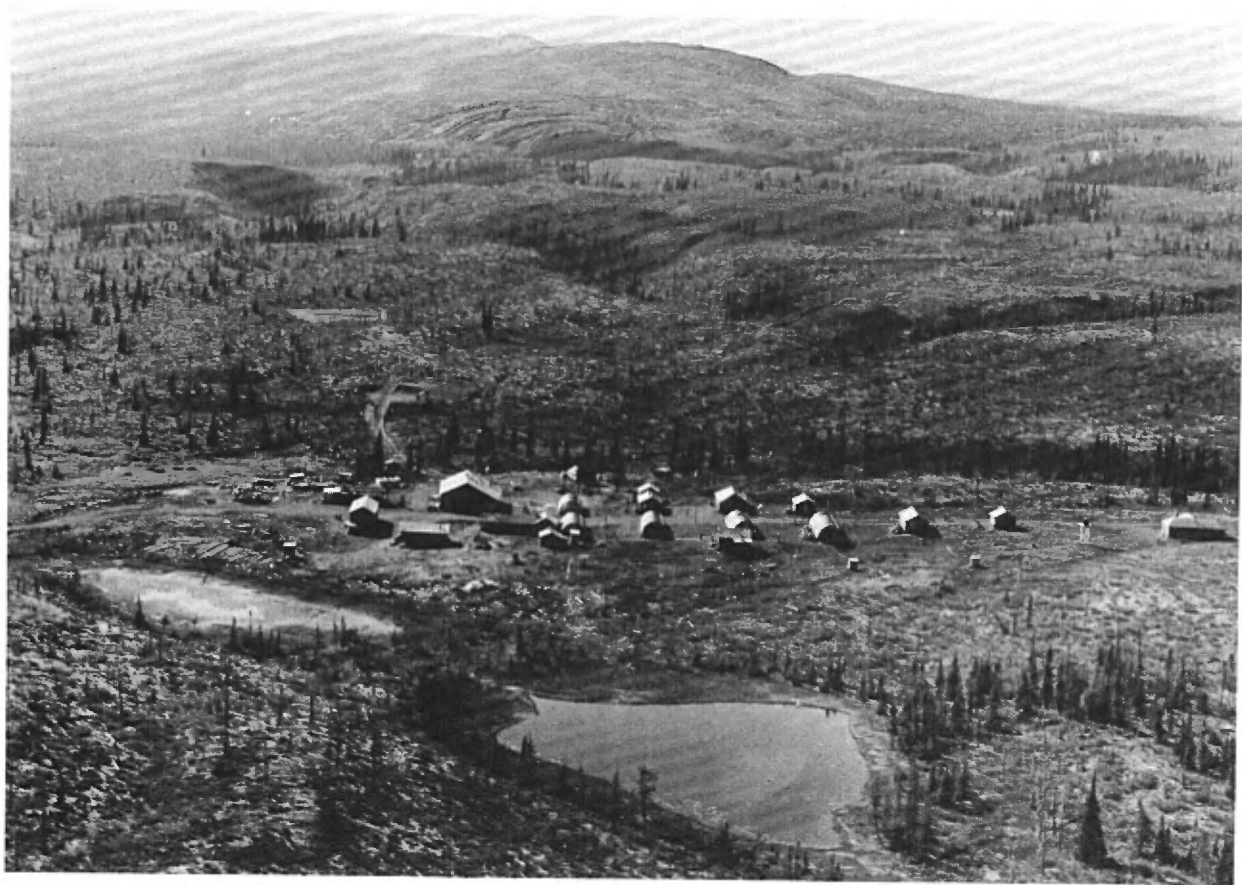
Aerial view of Schefferville, seen from the east. (Photo, Iron Ore Company of Canada, Ltd.)



Another aerial view of Schefferville looking northeast. (Photo, Iron Ore Company of Canada, Ltd.)



Aerial view of Late Precambrian formation of the Labrador geosyncline in the Burnt Creek region.  
(Photo, Topographical Surveys of Canada.)



Burnt Creek camp, Labrador geosyncline. (Photo, Hollinger North Shore Exploration Co. Ltd.)

climatic conditions prevail over the whole territory during the winter, whereas coastal and maritime climate has a major influence for a considerable distance into the interior during the summer months.

As a result, the main characteristic of the climate of the territory is its great instability. The deeper one enters into the hinterland, the warmer the summers and the colder the winters become. In general, the annual precipitation also decreases from south to north and from east to west.

The territory has thus but two seasons: winter and summer. The farther one travels to the north, the shorter are the summers and the longer, the winters. In general, the average daily temperature of the territory rises above 32°F. only during a period of about four months. The isotherm of 50°F. in July, which is generally considered as marking the limit between a temperate climate and arctic conditions, cuts across the east coast of Hudson bay at approximately latitude 57°N. and makes, toward the interior, a slightly sinuous line in an approximate east-west direction.

Snow usually melts in the woods during the first two weeks of June and regular night frosts start at about the end of August or early in September. In the hinterlands, daytime temperatures as high as 75°F. are sometimes recorded during the summer. However, the winters are rigorous. Their minimum temperatures easily reach 20°F. below zero and are known to have dropped to 50°F. or 60°F. below zero at various places.

#### Flora

The territory may be divided into three distinct zones of vegetation, one somewhat overlapping the others. They are from south to north: the taiga, the forest tundra, and the tundra.

#### Taiga

The taiga, also known as the forest of subarctic coniferous trees, occupies all of the southern part of the territory up to the vicinity of latitude 54°N. and even latitude 55°N. in its eastern section, near the headwaters of George river.

The taiga does not form a continuous forestry mantle and its aspect changes gradually from one region to another. It is broken

by bare rocky ridges and by peat bogs. Depending on the nature of the soil, the predominant trees are either black spruce or white spruce, the former in humid soils and the latter in dry places, where they form the best stands. Grey pine (*Pinus Banksiana*) is found in the sandy soils of the western part of the territory. Balsam stands in very humid spots. The deciduous trees growing in the territory consist mostly of white birch and poplar.

The stands of coniferous trees of the taiga suitable for industrial exploitation represent a relatively restricted part of the wooded areas. The fact remains, however, that mining enterprises will find, certainly as far north as latitude 57°N. and even farther in some favoured spots, the timber necessary for their current needs.

#### Forest Tundra

The forest tundra is nothing else than the northernmost part of the subarctic forest of coniferous trees where these grow in clusters along river banks and in protected valleys. The species are about the same as those in the taiga, except that black spruce forms by far the dominant variety.

#### Tundra

The real tundra begins in the territory between latitudes 58° and 59°N. Its southern boundary forms a sinuous line which starts south of Portland promontory, on the east shore of Hudson bay, and passes slightly north of the major part of Leaf river and crosses it near its mouth. The line then continues southward for a short distance following fairly closely the south shore of Ungava bay, after which it turns to the east and extends to the 59° parallel near the mouth of George river finally to follow the course of Koroc river.

Trees are not totally absent in the tundra, and, along with the very numerous species of arctic herbaceous plants, there are a few bushy varieties of willow, birch, and alder which seek humid and protected regions, such as river valleys and lake shores. These bushes are usually abundant enough along the main water-routes for travellers to find without too much difficulty the firewood necessary to cook their meals and keep warm.

Fauna

Caribou, the animal so precious to the Indian and Eskimo populations and which once thrived in very large numbers in the territory, has become considerably diminished in the last few decades. Several reasons have undoubtedly helped to accelerate its disappearance, but forest fires and the inconsiderate slaughter of the animal by Indians and Eskimos after the introduction of automatic firearms are among the main causes.

The principal fur-bearing animals inhabiting the southern, forested zone of the territory are mink, ermine, marten, otter, beaver, muskrat, lynx, and several species of fox. Owing to excessive and irrational killing by hunters, the number of these animals has also been considerably reduced, and hunting reserves for the reproduction of beaver have been established in areas surrounding a few Hudson's Bay Company posts. Black bears are in places fairly abundant in the southern part of the territory.

During the winter, Eskimos of the northern arctic zone capture white or polar foxes and arctic hares. They also hunt seals and kill a few polar bears along the coast.

Flocks of white partridge, duck, and Canada goose inhabit the territory, and various species of sea birds dwell along the coast. Partridge is relatively abundant in the forest-covered regions. It is generally prudent, however, not to rely too much on game resources of the interior of the territory.

Schools of codfish frequent the east coast of Ungava bay and the region of Chidley cape; salmon also ascend some of the large rivers flowing into the southern part of Ungava bay.

Large trout are caught at many places in the coastal waters and fish seems to be plentiful almost everywhere in the interior. The main varieties of fish are grey trout, speckled trout, carp, white fish, pike, and several other species.

Insects are encountered in extreme abundance during the summer months all over the territory. Black flies are active from the thawing season to November and are particularly voracious.

### Agriculture

The severity of the climate and the rocky or swampy nature of the soil limit considerably the agricultural possibilities of the territory. Some tillage, however, has produced satisfactory results along the east coast of James bay, where good crops of potatoes, carrots, beets, cabbage, turnips, onions, and rhubarb have been obtained. The growing period is about three months long, and seeding is not practical before June 10. A few cows are raised at Fort George (latitude 53°30'N. and longitude 79°W.) and they are fed during the winter with locally grown hay.

Farther inland, agricultural possibilities are generally very limited.

### Water Power

The potential reserves of hydro-electric power of the territory are immense. No sector is short of them, although the largest water falls are situated in the central plateau. To mention only one, the water fall at Eaton canyon, on Caniapiskau river, has a potential energy estimated at approximately 500,000 h.p.

No matter in what part of the territory a mining exploitation requiring a large amount of electricity may settle, it can be assured in advance that within a short distance from the site of its operations water falls of the required height and flow will be found.

### Population

The whole territory has a population of approximately 10,000 inhabitants, not counting the labour force presently building radar stations at Schefferville and Great Whale river. The total Eskimo population is about 2,500, whereas the Indians number some 1,250. A few thousand whites are now permanent residents in the area. They include Hudson's Bay Company agents, missionaries, employees of aviation companies, government officials and, more recently, employees of Iron Ore Company of Canada and their families who reside in Schefferville, New Quebec's first town. This town is 320 miles north of Sept Iles at the head of the railroad built by Quebec North Shore and Labrador Railway Company. Its present permanent population numbers 5,000 inhabitants.

The Eskimos live on the shores of the arctic part of the territory between Ungava bay and the northern part of Hudson bay. The Indians, of the Montagnais-Naskopi tribe, dwell in the southern and forest-covered part of the country, generally south of the 57th parallel. On the east coast of Hudson bay, they do not live north of Richmond gulf. Approximately 200 of them moved recently to Fort Chimo after the closing of the Fort McKenzie trading post, 90 miles farther south.

#### Permanent Establishments

Apart from the mining camps of the companies working on the iron-bearing deposits mentioned earlier in this report, the main permanent establishments of the territory are the following:

- Cape Hopes Advance (Ungava bay) - Department of Transport radio and meteorological station
- Fort Chimo (lower valley of Koksoak river) - Detachment of the Royal Canadian Mounted Police, Hudson's Bay Company post-office<sup>\*</sup>, Anglican mission, air base, and meteorological station
- George River (Ungava bay) - Hudson's Bay Company post
- Big Whale River (Hudson bay) - Hudson's Bay Company post and Anglican mission
- Payne Bay (Ungava bay) - Hudson's Bay Company post
- Port Harrison (Hudson bay) - Detachment of the Royal Canadian Mounted Police, post office, Department of Transport meteorological station, Hudson's Bay Company post, Anglican mission
- Povungnituc (Hudson bay) - Hudson's Bay Company post
- Richmond Gulf (Hudson bay) - Hudson's Bay Company post, Catholic mission
- Sugluk (Hudson strait) - Hudson's Bay Company post
- Wakeham Bay (Hudson strait) - Catholic mission
- Eastmain (mouth of Eastmain river) - Catholic mission
- Fort George (mouth of Grande rivière) - Catholic mission
- Ivuqivik (northern tip of Hudson bay) - Catholic mission
- Koartac (Cape Hopes Advance, Hudson strait) - Catholic mission

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<sup>\*</sup>Every post of this company also has a private transmitting radio station.

## GENERAL GEOLOGY

The geology of the territory here under study is only very broadly known, except for a few relatively small areas. However, the long traverses of Low and the field work of the few geologists who subsequently visited different parts of the territory make it possible at least to speculate in general terms on the geological character of the sections that have not yet been visited and to outline broadly the distribution of the main formations underlying the area.

All these formations, except for the surficial unconsolidated sediments of the Cenozoic period and possibly a few rare Palaeozoic outliers suggested by the presence of fossil-bearing erratics, belong to the Precambrian. Almost nine-tenths of the territory is underlain by Early Precambrian rocks, whereas the Late Precambrian formations, although presently much more important from the economic point of view since they contain the large iron ore deposits of the central plateau, occupy only relatively limited areas.

### Early Precambrian

#### Gneissic Complex

The Early Precambrian basement rocks of the territory seem to consist essentially of a granite-gneiss complex mainly of composite origin. The descriptions that we have of them agree that pure and homogeneous granites in distinct masses are rarely found. On the contrary, the rocks are heterogeneous, gneissic, commonly banded and seem to consist mainly of orthogneiss rich in basic inclusions and containing, in places, large zones of sedimentary or volcanic material more or less metamorphosed and granitized. The contacts between those still recognizable zones of metamorphic rock and the adjacent orthogneisses are not clear cut but the formations show gradational transitions from one variety of rock to the other.

Easily identifiable paragneisses, commonly containing garnet, sillimanite, and, less frequently, graphite, occupy wide areas of the complex. Large masses of them are found in various parts of the country, particularly east and southeast of Ungava bay. Elsewhere, these gneisses are associated with amphibolites or quartzites, and Low even observed in them inclusions of crystalline limestone. Both types of paragneisses, the ones much injected with granitic material and changing gradually into migmatites and the others, less

altered and containing interbeds of quartzite or of metamorphic limestone, are strongly reminiscent of the gneisses of the Grenville series that crop out abundantly in southwestern Quebec and southeastern Ontario.

### Greenstones

Belts of more or less metamorphosed greenstones, in which are commonly found still identifiable former basic to intermediate lavas, their associated tuffs, and sills of diabase containing inclusions of schistose sedimentary rocks or of greywackes, crop out in widely scattered parts of the territory. Their distribution and extent suggest that many more areas of them will still be discovered throughout the region.

It appears obvious from observations made in various parts of the territory that most of these rocks derived from ancient lavas are older than the adjacent granites. They are, like their associated sedimentaries, more or less metamorphosed, and it is probable that a certain amount of the paragneisses of the gneissic complex owe their origin to them.

The largest area of Early Precambrian greenstones so far discovered in the territory is that of Eastmain river and vicinity.

The greenstones of Eastmain river cover a large tract of ground along the lower course of the river and form seven other, much smaller, zones along its upper reaches. Six of these are to the north and the remaining one is more to the east of the river. Each of them is surrounded by intrusive granitic rock into which the zones grade after gradually passing through gneisses, which in turn become more and more acidic toward the granite.

The main zone of greenstone forms an assemblage of andesitic lavas and sedimentary formations lithologically and stratigraphically resembling that of the Opemisca region farther to the south. The volcanic flows and the sedimentary formations are invaded by intrusive basic rocks similar to those found farther south in the Temiscamian sub-province. The zone is approximately 125 miles long and has a very variable width.

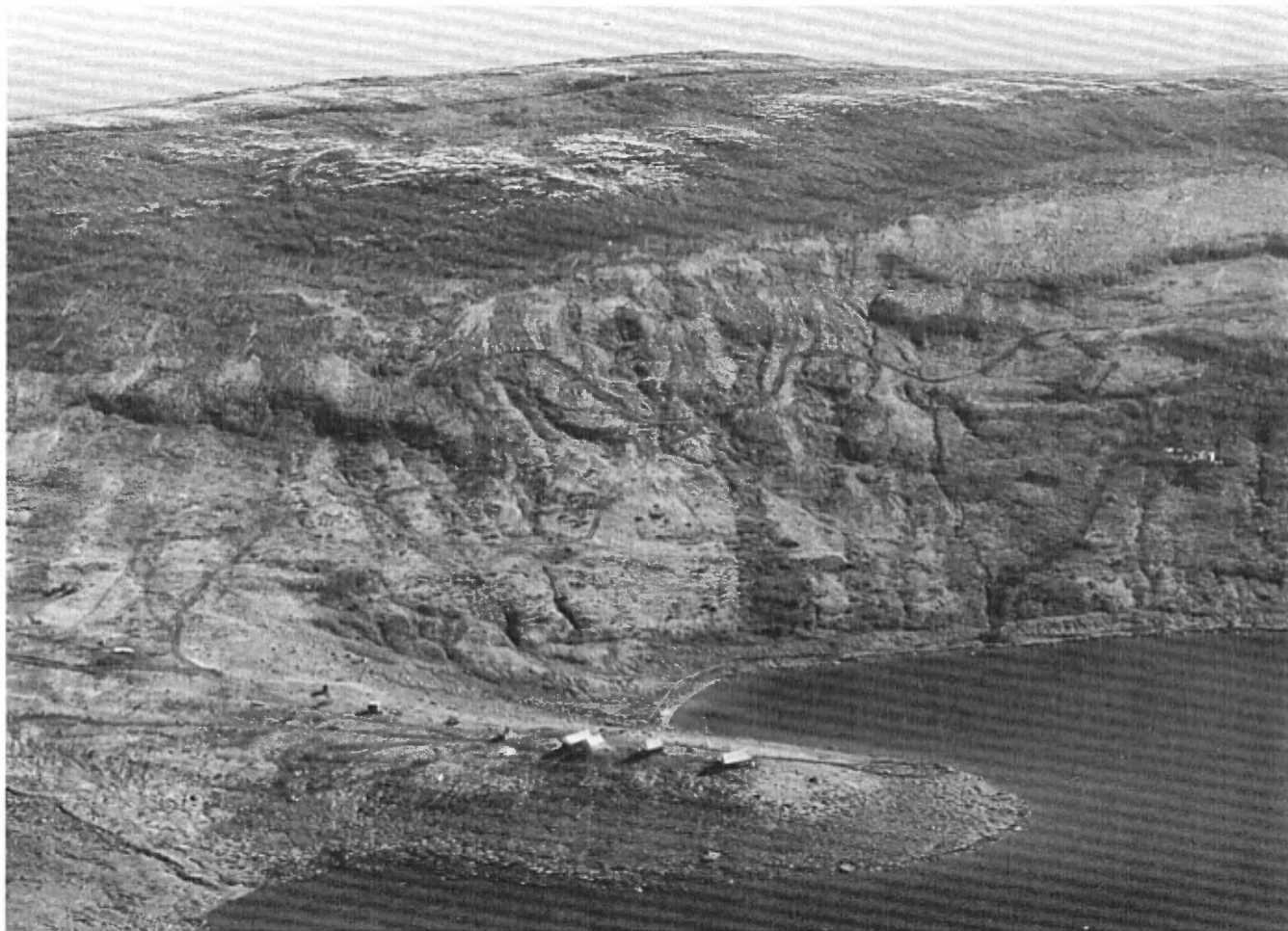
The other zones of greenstone of the Eastmain River region consist mostly of lavas, with various amounts of sedimentary rocks, invaded by acidic injections related to the granitic bodies over which they lie.

#### Late Precambrian

Late Precambrian sedimentary and volcanic formations lie unconformably, in certain parts of the territory, on the peneplained surface of the much folded and deformed Early Precambrian rocks. The subsidence of this peneplain during Late Precambrian time permitted the accumulation, at various places, of sedimentary deposits of variable thickness. A subsequent uplift of the depressed peneplain brought the sedimentaries into their presently exposed position. The three main Late Precambrian basins of deposition of the area were the Labrador geosyncline, a zone averaging 45 miles in width and extending southward and southwestward for nearly 500 miles into the interior of the territory, the Richmond Gulf basin, situated along the east coast of Hudson bay, and the Cape Smith zone.

The Late Precambrian formations of the Labrador geosyncline are made up of a series of sedimentary and volcanic rocks invaded by generally concordant, intrusive masses of basic to intermediate composition. James and Gill (1929) gave this large geological unit the name of "Caniapiskau Series". It contains the major part of the formations of the Labrador geosyncline. The Caniapiskau series lie unconformably along the southwestern border of the geosyncline on the crystalline basement rocks of the Early Precambrian. To the northeast, it is in contact with an important series of gneissic rocks that include hornblende and biotite gneisses, granitic gneisses and paragneisses. The relationship between these rocks and those of the Caniapiskau series to the southwest is still obscure.

The outstanding interest of the Caniapiskau series lies in the presence, within its members, of the iron-bearing formations containing the important iron ore deposits presently being explored in the Labrador geosyncline. These ferriferous formations, which consist mostly of beds of jasper, hematite, siderite, and chert, constitute, however, only a minor element of the series, the thickness of which is believed to exceed 10,000 feet. Among the rock types observed are sandstones and conglomerates, dolomites, argillaceous shales, siltstones, slates, shales, quartzite and intercalations of lava of various thicknesses.

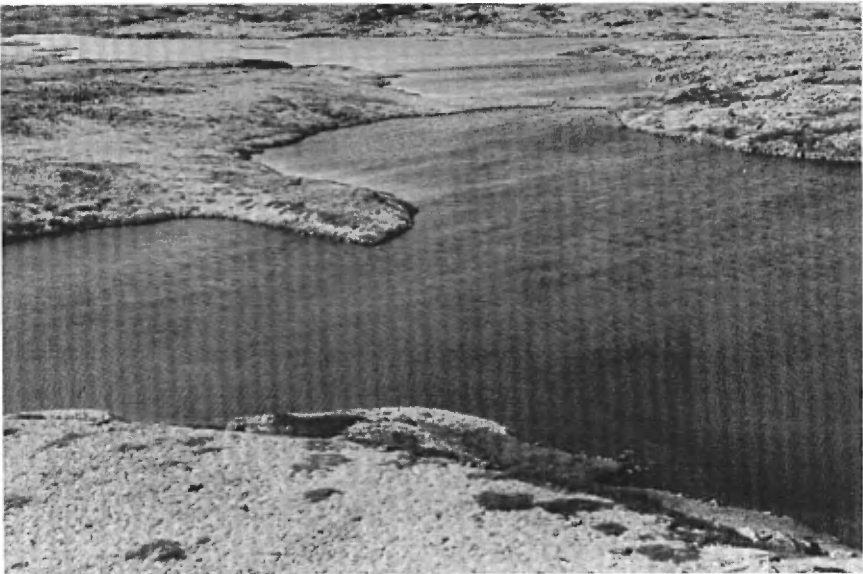


Eclipse deposits, property of Hollinger North Shore Exploration Co., Ltd. (Photo, Hollinger North Shore Exploration Co., Ltd.)

Plate XI



A - Knob Lake . (Photo, Hollinger North Shore Exploration Co. Ltd.)

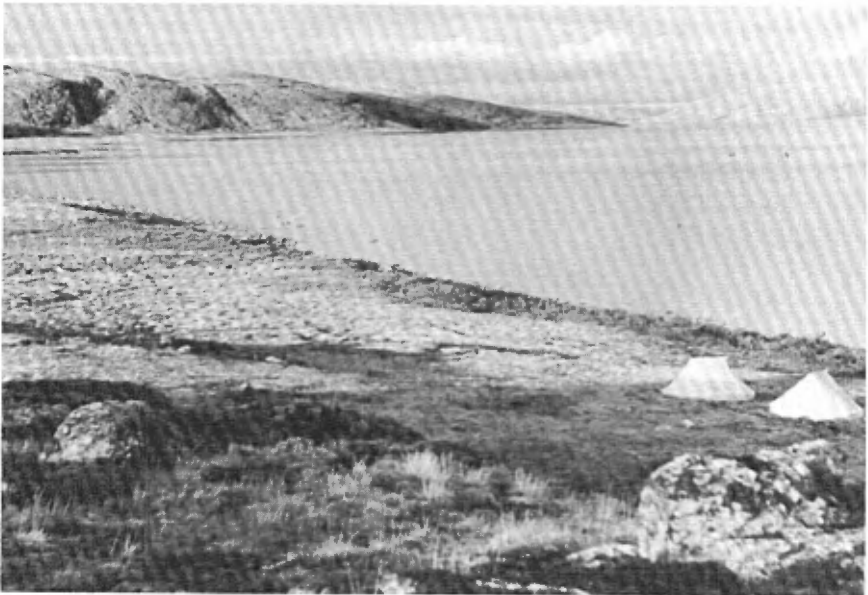


B - Lacustrine plateau, southwest of Payne lake . (Photo, E. Aubert de la Rüe.)

Plate XII

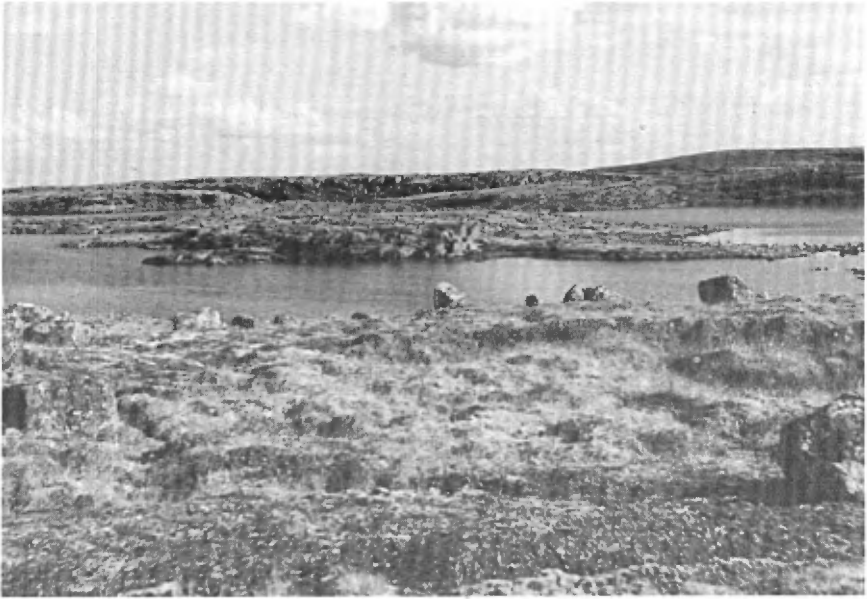


A - Middle valley of Payne river, upstream view. (Photo, E. Aubert de la Rüe.)

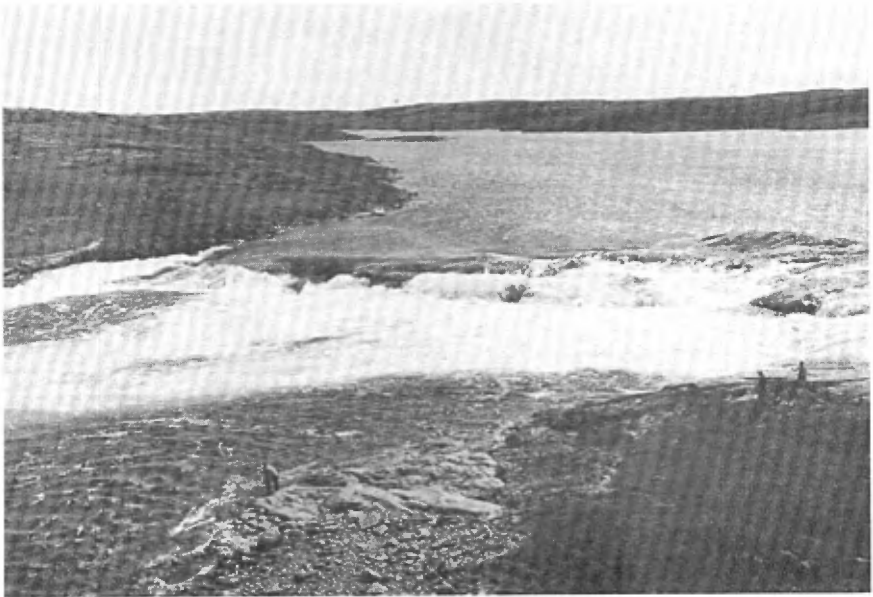


B - Payne river, just above its junction with Flaherty river. (Photo, E. Aubert de la Rüe.)

Plate XIII



A - Bay on north shore of Tasiat lake (Kogaluc River basin). (Photo, E. Aubert de la Rüe.)



B - Thirteenth falls on Kogaluc river. (Photo, E. Aubert de la Rüe.)

The Late Precambrian formations of the Labrador geosyncline were subjected to tangential pressures, especially from the northeast, which produced a series of folds and thrust faults the axial planes of which are oriented toward the northwest with dips generally to the northeast. These tectonic movements caused frequent repetitions of the same beds, that, more or less resistant to the action of atmospheric agents, have given the surface of the geosynclinal area its crenulated aspect characterized by elongated and parallel lakes separated one from the other by ridges rising to as much as 1,000 feet above the floors of the intervening valleys.

In the Late Precambrian basin of Richmond gulf, on the east coast of Hudson bay, the sedimentary strata, the thickness of which is at least 4,000 feet, form a border zone seldom exceeding seven miles in width over a distance of 90 miles along the coast. The same formations crop out in the string of coastal islands of the archipelagos of Nastapoca, Manitousunuc, and Long Island. This sedimentary zone has thus a total length of over 200 miles.

The strata of this zone lie unconformably over Early Precambrian gneissic granite and consist of gently dipping beds of conglomerate, quartzite, chert, and limestone, covered by a layer of fine crystalline basalt. The calcareous formations contain concretions that are similar to those found towards the southeast, in the Mistassini Lake basin, and that probably represent a form of rudimentary life that existed at the time of deposition of the sediments.

The Cape Smith zone strikes N.60°E. across the peninsula on the west side of Ungava bay. It extends from Cape Smith, 125 miles south of Cape Wolstenholme on the east shore of Hudson bay, to Wakeham bay, south of Hudson strait. Its width varies from 40 miles at its western extremity to 10 miles at the eastern.

The rocks in this zone consist of flows of greenish grey to dark green lavas containing narrow sedimentary bands and intruded by concordant diorite bodies. The rocks are more or less schistose. Ellipsoidal lavas are common and the sediments are tuffaceous and feldspathic. The whole series is older than the bordering granite gneisses.

### Glacial and Post-glacial Phenomena

The ice cap that covered the territory during the Pleistocene epoch left everywhere evident traces of its presence. The erosive action of the ice was, however, not considerable and virtually limited itself to a sweeping of the peneplain it invaded, removing unconsolidated material from its surface, scraping off the disintegrated and altered surficial parts of the rocks, and leaving behind monotonous, polished, and striated rocky surfaces. However, the removed débris were not generally transported far and most of them were left almost at or near their places of origin, especially in the depressed parts of the territory.

The arrangement of glacial striae shows that the centre of the ice cap was in the central plateau area of which mention has been made and that the ice moved in different directions from there over the surrounding peneplain. However, the orientation of the striae observed near the border of the peninsula that lies between Ungava bay and Hudson bay indicates the possible existence in this sector of a secondary centre of glaciation that developed probably towards the end of the glacial period when the main centre was farther south.

Every form typical of constructive glacial action can be seen in the territory. Glacial clays are very abundant although ordinarily in relatively thin layers. Numerous eskers are present mainly on the central plateau, but also here and there throughout the entire area. Drumlins are numerous in the northwestern part of the territory and in the region of Portland promontory, on the east coast of Hudson bay.

The retreat of the ice sheets, towards the end of the Pleistocene period, was followed by an invasion of the coastal areas by the sea. This invasion was very uneven, and of variable extent, depending on the topography of the coastal region. Present data are still too sketchy and uncertain to trace even approximately the maximum limit of this post-glacial immersion. It nevertheless appears that the extreme inland points reached by the sea were not more than a few tens of miles from the coast-line, except along the valleys of the large streams.

One of the consequences of the post-glacial marine invasion was the cleaning of the periphery of the peneplain which

is, accordingly, more rocky and more bare along its border zone than in the interior where the bottom moraine is more or less still intact.

The territory has risen unevenly since the end of the post-glacial marine invasion, as evidenced by the presence of raised marine beaches all along the coast-line. The elevation of those beaches varies between 180 and 900 feet above the present sea level.

### ECONOMIC GEOLOGY

#### Iron Deposits of the Labrador Geosyncline

The Labrador geosyncline, which appears today as the most promising part of the whole territory, has recently become known to the general public on account of the immense deposits of iron ore that have been discovered within its limits in the last few years.

Low recognized the presence of ferriferous formations in this vast sedimentary basin in the course of his exploratory voyages between 1892 and 1895, but it was only more than 30 years later, in 1929, that the first large-scale exploratory work for economical purposes was undertaken in that part of the territory by New Quebec Company, Ltd. James and Gill, who took part in the expedition, recognized the presence of three deposits of high-grade iron ore and suggested the possibility of other major interesting occurrences of the same material in the 1,000-square-mile area occupied by the Caniapiskau series to which the ferriferous formations belong.

Labrador Mining and Exploration Company was organized in 1936 and received from the Newfoundland government an exploration permit for a territory of 20,000 square miles. J.A. Retty was named chief geologist for the company. A programme of systematic geological exploration was undertaken in the upper basin of the Hamilton river in the search for precious and base metals. This quest was not long in revealing the existence, at numerous places in the Labrador geosyncline, of large deposits of high-grade iron ore. The discoveries aroused the interest of a number of companies and intensive prospecting was soon going on along practically the whole zone of Late Precambrian formations south of Leaf river.

Deposits of Iron Ore Company of Canada Limited

A new company, Hollinger North Shore Exploration Company Limited, was organized in 1941 to explore a territory of 3,900 square miles in New Quebec, its concession being adjacent to that of Labrador Mining and Exploration Company. Several deposits were discovered by the two companies and, in 1949, Iron Ore Company of Canada was organized for their development.

These deposits, the most important discovered to date, occur in the southeastern part of the Labrador geosyncline, in the vicinity of the divide between Hamilton and Swampy Bay rivers. They number about thirty and their importance, structure, and mineralogical composition vary considerably from one deposit to the other. The total length of the productive formation, in which occur the deposits to date discovered, is at least 90 miles on the properties of the two companies. The deposits presently under development form discontinuous zones in the ferriferous formations.

With few exceptions, the bodies of iron ore so far discovered crop out at the surface. The trenching, drilling, and geophysical surveying that was later done on them aimed mostly at a better knowledge of their grade and tonnage. The unconsolidated overburden is rather thin, except in the valleys where a large number of ore bodies may still remain to be discovered.

The iron ore is blue, red, yellow, brown, or black, depending upon the proportion of the various iron-bearing minerals present. The brown variety is the most common. A certain percentage of the ore contains an appreciable amount of manganese. The most common impurity in the ore is silica, which, for a good commercial ore, should not exceed ten per cent. A large proportion of the iron ore is of the Bessemer type, which means that it contains less than 0.045 per cent phosphorus.

Hollinger North Shore Exploration Company has already proved some 280 million tons of ore in New Quebec. If this tonnage is added to the ore already discovered by Labrador Mining and Exploration Company, total reserves amount to about 418 million tons. Mining operations began in the first half of 1954. Open-pit mining methods are used and annual production is expected to reach 12 million tons by 1956. The ore is shipped out by the 360-mile railroad that links the deposits with the seaport at Sept-Iles.

Plate XIV

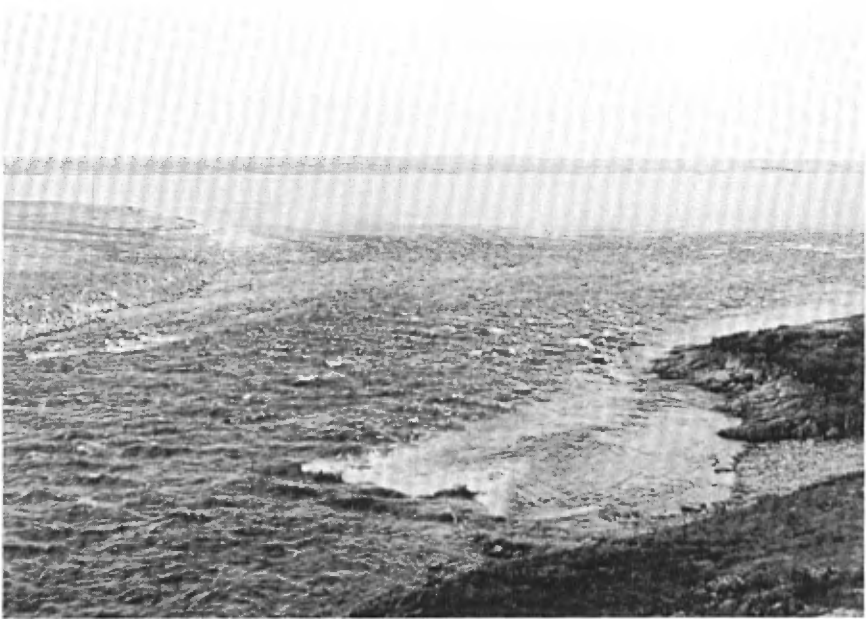


A - East coast of Ungava Bay. (Photo, Alexander Forbes; Northernmost Labrador, published by the American Geographical Society of New York.)



B - East Coast of Ungava Bay. (Photo, Alexander Forbes; Northernmost Labrador, published by the American Geographical Society of New York.)

Plate XV



A - Discharge of Kogaluc river into Tesek lake. (Photo, E. Aubert de la Rüe.)



B - Low, rolling hills surrounding Payne lake. (Photo, E. Aubert de la Rüe.)

Plate XVI



A - Northward view of George river at  $57^{\circ}29'$  North latitude. (Photo, Jacques Rousseau.)



B - Cascade and forest tundra on the west bank of George river at  $57^{\circ}48'$  North latitude. (Photo, Jacques Rousseau.)

Plate XVII



A- Eaton canyon along the upper course of Caniapiskau river. (Photo, Hollinger North Shore Exploration Co. Ltd.)



B - Another view of Eaton canyon along the upper course of Caniapiskau river. (Photo, Hollinger North Shore Exploration Co. Ltd.)

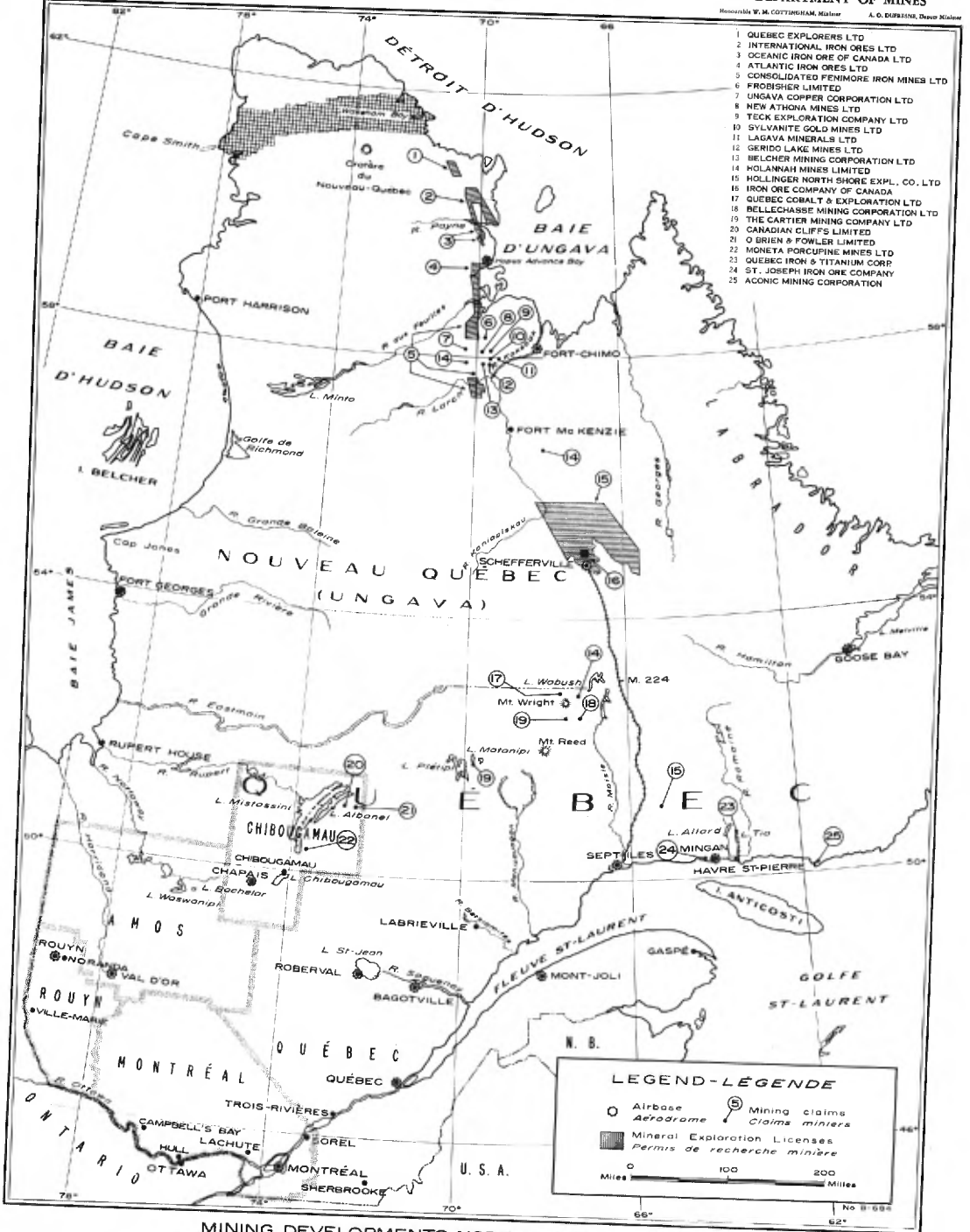
Illustré par W. M. COTTINGHAM, mines

A. G. DUBREUIL, voir mines

1957

Illustré par W. M. COTTINGHAM, Mines

A. G. DUBREUIL, Département des Mines



MINING DEVELOPMENTS NORTH OF 50<sup>th</sup> PARALLEL  
 DÉVELOPPEMENTS MINIERES AU NORD DU 50<sup>e</sup> PARALLÈLE

FIG.-1

Other Companies Working in the Ferriferous Zone of the  
Labrador Geosyncline

Many other companies have carried out or are still working on important projects in the western part of the Labrador geosyncline to the north of the Iron Ore Company of Canada holdings, where the iron formations are more extensively exposed. These companies are Norancon Exploration (Quebec) Ltd., Great Mountain Iron Corporation, Fort Chimo Mines Ltd., Quebec Labrador Development Co. Ltd., Fenimore Iron Mines Ltd., Atlantic Iron Ore Ltd., Oceanic Iron Ore of Canada Ltd., Premium Iron Ore Ltd., International Iron Ore Ltd., and Quebec Explorers Ltd.

Exploration was carried out on iron formations similar to those in which the important iron deposits to the south were discovered. No high-grade iron deposit has been found north of the concession of Hollinger North Shore Exploration Company Limited but very large quantities of low to medium grade iron ore were discovered and metallurgical research has demonstrated the feasibility of producing commercial concentrates from this ore.

South of Schefferville the Labrador geosyncline extends to the south and southwest and the Mount Wright area is located at its southwest extremity. Mount Wright is located east of aux Pekans river and 185 miles north of Shelter Bay. This village is about 25 miles west of Sept-Iles, on the north shore of the St. Lawrence.

The bedrock of the Mount Wright area consists of Precambrian metasediments which include gneisses, quartzites, dolomites, iron formations as well as acidic and basic intrusives. Several companies have carried out exploration work over the past seven or eight years and their diamond-drilling has revealed large quantities of ore assaying 30 to 35 per cent iron.

Concentration mills are presently (1956) being planned for the Mount Wright area as well as a railroad to ship the concentrates to seaports on the north shore of the St. Lawrence.

Manganese Minerals

Besides iron, the most abundant economic metal so far discovered in the territory is manganese. It is practically everywhere present as oxides and in variable amounts in the iron ore.

Plate XXI



A - Junction of Payne (left) and Flaherty (background) rivers. (Photo, E. Aubert de la Rüe.)



B - North shore of Payne river estuary at low tide. (Photo, E. Aubert de la Rüe.)

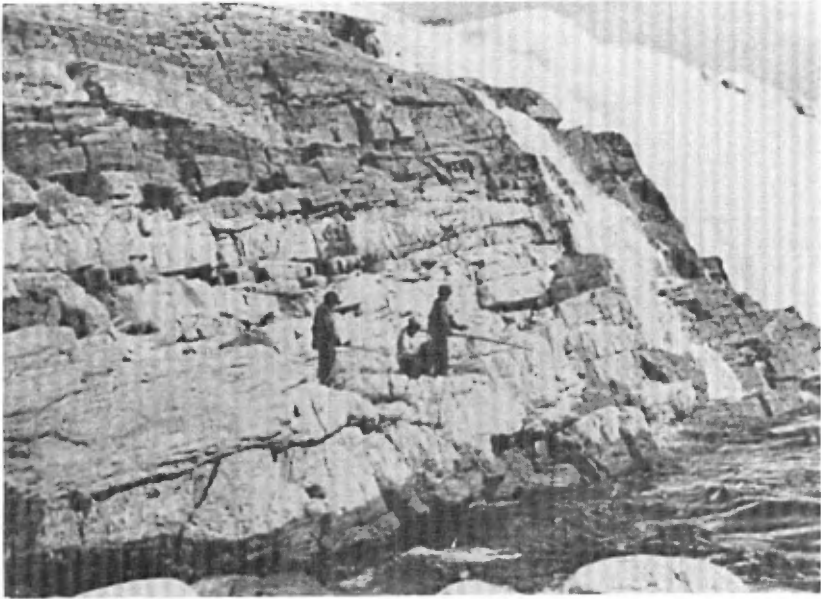


A - Rapid on George river at  $55^{\circ}41'$  North latitude. (Photo Jacques Rousseau.)



B - Falls on George river at  $55^{\circ}26'$  North latitude. (Photo, Jacques Rousseau.)

Plate XIX



A - Big Falls, Caniapiskau river; Late Precambrian sedimentary formations. (Photo, "The Beaver", Hudson's Bay Company.)



B - Little Falls, Caniapiskau river. (Photo, "The Beaver", Hudson's Bay Company.)

Plate XVIII



A - Upturned Early Precambrian paragneiss, Fort Chimo. (Photo, E. Aubert de la Rüe.)



B - Falls on Kogaluc river. (Photo, E. Aubert de la Rüe.)

Approximately 45 million tons of iron ore discovered on the properties of Hollinger North Shore Exploration Company, Limited, and Labrador Mining and Exploration Company, Limited, have a tenor in manganese of between 7.5 and 8 per cent.

This mineral also occurs as a carbonate (rhodocrosite) and is one of the constituents of the rock containing the lead and zinc sulphides of the Richmond Gulf region.

Deposits of wad containing between 10 and 35 per cent manganese have also been discovered around Wilson lake (56°20'N.: 68°50'W.), a short distance east of Cambrian lake. These deposits lie over bog iron (goethite and limonite) formations and are included in a zone measuring approximately a mile and a quarter in length by three-quarters of a mile in width. Samples of them were taken at various places down to a depth of five feet.

Undoubtedly, surficial deposits of wad of the same type occur in other parts of the territory, and their profitable extraction could be expected in the event of larger deposits of manganese being mined in the vicinity.

#### Sulphide Mineralization

Impregnations and concentrations of pyrite and pyrrhotite, here and there containing sulphides of copper, lead, zinc, and nickel, as well as a little gold and silver, have been found in most of the greenstone zones and in some Late Precambrian sedimentary formations of the territory under consideration. The main greenstone zones were described earlier in this report, and only the principal deposits of the metallic minerals in them will be very briefly discussed here.

Deposits of pyrite containing galena, sphalerite, and a little chalcopyrite and marcasite are disseminated between Richmond gulf, along the east coast of Hudson bay, and the lower course of Little Whale river. They generally consist of impregnations and replacement deposits in highly silicified, Late Precambrian limestones. Assays have indicated that these sulphides contain lead, zinc, copper, and a little silver, as well as cadmium and a little gold. The deposits were recently explored by the Consolidated Mining and Smelting Company of Canada, Limited, and Gulf Lead Mines, Limited. The results obtained by the latter company through strip-

ping, trenching, and drilling, suggest that the region may one day become a base metal producer.

Sulphide mineralization is also found in small bodies or in quartz veins in the greenstone zone of the Cape Smith (Hudson bay) region. A part of this zone was prospected between 1931 and 1933 and sulphide masses were found at many places. A careful sampling of the showings in the vicinity of the shore has revealed traces of copper, nickel, and gold, but the areas so far examined represent only a restricted part of the Cape Smith greenstone zone. The little encouragement obtained from these few efforts confined to the coastal region should not be considered as indicative of the possibilities of the whole area without much further exploration of all the zone being done, and, as a matter of fact, important discoveries were made there during the summer of 1956.

Another zone of sulphide mineralization lies slightly to the east of Attikamagen lake, a large body of water in the central part of which is the intersection of the 55th North parallel and the 66°30' West meridian, in the eastern part of the Labrador geosyncline. This zone is included within the limits of the territory being explored by Hollinger North Shore Exploration Company and, to date, at least three different deposits of iron, zinc, lead, and copper sulphides containing a little gold and silver, have been found. One of these deposits, which is 660 feet long and averages 13 feet in width, yielded an average tenor of about 6.75 per cent zinc, 1.4 per cent copper, 0.5 per cent lead, and from \$2 to \$3 in gold and silver per ton. Exploration for nickeliferous mineralization is also being carried out in this zone.

Farther north in the same zone, other sulphide deposits were also discovered on the property of Norancon Exploration (Quebec), Limited. One of them, situated half a mile to the west of Norancon lake, 15 miles east of the discharge of Swampy Bay river into Otelnuc lake, consists of a small body of massive sphalerite, 6 to 8 feet wide, associated with a calcite vein in slaty schists. The average tenor is about 19.3 per cent zinc.

The east half of the Labrador geosyncline contains an important band of sulphide mineralization with an average width of about ten miles. It is more than 120 miles long and extends from northwest of Fort McKenzie to Leaf river. Many important zones of sulphides have been discovered and several thousand claims have been

staked since 1953 by several mining companies. The most common mineralization consists of concentrations of pyrite and pyrrhotite containing here and there sulphides of copper, lead, zinc, nickel, cobalt, and a little gold and silver. The large size and abundance of the mineralized zones augur well for the development of a base metal mining industry in the area.

The companies engaged in the exploration of this band of sulphides, as well as of the Cape Smith zone, are the following: Holannah Mines Limited, Ungava Copper Limited, Little Long Lac Gold Mines Limited, Climax Molybdenum Limited, Martin-Bird Gold Mines Limited, Hopes Advance Mines Limited, Teck-Hughes Gold Mines Limited, Sylvanite Limited, Belcher Mining Corporation, Hardrock Gold Mines Limited, Powell Rouyn Gold Mines Limited, Lemoyne Ungava Mines Limited, Lake Shore Mines Limited, Malartic Gold Fields Limited, Delnite Limited, and Wright-Hargreaves Limited.

The presence of small quantities of molybdenite was reported in the vicinity of the mouth of Big Whale river, along the east coast of Hudson bay. Flakes of this mineral, up to half an inch in diameter, were also noted in a small pegmatite dyke that cuts the greenstones of Paint Hills bay, at latitude 53°N., along the east coast of Hudson bay.

#### CONCLUSION

The list of the known mineral resources of the territory just described is as yet neither long nor varied but this inventory has barely been started. Extensive tracts of the territory are still totally unexplored; the sum of the few areas that have been the object of geological surveys and systematic prospecting represents a very small fraction of the immense territory. Individual prospectors have not yet invaded these remote lands notwithstanding the recent discovery of iron ore deposits that are among the richest and largest of our time and of numerous zones of sulphide mineralization.

More abundant and detailed explorations will certainly reveal the existence of hitherto unsuspected mineral deposits in this vast sector of the Canadian Shield. Their development will demonstrate the abundance of the mineral riches of this extensive territory and their extraction will one day be a considerable asset to the general economy of the Province as well as of the country as a whole.

BIBLIOGRAPHY

Aubert de la R e, Edgar - Geological Survey Through the Ungava Peninsula; Arctic, Vol. 1, No. 2, pp. 135-136. Autumn, 1948, Montreal.

Premiers r sultats d'une travers e de la p ninsule d'Ungava (Labrador canadien); C.R. Somm. Soc. G ol. Fr., Nov. 8, 1948, pp. 272-274, (No.13-14).

Quelques aspects du Labrador; La Nature, No. 3178, February, 1950, pp. 47-51, and No. 3179, March 1950, pp. 80-84.

Auger, P.E. - The Stratigraphy and Structure of the Northern Labrador Trough, Ungava Bay, New Quebec; Can. Min. and Met. Bull., vol. 47, No. 509, pp. 529-32.

Baird, P.D. and Robinson, J.L. - A Brief History of Exploration and Research in the Canadian Eastern Arctic; Can. Geogr. Journ., March, 1945, pp. 137-156.

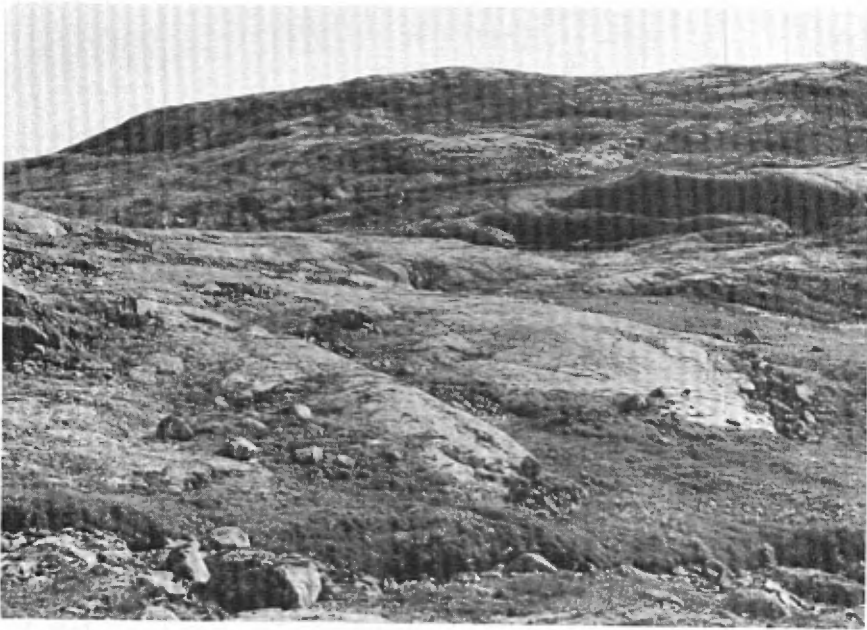
Bell, Robert - Report on an Exploration of the East Coast of Hudson Bay; Geol. Surv. Can., 1877-1878, pp. 1C-37C, Montreal, 1879.

Observations on the Geology, Mineralogy, Zoology, and Botany of the Labrador Coast, Hudson Strait and Bay; Geol. Surv. Can., Rept. of Prog., 1882-83-84, Pt. DD.

The Labrador Peninsula; Scottish Geogr. Mag., July, 1895, p. 384 and following.

Bergeron, Robert and Harquail, James, Prospecting and Exploring of Iron Ore Deposits in Northern Ungava; Can. Min. and Met. Bull., pp. 276-280, April, 1954.

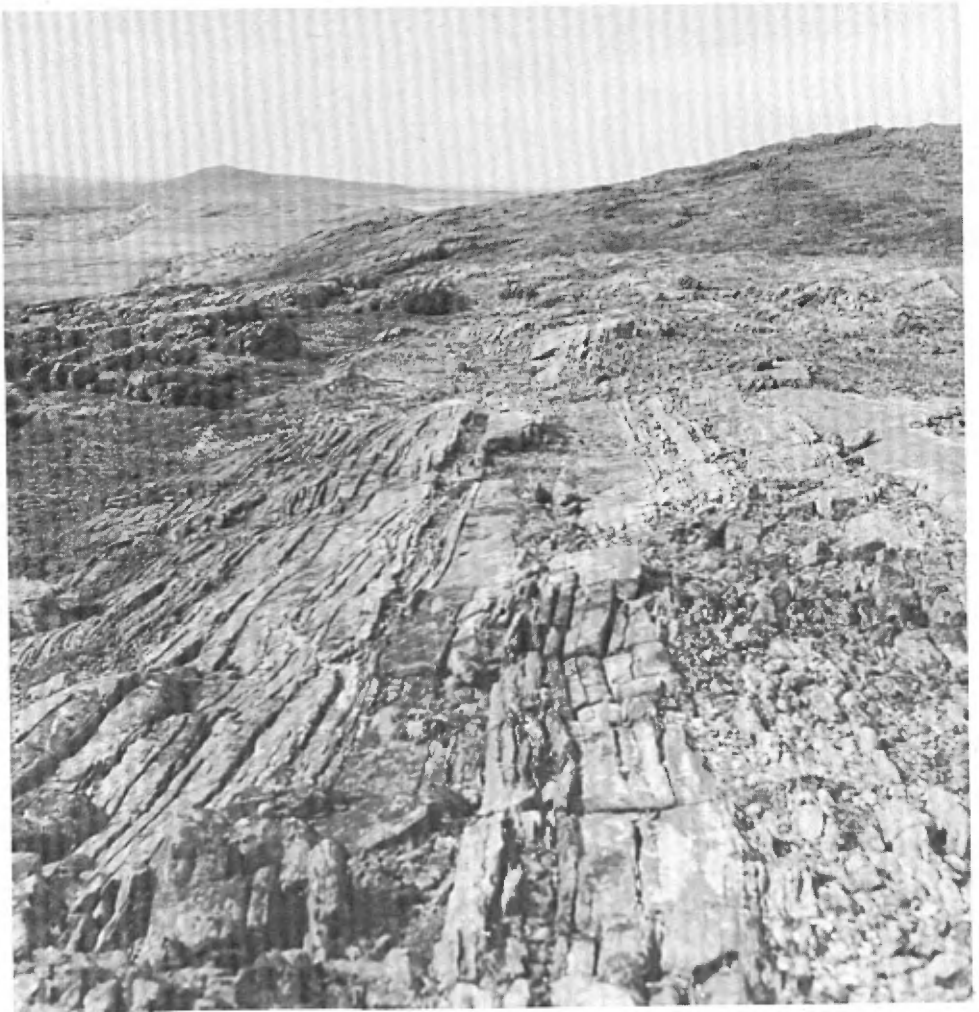
Boisvert, Paul F. - Un grand explorateur contemporain dans le Nouveau Qu bec et le Labrador; 46 p., La Soci t  de G od sie de Qu bec, Contribution No. 43.



A - Greenstone "moutonnée", estuary of Payne river. (Photo, E. Aubert de la Rüe.)



B - Polygonal soil, lower valley of Payne river. (Photo, E. Aubert de la Rüe.)

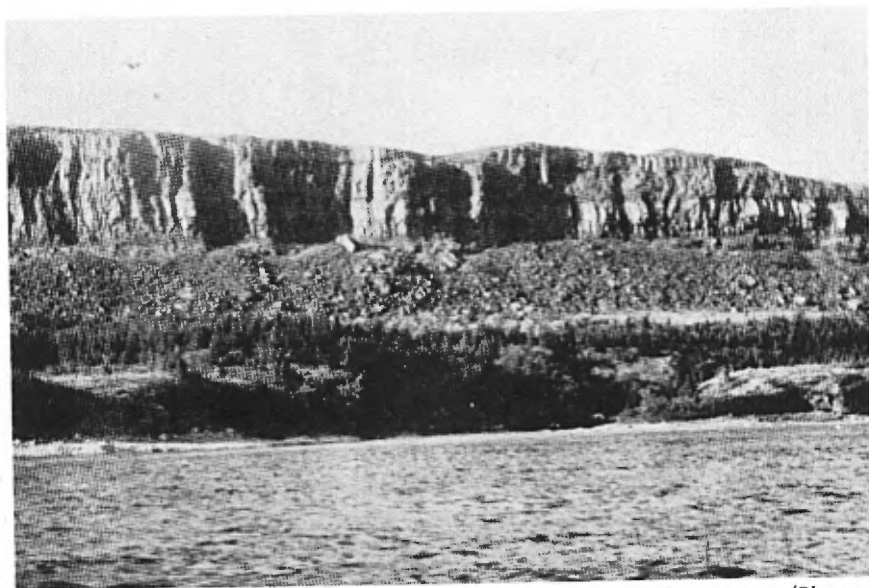


Upturned beds of iron formation (quartzite containing hematite), Late Precambrian, Kayak bay, west shore of Ungava bay. (Photo, E. Aubert de la Rüe.)

Plate XXIV



Pegmatite dyke cutting paragneiss on the left bank of Koksoak river, Fort Chimo. (Photo, E. Aubert de la Rüe.)



A - Stratification along the north bank of Little Whale river. (Photo, Gulf Lead Mines, Limited.)



B - Limestone formations south of Little Whale river. (Photo, Gulf Lead Mines, Limited.)

Coleman, A.P. - La péninsule du Labrador; Bull. Soc. Géogr. de Québec; Vol. 12, pp. 143-145, Québec, 1918.

Northeastern Part of Labrador, and New Quebec; Geol. Surv. Can., Memoir 124, 1921.

Cooke, H.C. - Studies of the Physiography of the Canadian Shield;  
I.- Mature Valleys of the Labrador Peninsula; Trans. Royal Society Canada, Third Series, Vol. XXIII, Sect. IV, 1929, pp. 91-120.  
II.- Glacial Depression and Post-Glacial Uplift; id. Vol. XXIV, Sect. IV, 1930, pp. 51-87.  
III.- The Pre-Pliocene Physiographies, as inferred from the Geologic Record; id. Vol. XXV, Sect. IV, 1931, pp. 127-180.

Denis, T.C. - Extracts from Reports on the District of Ungava Recently Added to the Province of Quebec under the name of the Territory of New Quebec; 205 p. Department of Colonization, Mines and Fisheries, Quebec 1915. See also later editions, in particular that of 1929.

Dresser, John A., and Denis, T.C., - Ungava or New Quebec; Géology of Quebec, Vol. II, pp. 227-249. Geological Report No. 20, Que. Dept. of Mines, 1946.

Fahrig, W.F. - Lac Herodier, New Quebec; Geol. Surv. of Canada, Paper 55-1, 1955.

Flaherty, Robert J. - Two Traverses Across Ungava Peninsula, Labrador; The Geographical Review, Vol. VI, No. 2, August, 1918, pp. 116-132.

Forbes, Alexander, with contributions by O.M. Miller, N.E. Odell and Ernst and C. Abbe - Northernmost Labrador; American Geographical Society, Spec. Publ., No. 22, 255 p., 1933, Vol. I, plus plates and navigational notes.

Gardner, Gérard, and Brian, E. Wilmot - Exploring Labrador and Hudson Bay; Ottawa University Review, January-March, July, September, 1943.

- Gill, J.E., Bannerman, H.M., and Tolman C. - Wapussakatoo Mountains, Labrador; Bull. Geol. Soc. of America, Vol. 48, May 1st, 1937, pp. 567-585.
- Gunning, H.C. - Sulphide Deposits at Cape Smith, East Coast of Hudson Bay; Geol. Surv. Can. Sum. Rept., 1933, Pt. D, pp. 139D-154D.
- Gustafson, J.K., and Moss, A.E. - The Role of Geologists in the Development of the Labrador-Quebec Iron Ore District; Can. Min. Jour., June, 1953.
- Harrison, J.M. - The Quebec-Labrador Iron Belt, Quebec and Newfoundland; Geol. Surv. Can., Paper 52-20; 1952.
- Prospecting Quebec-Labrador Iron Fields; Can. Min. Jour., October, 1952.
- Hubbard, Mrs. Leonidas - Labrador from Lake Melville to Ungava Bay; Bull. Amer. Geogr. Soc., Vol. 38, No. 9, pp. 529-539, 1906.
- A Woman's Way through Unknown Labrador; an Account of the Exploration of the Nascauppee and George Rivers; 305 p., 52 illustr., 1 map, New York, 1908.
- Hustich, I. - Forest Botanical Field Work in Ungava, 1948; Prelim. Rept. 6 p., The Arctic Institute of North America, Montreal.
- Phytogeographical Regions of Labrador; Arctic, Vol. 2, No. 1, pp. 36-42. May, 1949, Montreal.
- Kranck, E.H. - Geological Research along the East Coast of Hudson Bay; Arctic, Vol. I, No. 1, Spring, 1948, pp. 66-67, Montreal.
- Leith, C.K. - An Algonkian Basin in Hudson Bay; a Comparison with the Lake Superior Basin; Economic Geology, Vol. V, 1910, pp. 227-246.
- Low, A.P. - Report on Explorations in James Bay and Country East of Hudson Bay, drained by the Big, Great Whale, and Clear-

water Rivers; Geol. Surv. Can., Ann. rept., Vol. III, Part J, 1887-88.

Report on Explorations in the Labrador Peninsula, along the Eastmain, Koksoak, Hamilton, Manicouagan and Portions of Other Rivers in 1892-93-94-95; Geol. Surv. Can., Ann. Rept., Part L, Vol. VIII, 1895.

Report on a Traverse of the Northern Part of the Labrador Peninsula from Richmond Gulf to Ungava Bay; Geol. Surv. Can., Ann. Rept., Part L, Vol. IX, 1896.

Exploration of Part of the South Shore of Hudson Strait and of Ungava Bay; Geol. Surv. Can., Ann. Rept., Part L, Vol. XI, 1898.

Report on an Exploration of the East Coast of Hudson Bay from Cape Wolstenholme to the South End of James Bay; Geol. Surv. Can., Ann. Rept. Vol. XIII, Part D, 1900.

Report on the Dominion Government Expedition to Hudson Bay and the Arctic Islands, D.G.S., "Neptune", 1903-1904; 355 pp., Map 906, 1906.

McLean, John - "John McLean's Notes on Twenty-five Years- Service in the Hudson Bay Territory"; Edited by W.S. Wallace; The Champlain Society, 1 Vol., 1932.

McMillan, J.G. - Geological Report of Arctic Expedition; p. 431, in Capt. J.-E. Bernier's Report on the Dominion of Canada Government Expedition to the Arctic Islands and Hudson Strait, on Board the D.G.S. "Arctic"; Ottawa, 1910.

Meen, V.B. - Chubb Crater, Ungava, Quebec; Journ. Royal Astron. Soc. Can., Vol. XLIV, No. 5, 1951, pp. 169-180.

Chubb Crater, Ungava, Quebec; Proc. Geol. Ass. Can., Vol. 4, 1951, pp. 49-59.

Solving the Riddle of Chubb Crater; National Geographic Magazine, Vol. Cl, No. 1, 1952, pp. 1-32.

- Moore, E.S. - The Iron Formation of Belcher Islands, Hudson Bay;  
Journ. of Geology, Vol. 26, pp. 412-438, 1918.
- Polunin, N. - Botany of the Canadian Eastern Arctic; National Museum  
of Canada, Ottawa, Part 1, Bull. No. 92, 1940; Part 2,  
Bull. No. 97, 1947; Part 3 (Vegetation and geology),  
Bull. 104, 1948.
- Report on Botanical Explorations in Arctic Canada,  
1946-1948; Arctic, Vol. 2, No. 1, pp. 45-55, May 1949.
- Retty, J.A. - Labrador, North America's Newest Great Iron Ore Field;  
Mining and Metallurgy, Sept. 1948, pp. 480-483.
- Iron Ore Galore in New Quebec-Labrador; Can. Geog.  
Journ., Vol. XLII, No. 1, pp. 2-21, 1951.
- Rousseau, Jacques - By Canoe Across the Ungava Peninsula via the  
Kogaluk and Payne Rivers; Arctic, No. 2, Vol. 1,  
Autumn 1948, pp. 133-135.
- The Vegetation and Life Zones of George River, Eastern  
Ungava, and the Welfare of the Natives; Arctic, Vol. 1,  
No. 2, pp. 93-96, Autumn 1948.
- A travers l'Ungava; L'Actualité Economique, No.1, 25th  
Ann. April, June, 1949, pp. 83-131.
- Shaw, G. - Preliminary Map, Eastmain, Quebec; Geol. Surv. Can. Paper  
42-10, 1942.
- An Experiment in Reconnaissance Mapping; The Canadian  
Mining and Metall. Bull., March 1943, Vol. XLVI,  
pp. 85-96.
- Stainer, J.A. - Canoe Journey in Canadian Labrador; Geogr. Journ.,  
Vol. XCII, p. 152, 1938.
- Tanner, U. - Outlines of the Geography, Life and Customs of Newfound-  
land Labrador (The Eastern Part of Labrador Peninsula);  
2 Vol., Cambridge University Press, 1947.

Plate XXVI



A - Princess falls (164 feet), Little Whale river. (Photo, Gulf Lead Mines, Limited.)



B - Lower falls of Little Whale river (24 feet). (Photo, Gulf Lead Mines, Limited)



A - George River post of Hudson's Bay Company, at the mouth of George river. (Photo, M. M. Ritchie.)



B - Abluviak (Adloylik) fiord, westward view, east shore of Ungava bay. (Photo, M. M. Ritchie.)

Plate XXVIII



A - Abloviak (Adloylik) fiord, eastward view; part of Torngats mountains in background. (Photo, M. M. Ritchie.)



B - East shore of Ungava bay, northward view from the mouth of Koroc river. (Photo, M. M. Ritchie.)

Plate XXIX



A - Koroc river, eastward view from the mouth of Sukaliuk brook; mountains are 2,000 feet above level of river. (Photo, M. M. Ritchie.)



B - "Arctic cotton" (*Eriophorus Scheuchzeri*) at small lake near junction of Sukaliuk brook and Koroc river; artist René Richard. (Photo, M. M. Ritchie.)



C - Camp of National Geographic Society and Royal Ontario Museum expedition, two miles north of New Quebec crater, 1951. (Photo, M. M. Ritchie.)



Aerial photograph of the New Quebec crater. © National Geographic Society, U.S.A.



Fort Chimo, Hudson's Bay Company post on the banks of Koksoak river, from Ungava bay. (Photo, P.-E. Imbault.)

Turner, L.M. - The Physical and Zoological Character of the Ungava District, Labrador; Trans. Royal Soc. Can., Vol. 5, Sect. IV, p. 79, 1887.

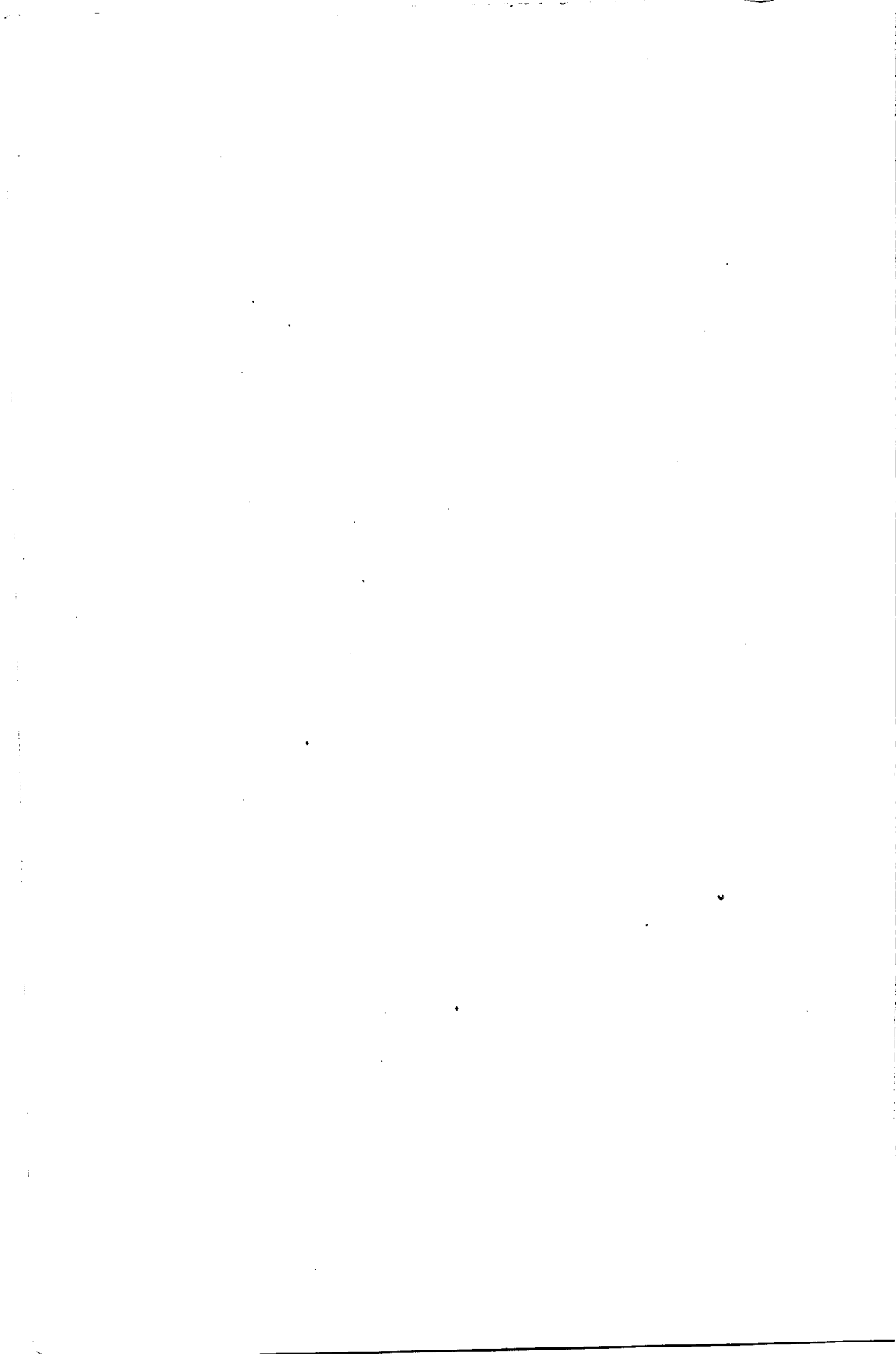
Villeneuve, G. Oscar - Aperçu climatique du Québec:(Nouveau-Québec, See pp. 7-13), 25 p., Publ. Dep't. Lands and Forests, Bull. No. 10, 1948.

Wallace, Dillon - The Lure of the Labrador Wild: The Story of the Exploring Expedition Conducted by Leonidas Hubbard, Jr.; Fleming H. Reves and Co., New York, 1905.

Wheeler, E.P. - Topographical Notes on a Journey across Labrador; Geogr. Review, Vol. XVIII, No. 3, pp. 475-481, July 1938.

Young, G.A. - Iron-bearing Rocks of Belcher Islands, Hudson Bay; Geol. Surv. Can., Summ. Rept., 1921, Part E.

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ALPHABETICAL INDEX

	<u>Page</u>		<u>Page</u>
Access to area .....	2	Coast-line of area .....	4
Abbé, C. -		Coleman, A.P. -	
Ref. to work by .....	25	Ref. to work by .....	25
Abbé, Ernst -		Companies work in New Quebec ..	20
Ref. to work by .....	25	Concentration mills .....	20
Agriculture in area .....	10	Consolidated Mining and Smelting	
Animals in area .....	9	Co. of Canada, Ltd. -	
Atlantic Iron Ore Ltd. -		Ref. to work by .....	21
Ref. to work by .....	20	Cooke, H.C. -	
Aubert de la Rüe, Edgar -		Ref. to work by .....	5,25
Ref. to work by .....	1,4,24	Copper sulphide .....	21,23
Auger, P.-E. -			
Ref. to work by .....	24	Delnite Ltd. -	
		Ref. to work by .....	23
Babel, Rev. Louis -		Denis, I.-C. -	
Ref. to work by .....	3	Ref. to work by .....	25
Baird, P.D. -		Description of area .....	4
Ref. to work by .....	24	Drainage of area .....	6
Bannerman, H.M. -		Dresser, John A. -	
Ref. to work by .....	4,26	Ref. to work by .....	25
Belcher Mining Corporation -			
Ref. to work by .....	23	Early Precambrian .....	12
Bell, Robert -		Eastmain .....	11
Ref. to work by .....	24	Eskimos .....	9,11
Bergeron, Robert -		Establishments in area .....	11
Ref. to work by .....	24	Exploration in area .....	3,20
Bibliography .....	24	Extent of area .....	2
Big Whale River .....	11		
Boisvert, Paul F. -		Fahrig, W.F. -	
Ref. to work by .....	24	Ref. to work by .....	25
Brian, E. Wilmot -		Fauna of area .....	9
Ref. to work by .....	25	Fenimore Iron Mines Ltd. -	
		Ref. to work by .....	20
Cadmium .....	21	Fish in area .....	9
Caniapiskau series .....	14	Flaherty, Robert J. -	
Cape Hopes Advance .....	11	Ref. to work by .....	4,25
Caribou .....	9	Flora of area .....	7
Chalcopyrite .....	21	Forbes, Alexander -	
Climate of area .....	6	Ref. to work by .....	5,25
Climax Molybdenum Ltd. -		Forest tundra .....	8
Ref. to work by .....	23	Fort Chimo .....	2,11

<u>Page</u>	<u>Page</u>
Fort Chimo Mines Ltd. -	Hustich, I. -
Ref. to work by ..... 20	Ref. to work by ..... 26
Fort George ..... 11	Indians ..... 11
Galena ..... 21	International Iron Ore Ltd. -
Gardner, Gerard -	Ref. to work by ..... 20
Ref. to work by ..... 25	Iron deposits ..... 17
General statement ..... 1	Iron ore ..... 18,22
Geology -	Iron Ore Co. of Canada Ltd. -
Economic ..... 17	Ref. to work by ..... 18,20
General ..... 12	Ivugivik ..... 11
George River ..... 11	James, W.F. -
Gill, J.E. -	Ref. to work by ..... 14,17
Ref. to work by ..... 4,14,17,26	Koartac ..... 11
Glacial phenomena ..... 16	Kranck, E.H. -
Gneissic complex ..... 12	Ref. to work by ..... 4,26
Gold ..... 21,22,23	Labrador geosyncline ..... 17
Great Mountain Iron Corp. -	Labrador Mining and
Ref. to work by ..... 20	Exploration Co. -
Greenstones ..... 13	Ref. to work by ..... 17
Gulf Lead Mines Ltd. -	Lake Shore Mines Ltd. -
Ref. to work by ..... 21	Ref. to work by ..... 23
Gunning, H.C. -	Late Precambrian ..... 14,15
Ref. to work by ..... 4,26	Lavas ..... 15
Gustafson, J.K. -	Lead sulphide ..... 21,22,23
Ref. to work by ..... 26	Leith, C.K. -
Hardrock Gold Mines Ltd. -	Ref. to work by ..... 26
Ref. to work by ..... 23	Lemoyne Ungava Mines Ltd. -
Harquail, James -	Ref. to work by ..... 23
Ref. to work by ..... 24	Little Long Lac Gold Mines -
Harrison, J.M. -	Ref. to work by ..... 23
Ref. to work by ..... 26	Location of area ..... 2
Holannah Mines Ltd. -	Low, A.P. -
Ref. to work by ..... 23	Ref. to work by ..... 3,26
Hollinger North Shore Explora- tion Co. Ltd. -	Malartic Gold Fields Ltd. -
Ref. to work by ..... 18	Ref. to work by ..... 23
Hopes Advance Mines Ltd. -	Manganese minerals ..... 20
Ref. to work by ..... 23	Marcasite ..... 21
Hubbard, Mrs. Leonidas -	Martin-Bird Gold Mines Ltd. -
Ref. to work by ..... 4,26	
Hudson's Bay posts ..... 11	

	<u>Page</u>		<u>Page</u>
Ref. to work by .....	23	Prospectors .....	23
McLean, John -		Pyrite .....	21,23
Ref. to work by .....	27	Pyrrhotite .....	21,23
McMillan, J.G. -			
Ref. to work by .....	27	Quebec Explorers Ltd. -	
Meen, V.B. -		Ref. to work by .....	20
Ref. to work by .....	27	Quebec Labrador Development	
Miller, O.M. -		Co. Ltd. -	
Ref. to work by .....	25	Ref. to work by .....	20
Mineralization .....	21,23	Quebec North Shore and	
Missions .....	11	Labrador Railway Co. ....	3
Molybdenite .....	23		
Moore, E.S. -		Retty, J.A. -	
Ref. to work by .....	28	Ref. to work by .....	4,17,28
Moss, A.E. -		Rhodocrosite .....	21
Ref. to work by .....	26	Richmond Gulf .....	11
		Rivers of area .....	6
New Quebec Co. Ltd. -		Robinson, J.L. -	
Ref. to work by .....	17	Ref. to work by .....	24
New Quebec crater .....	5,6	Rousseau, Jacques -	
Nickel sulphide .....	21,23	Ref. to work by .....	4,28
Norancon Exploration			
(Quebec) Ltd. -		Sedimentary formations .....	13
Ref. to work by .....	20	Shaw, G. -	
		Ref. to work by .....	4,28
Oceanic Iron Ore of Canada Ltd.-		Silver .....	21,22,23
Ref. to work by .....	20	Sphalerite .....	21
Odell, N.E. -		Stainer, J.A. -	
Ref. to work by .....	25	Ref. to work by .....	28
Otish mountains .....	5	Sulphide mineralization .....	21,22
		Sugluk .....	11
Payne Bay .....	11	Sylvanite Limited -	
Physical characters of area ....	4	Ref. to work by .....	23
Polunin, N. -			
Ref. to work by .....	28	Taiga .....	7
Population of area .....	10	Tanner, U. -	
Port Harrison .....	11	Ref. to work by .....	6,28
Post-glacial phenomena .....	16	Teck-Hughes Gold Mines Ltd. -	
Powell Rouyn Gold Mines Ltd. -		Ref. to work by .....	23
Ref. to work by .....	23	Tolman, C. -	
Povungnituc .....	11	Ref. to work by .....	4,26
Premium Iron Ore Ltd. -		Topography of area .....	5
Ref. to work by .....	20	Tundra .....	8

	<u>Page</u>		<u>Page</u>
Turner, L.M. -		Wapussakatoo mountains .....	5
Ref. to work by .....	29	Water power in area .....	10
Ungava Copper Ltd. -		Wheeler, E.P. -	
Ref. to work by .....	23	Ref. to work by .....	4,29
Villeneuve, G. Oscar -		Wright-Hargreaves Ltd. -	
Ref. to work by .....	29	Ref. to work by .....	23
Volcanic flows .....	13	Young, G.A. -	
Wakeham Bay .....	11	Ref. to work by .....	29
		Zinc sulphide .....	21,22

---

