

# GM 27894

SUMMARY REPORT ON THE LABRADOR TROUGH PROJECT

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1970

SUMMARY REPORT

on the

LABRADOR TROUGH PROJECT

New Quebec

for

CITIES SERVICE MINERALS CORPORATION

Ministère des Richesses Naturelles, Québec  
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Derry, Michener & Booth

O. E. LEIGH - Project Manager



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INTRODUCTION

This report describes reconnaissance exploration carried out in the northern part of the Labrador Trough during the 1970 field season. This work was done on behalf of Cities Service Minerals Corporation under the direction of Derry, Michener & Booth by agreement dated April 29, 1970. Mr. O. E. Leigh was the Project Manager and field crew and operations were supervised directly by Mr. R. P. Hewitt.

The project is envisaged as a long-term venture to thoroughly evaluate the mineral potential of the Labrador Trough and acquire properties which will support one or more mining operations. The principal objectives of the 1970 program were:

- (1) To initiate reconnaissance on a moderate scale,
- (2) to determine by study of available data and by field examination those portions of the Trough and types of mineralization offering the highest potential for exploration,
- (3) to acquire any available properties or showings of interest.

The field work was carried out during the period June to September by two 2-man parties headed respectively by a geologist and an experienced prospector and directly supervised and guided by the senior geologist.

SUMMARY

A study of the reports and maps, both private and public, at the Quebec Department of Mines was undertaken prior to field work which commenced early in June. Reconnaissance flying over the selected areas and over favourable geological targets resulted in a number of areas being selected for detailed examination. This initial work resulted in the acquisition by staking of 228 mining claims in nine groups.

Eight of the claim groups protect undeveloped showings of disseminated sulphides containing low values in copper and nickel and one claim group covers the portion of the east rim of a basin containing copper-bearing argillites.

There are in the Labrador Trough distinctive types of mineral deposits, the most important being disseminated sulphide in gabbro containing copper-nickel, sulphide-rich horizons in sediments containing base metals, high-grade nickel deposits associated with ultrabasic rocks, deposits of asbestos associated with ultrabasics and in addition there are large deposits of iron.

It is recommended that detailed mapping and sampling be done over the staked ground in preparation for drilling. The reconnaissance program should be continued and expanded next year with particular emphasis on the copper-bearing sediments, and the nickel-bearing ultrabasic rocks. We believe that the ground presently staked is valuable and may possibly lead to the development of an ore deposit. The 1971 field season will therefore be two-fold in that we will be following up known discoveries on the one hand and exploring for new ones at the same time.

RECOMMENDATIONS

In view of the outstanding potential for economic mineral deposits within the Labrador Trough and the indication that much of the early exploration has been of a superficial nature with many areas unexamined, an expanded program of exploration is clearly warranted.

It is recommended that the major portion of the program next year be directed towards broad scale reconnaissance which should include the continuing investigation of known mineral occurrences and a specific search for cupriferous shales and nickel-copper sulphides associated with ultrabasic rocks. It is considered that less emphasis should be given to the search for mineralized 'blotchy' gabbro deposits although presently known occurrences should be thoroughly examined.

Ground follow-up, to include detailed mapping, sampling, geophysical surveys and possibly drilling, should be undertaken on the nine properties acquired this summer.

In view of the renewed activity and interest in the Trough being displayed by a number of companies, it is proposed that six 2-man crews be placed in the field under the direction of a senior field geologist and an assistant who would act as expeditor and general field assistant. It is proposed that caches of fuel and supplies be set out early in the season and a helicopter be chartered for the field season.

## AREA AND LOCATION

The Labrador Trough is a regional geological unit extending in a south-southeast direction along the west shore of Ungava Bay to the vicinity of Wabush in the south. The Trough extends from latitude 60°30' north and longitude 71° west southward to latitude 54° north and longitude 66° west - a distance of approximately 600 miles (see location map - page 1a). The belt has a maximum width of 60 miles in the vicinity of Schefferville but along most of its length it is about 40 miles wide; north of the Leaf Inlet the Trough thins to a width of 10 to 15 miles. The areal extent of the Labrador Trough is in excess of 18,000 square miles.

## PHYSIOGRAPHY

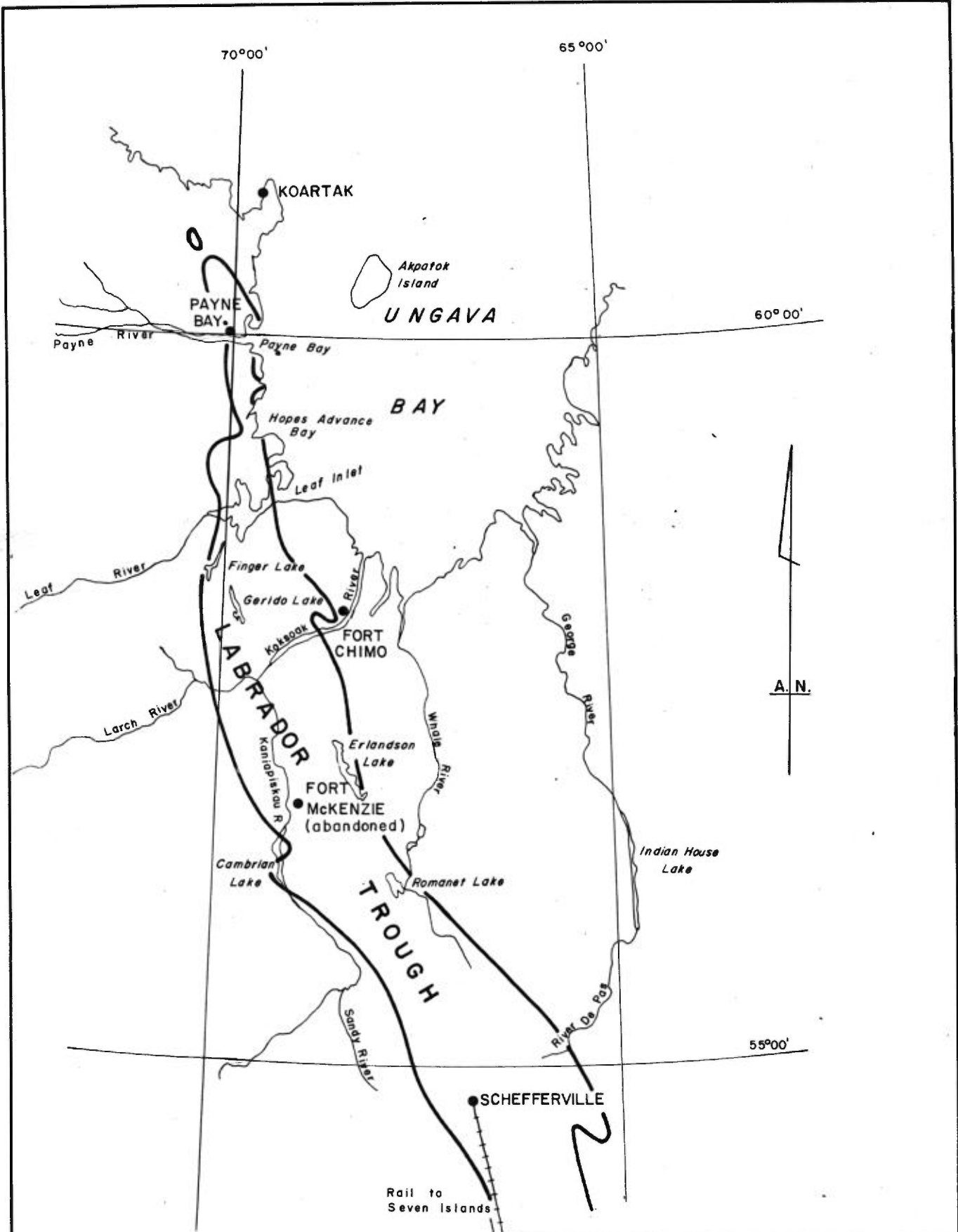
Three main physiographic units are recognized within the Trough (Hare, F. L., 1959). The 'upland areas' extending from the southern end of the Trough north to Cape Hopes Advance Bay along a belt 15 to 50 miles wide; the 'drift covered areas' along either side of the upland areas, and the 'bedrock controlled plateau elements' of the northern end of the Trough. Bedrock exposure may be as high as 40% in both the upland and plateau controlled areas, but is almost negligible elsewhere.

Lakes occur extensively throughout the Trough and are mostly elongated parallel to the bedrock geology. Consequently the lakes extend generally in a north-south direction. At the northern end of the Trough the lake shores are largely rock and difficult to approach with a float plane; however, there are occasional sand beaches at either the northern or southern ends of the lakes.

As would be expected the vegetation cover along the trend of the Trough is variable. At the southern end and extending north almost to the Koksoak River, the Trough is mostly 'lichen-woodlands'. North of the Koksoak River to the Leaf Inlet the Trough is covered by 'forest-tundra', i.e. groves of trees, usually in the valleys, side by side with areas of tundra. The remainder of the Trough to the north of Leaf Inlet is 'sedge-dominated tundra', including alder and willow thickets.

Because of the light vegetation cover the tundra areas have optimum rock exposure, are easily accessible and are ideal for helicopter operations. Depending on the geology and physiography the woodland areas may have reasonable rock exposure but are generally less accessible.

The field season at the northern end of the Trough extends from late June through to the end of September.



DERRY, MICHENER & BOOTH		
LABRADOR TROUGH		
<b>LOCATION MAP</b>		
Scale: 1" = 64 miles	Date: Oct, 1970	Map No. 1

### EARLY EXPLORATION AND HISTORY

Between 1893 and 1895 A. P. Low of the Geological Survey of Canada recognized the Labrador geosyncline with its iron formations as a major geological feature of particular economic potential. However, it was not until 1929 that the first discovery of economic significance was made. This was the discovery by W. F. James and J. E. Gill of ore grade iron-bearing material near Knob Lake. As a result of their discovery, exploration in the area was commenced for iron ore. In 1936, extensive concessions were granted to the Labrador Mining and Exploration Company and to Hollinger North Shore Exploration Company for exploration for iron. These companies also made a cursory examination of the base metal mineralization within the belt during the period 1936 to 1939 and then later from 1942 until 1945 carried out a more intensive search which included prospecting, detailed and regional mapping together with some limited diamond drilling. However with the rapid depletion of iron ore reserves in the Lake Superior region toward the end of World War II a renewed interest was taken in the iron ore potential of the region and exploration for base metals seems to have declined for a period.

The search for iron ore was successful and by 1949 four hundred million tons of direct shipping ore had been proven in the North Lake - Sunny Mountain ore zone. To exploit these deposits a three hundred and sixty mile railway line was completed in 1954 through to Sept-Îles on the Gulf of St. Lawrence.

It was probably the advent of the railway line which created a renewed interest in the base metal potential of the Labrador Trough.

Interest in the north end of the Trough became apparent in 1969 and appears to have been gathering momentum ever since. Ground staked in the area at present is held by such companies as Falconbridge, Imperial Oil, Patino Mining Corporation, Canex Aerial Exploration Ltd., Premium Iron Ores, the Hollinger interests and a number of private individuals.

### ACCESS AND SUPPLY

Chartered flights to both Fort Chimo toward the northern end of the belt and Schefferville 250 miles to the south are available at regular prices from Montreal. Supplies can be obtained year round at Schefferville which has rail connections to the south but bulk supplies arrive at Fort Chimo by ship during August and consequently there is often a shortage of essential foods and fuels at Fort Chimo during the early part of the season. The lack of local transport and other services at Fort Chimo is a further cause of delay.

During the past season Fort Chimo was used as a base for operations and as a supply centre, using a chartered Beaver aircraft and occasionally a light helicopter to facilitate field work. This arrangement was not entirely satisfactory for the reasons outlined above.

#### SUMMARY OF FIELD PROCEDURE

A search of the Mining Recorder's files in Quebec City prior to the opening of the season revealed a large volume of information of variable quality. Assays were deleted from most reports but they describe varied extensive mineralization throughout the Trough which was useful for background information although not directly of value as a basis for selecting properties.

A chartered Beaver aircraft for the season and a light helicopter chartered for shorter periods provided support for two field parties and a senior geologist operating out of Fort Chimo. Ross Toms, prospector, did all claim staking under contract and assisted the project in various other ways.

Early in the season mineralized occurrences, known to Ross Toms and to D.M.B. through previous reports, were visited. As a result 75 claims were staked north of Holannah Lake adjacent to the Erickson #1 and Leslie #2 showings belonging to the Hollinger interests (See Map #7). In addition, 25 claims were staked at this time on the Mutch Lake showings.

During the season airborne reconnaissance, both fixed-wing and helicopter, was carried out over the known 'blotchy' gabbro horizons between the Koksoak River and Leaf Inlet and in numerous other areas.

The following areas selected as a result of these aerial surveys and literature research, etc. were examined in more detail by geological reconnaissance and prospecting: (See Map 2)

- (1) The belt north of the Leaf Inlet north to Lucille Lake and west of Raymond Lake,
- (2) the area surrounding Lake LaSalle five miles south of the Leaf Inlet,
- (3) the area north and east of Celine Lake at Latitude  $58^{\circ}32'$ , longitude  $69^{\circ}30'$ ,
- (4) the area along strike, both north and south, from the Mutch Lake showing,
- (5) the area at the north end of Gerido Lake and extending from Harveng Lake across to longitude  $69^{\circ}53'$ ,

- (6) the area around the northern shore of Hook Lake which lies on the west side of Gerido Lake,
- (7) the area along the eastern side of Lac Couteau at latitude 58°08', longitude 70°02',
- (8) the area around Folding Lake and on the west side of Lac St. Pierre and
- (9) the area south of the Koksoak River and east of Lac de Lauzon.

SUMMARY OF CLAIMS STAKED

As a result of these various activities, the following claim groups were staked (see Map #2):

<u>Name</u>	<u>No. of Claims</u>	<u>Approximate Expiry Date</u>
Mutch Lake	35	June, July, 1972
Harveng Lake	15	July 28-30, 1972
Sandy Bay	14	Aug. 25-29, 1972
Holannah-Sauve Lake	75	May, June, 1972
The Big 'M'	15	Subject to dispute
Massive-Surprise Lake	46	Aug. 26 - Sept. 2, 1972
Boundary Lake	10	Aug. 24 - Sept. 1, 1972
Prinzeles Lake	10	Aug. 25-30, 1972
Folding Lake	<u>8</u>	Aug. 25-26, 1972
Total	228	

ASSAYS FROM CLAIM GROUPS

Chip samples taken at a number of 'blotchy' gabbro showings indicated a copper-nickel content as follows:

	<u>Cu %</u>	<u>Ni %</u>
Mutch Lake	0.4	0.15
Harveng Lake	0.2	0.10
Big 'M'	0.90	0.16

A portion of the nickel content is probably bound up in the crystal lattices of pyrrhotite or is in the form of silicate and may not be recoverable by normal methods in either case. It should also be noted that the values given above are for samples that are not wholly representative and give only an indication of the probable base metal content.

A number of rock geochemical samples were taken over some areas in an effort to determine if any characteristic trace elements were associated with the mineralization. The assay results from these samples were received while this report was nearing completion. The evaluation of the assays and possible field application of the method will require detail study which will form the subject matter of an auxiliary report to be submitted in January. (Attached as Appendix I).

#### REGIONAL GEOLOGY

##### (a) General (see Map No. 3)

The geosynclinal nature of the Labrador Trough has long been recognized and many writers refer to it as the Labrador Geosyncline. Stockwell (1957) considered the Trough to be part of the Churchill Province and made up of Aphebian rocks deformed during the Hudsonian orogeny.

Gross (1968) describes the sequence of rocks within the Labrador Trough as "a sinuous to arcuate belt of sedimentary, volcanic, and intrusive rocks" which "lie unconformably above older Precambrian granite, granodiorite, and gneisses along the west side of the geosyncline ..... and, along the east side of the belt, appear to be either in fault contact with granite gneisses, hypersthene granite and amphibolites or to pass through a highly metamorphosed zone within which it is difficult to distinguish the rocks of the geosyncline from those of the basement."

The Labrador Trough is terminated to the south by the metamorphic front of the Grenville Structural Province. At the northern end, the Trough terminates where the rocks form a keel-like structure around Roberts Lake. To the northwest of Roberts Lake, around Lac Nagvaraaluk, a small inlier of what are considered to be Trough sediments outcrop in a basin structure; the mode of occurrence and the location of this inlier strongly suggests that the rocks of the Cape Smith - Wakeham Bay belt in Ungava are a continuation of the same geosyncline sequence as is exposed within the Labrador Trough.

The rocks of the Labrador Geosyncline include arkoses, arkosic grits, boulder and pebble conglomerates, stromatolitic dolomite, dolomite and calcarenite, siltstone, shales and graphitic shales, banded iron formations, sandstone, greywackes, basaltic lavas,

dolerites, gabbros and ultrabasic rocks with roughly that sequence of deposition and emplacement.

The history of the accumulation of these rocks is typical of the development of geosynclinal and orogenic belts up until the time that discordant granites are normally emplaced. Another feature of the Trough is the assemblage of igneous mafic rocks of greenschist metamorphic grade and of ultramafic rocks, including serpentinite, which is similar to the ophiolites of other orogenic belts of the Alpine type. Acid volcanism is of only minor significance or not present at all and hydrothermal gold deposits are not known.

### Structure

The structure of the Trough is displayed by the persistent north-west strike of the rocks. Generally the rocks along the western margin dip gently to the east and in most areas are relatively undisturbed. Along the central portion of the belt tight folding, in places isoclinal, and northwest trending thrust faults are the dominant structural features. The structural deformation is considered to have been caused by two periods of stress during the Hudsonian orogeny.

### Metamorphism

Regional metamorphism is general throughout the belt. Thermal metamorphism is, on the other hand, of only minor significance being confined to the borders of gabbroic or ultramafic sills. The rocks of the central portion of the Trough are essentially an almandine-amphibolite facies on the eastern margin. By Myashiro's classification of metamorphism the metamorphic grade of the Trough rocks belong to the Kyanite-sillimanite group of intermediate pressures. Along the strike of the Trough metamorphic grades increase to epidote-amphibolite and amphibolite facies towards the metamorphic front of the Grenville Province at the southern end, and north of Thevenet Lake at the north end there is a similar progressive increase in metamorphic grade to the amphibolite facies.

### Trough Development

The most recent concept of the palaeogeographic development of the Trough is outlined by Dimroth (1968). He considers that the geosynclinal cycle began with the deposition within a centrally located east-west trending graben of a red bed sequence, arkosic rocks and conglomerates. This was followed by sedimentation within the graben and along the main trend of the Trough of an essentially miogeosynclinal sequence. This sequence consisted of stromatolitic dolomite, calcarenite, shales and graphitic shales and was succeeded by a period of submarine volcanism

and minor orogenic activity. This cycle of geosynclinal development and tectonic activity was confined to the southern half of the Labrador Trough. Subsequently there occurred a renewed cycle of sedimentation which took place along the full length of the Trough. This second cycle was a broadly similar sequence throughout and commenced with arkosic sediments, quartzites and some dolomites. The iron formations then followed with locally some intercalated volcanics after which a sequence of shaley rocks, dolomites and more psammitic material were widely deposited. Towards the end of this period of sedimentation there began the extensive basic volcanism which culminated with the emplacement of the gabbroic and ultrabasic rocks. Finally the second cycle of geosynclinal development terminated in orogenic activity which produced extensive deformation and thrust faulting of the rocks along the central trend of the belt and also produced low to intermediate grade regional metamorphism.

#### GEOLOGY OF AREAS EXAMINED

The areas explored during the recent summer all lie within the sequence of volcanic rocks and their related intrusives at the northern end of the Trough. The lavas there are known as the Hellancourt Volcanics and together with their associated gabbros and ultrabasics represent the basic igneous activity which preceded the last phase of orogenesis along the Labrador Trough.

The rocks are mostly isoclinally folded along axes trending southeast to south-southeast with dips generally very steep to vertical. Thrust faulting parallel to the strike of the stratigraphy has been inferred in many areas to explain repetitions of stratigraphy and the presence of large numbers of synclinal fold structures. Between the Koksoak River and the Leaf Inlet, mineralization of economic significance notably occurs in close proximity to the contact between the Baby Formation - essentially phyllites, shales and some quartzites - and the overlying basic sequence of the Hellancourt Volcanics. It is along or close to this contact that the so-called 'blotchy' gabbro with associated disseminated sulphide mineralization most commonly occurs. Also the upper shaley portion of the Baby Formation usually contains abundant sulphides. This generalization however does not seem to apply north of Leaf Inlet.

MINERALIZATION

(a) Introduction

Mineralization in the Labrador Trough may conveniently be classified into the following groups for ease of description:

- (1) Disseminated and locally massive sulphides containing copper and nickel and associated closely with the so-called 'blotchy' gabbros and with finer-grained 'mafic' gabbros.
- (2) Disseminated and massive sulphides associated with ultramafic rocks.
- (3) Conformable copper, zinc, silver, gold mineralization associated with shaley sediments.
- (4) Quartz-carbonate vein deposits with copper sulphides.
- (5) Iron ore deposits along the western side of the Trough.
- (6) Uranium and thorium occurrences at or near the base of the sediments along the western margin of the Trough.
- (7) Asbestos deposits including chrysotile associated with ultramafic rocks and crocidolite within the iron formation.

In addition, disseminated copper and iron sulphides have been found in boulders of quartzite and arkosic quartzite in the Lac Patu area (Twp. 5049) and outcropping on the north-west shore of Wapanikskan Lake (Twp. 5348).

Disseminated pyrrhotite is known to constitute up to 20% by volume of some fine-grained basic pillow lavas but no economic minerals are associated with this type of deposit.

*Lucina*

Gabbro Deposits

(a) 'Blotchy' Gabbros

Sulphide mineralization occurs with both the coarse-grained anorthositic rocks of glomeroporphyritic texture - the so-called 'blotchy' gabbros, and with the finer-grained, uniform textured 'mafic' gabbros. These two rock types interfinger or occur as alternate layers usually with a gradational contact. Sulphides and copper-nickel mineralization occur more consistently with the porphyritic gabbro but base metal content is usually of higher grade in the mafic gabbro.

The 'blotchy' gabbros may be up to 1000 feet in thickness but usually range from 50 to 150 feet. They consist of roughly spherical aggregates or single crystals of saussuritized plagioclase feldspar, from 1/2" to 4" in diameter, which frequently exhibit zoning. The feldspar aggregates are set in a matrix of feldspar, pyroxene, hornblende, quartz, biotite, chlorite, apatite and sulphides in varying proportions throughout the Trough. This gabbro type is widely distributed throughout the Trough and three major zones have been mapped: from Hopes Advance Bay south to Lac De Freneuse (the Leaf zone) - a length of about 60 miles, from Harveng Lake south to the Mercier River (the Gerido zone) - a length of about 70 miles and from Glance Lake (lat. 55°43', long. 66°48') south to Attikamagen Lake (the Attikamagen zone) - a distance of more than 60 miles. Sulphides occur with all three of these belts but is heaviest along the two most northerly zones.

The sulphides found are pyrrhotite, pyrite and chalcopyrite in decreasing order of abundance and some associated magnetite may also be present. The sulphides are deposited interstitially between the phenocrysts in the 'blotchy' gabbros and tend to occur as disseminated coarse-grained aggregates rather than as discrete disseminations. Deposits tend to be more heavily concentrated toward the base of the intrusive but also occur as sulphide rich horizons within the anorthositic layer.

(b) Mafic Gabbros

The mafic gabbros are typically medium-grained and dark in colour. Some have the appearance of ultramafic rocks, possibly because the feldspars are unaltered and still translucent. Baragar (1967) has shown that these mafic rocks which occur interlayered with or as a border phase of the 'blotchy' gabbro are chemically similar to the "normal gabbro series basalt". The sulphides within the mafic horizons occur as relatively fine disseminations, as aggregates of sulphides and as lenses of massive sulphides up to several feet wide and tens of feet long. In a number of the mafic zones there is a higher than usual

copper content and an enrichment in silver. Nickel content is reported to be higher in some instances.

(c) Weathering

At the northern end of the Trough the weathering of the basic igneous rocks has been essentially by mechanical processes although chemical weathering is important where sulphides occur. Over an outcrop containing sparsely disseminated sulphides oxidation of the sulphides may produce a light coloured orange-brown staining; where sulphide mineralization is more intense (in excess of 2 or 3% by volume) oxidation of the host rock may occur to depths of 6 to 12" and produce intense brown to dark purplish-brown staining clearly evident from the air. It should be stressed that while this oxidation may be only inches deep it is usually very complete and leaching is thorough. Malachite staining is only occasionally present. These highly-oxidized "crusts" are usually very friable but may in places be formed of a hard limonitic coating. The primary glomeroporphyritic texture is frequently still in evidence and leached cavities between the oxidized feldspar aggregates give some indication of the extent of the original sulphide mineralization.

Generally speaking, the intensity of oxidation and the resultant colour-staining reflect the intensity of sulphide mineralization and serve as a useful guide in gauging the merits of a mineralized outcrop. It was observed however that the presence of foliation tends to facilitate oxidation irrespective of the amount of sulphide present. This was particularly the case with mineralization north of the Leaf Inlet.

(d) Discussion

It is difficult to imagine that the type of mineral occurrences described above are anything other than a sulphide phase, either an immiscible sulphide melt or the product of normal fractional crystallization, from the same magma as the host rock although there have been suggestions that the sulphides of the gabbros could have been derived from nearby sulphide rich shales. However, there is such an abundance of disseminated sulphides throughout many of the lava flows that it seems quite probable that a basic margin rich in sulphur does exist. The problem of the origin of these uniquely textured basic rocks and of the sulphide mineralization is then essentially the same.

The association of the 'blotchy' gabbros both in space and time with the more normal gabbros throughout the entire Labrador Trough and the similarity of chemical characteristics of all the basic rocks suggests that the glomeroporphyritic gabbro was the result of a peculiar phase in the development of the magma that gave rise to all the basic lavas and sills of the region.

Studies of flow characteristics of liquids charged with solid particles have revealed that flow can cause an inward migration of solid particles and that suspended material ascending in a pipe can be concentrated in the centre of the pipe when the velocity increases beyond a critical value. It is possible then that flow phenomena working within a deeply seated magma and at shallow depths during the emplacement of the 'blotchy' gabbro could be invoked to explain the exceptional tectural character of this rock and its associated sulphide mineralization. Flow differentiation and crystal settling in the final stages of emplacement is possibly also the mechanism that resulted in the interlayering of mafic and anorthositic phases. Filter pressing could also be important in the final stages of emplacement.

(e) Other Deposits in Gabbros (See Map No. 2)

In addition to those mineralized gabbro showings which are described in detail under Description of Claim Groups, the following deposits were examined:

The Lac St. Pierre showing consisted of a small outcrop 150 feet long and about 20 feet wide of medium-grained gabbro carrying sparsely disseminated pyrrhotite and chalcopyrite. Other scattered limonite stained outcrops indicating the presence of some sulphides occurred both on strike to the east and to the west; some trenching had previously been done but only weak mineralization was exposed.

The Hook Lake showings occur within 'blotchy' gabbros outcropping around the rim of the basin structure north of Hook Lake. These showings are small and not strongly mineralized but they deserve a closer look in view of their proximity to the weakly cupriferous sulphide-rich shales that occur in the footwall of the gabbro sequence.

The Erickson No. 7 and the Mercier River showings are both small outcrops of weakly mineralized 'blotchy' gabbro which have previously been investigated by the Hollinger interests. The showings occur in areas of poor rock exposure and are unimpressive.

A significant feature of both the mafic and blotchy gabbros is that their areal distribution and the localization of sulphides within them does not show any consistent relationship to structure.

Hogg (CIMM - September 1966) describes 3 Cu-Ni deposits in the Trough as follows:

765,000 tons	-	\$15.98/ton
573,000 "	-	12.77/ton
580,000 "	-	19.95/ton

Two other Ni-Cu deposits are described as follows:

506,000 tons	-	\$13.65/ton
716,000 "	-	21.62/ton

### Sedimentary Deposits

#### (a) General Description

Sulphides associated with shales are by far the most numerous and widely distributed type of sulphide deposits in the Labrador Trough. They are known along the full length of the Trough to Hopes Advance Bay and probably occur further to the north as well.

These deposits are made up of fine-grained pyrite and/or pyrrhotite with chalcopyrite occasionally present as a minor constituent. Locally chalcopyrite, sphalerite and galena may be present in economically significant amounts together with some gold and silver. The sulphide mineralization is typically finely banded and occurs along the bedding laminae. In places the sulphides may be coarse, euhedral crystals suggesting recrystallization of the finely banded material. Pyrite and pyrrhotite also occur as veinlets cutting across the laminae carrying the fine-grained sulphides.

Significant sedimentary sulphide occurrences include the Soucy Lake deposit, Prud'homme No. 1 North and No. 1 South, Fredrickson Lake and Jimmick Lake. The Ungava Copper Corp. Ltd. have reported one deposit, the Soucy "A" zone as containing 2,613,000 tons of 1.29% Cu and 1.77% Zn. In addition, Hogg reports one deposit containing 4,745,000 tons with a Cu-Zn-Ag-Au value of \$16.30/ton and three other smaller zones with somewhat higher dollar value per ton.

#### (b) Weathering

Throughout the Trough the shale horizons weather preferentially to the crystalline rocks. This is because they are soft and usually strongly foliated or fissile making them amenable to both mechanical and chemical processes. Consequently the shale horizons are poorly exposed and often are the loci for valley development. The presence of sulphides generally

accelerates weathering causing more extensive oxidation and limonite staining; the surface expression of the sulphide rich shales usually takes the form of oxidized and highly stained flakey rubble. It is probably true that the limonite staining is diagnostic of the presence of sulphides in the fresh rock. Even the slightest trace of sulphide material when oxidized will produce limonite staining. With more abundant sulphides the limonite staining may be a more intense orange-brown colour. Heavy disseminations or massive sulphides usually develop goethite crusts, dark brown in colour.

(c) Discussion

The mineralized shales are significantly closely associated in the stratigraphic column with the basic volcanic sequences. The sulphides appear to be syngenetic in origin but quite possibly have their source in the hydrothermal emanations associated with the regional basic igneous activity and as such the deposits could be sedimentary-exhalative in type.

The exploration for conformable copper-zinc base metal deposits is made difficult by the generally poor exposure of the shaly sediments and the prolific regional distribution of associated barren sulphide mineralization. Geophysical techniques are not entirely satisfactory at the reconnaissance stage because the shales themselves are excellent conductors and the massive sulphides mostly appear to be non-magnetic.

These factors have probably discouraged other exploration companies in the past except where mineralization outcropped prominently. Also in the northern areas of the Trough the disseminated sulphides within the 'blotchy' gabbros are extensive and well exposed. Consequently they have tended to draw attention away from the mineralized shales. However the wide regional extent of the sulphide-rich shales together with the fact that concentrations high in valuable base metals do occur indicate considerable potential for further significant deposits.

Reconnaissance exploration for copper-zinc mineralization in shales may prove to be possible by geochemical and rock geochemical techniques which would probably be cheap and rapid.

(d) Hook Lake Area Shales

In addition to the mineralized shale deposits on the Folding Lake claim group described in detail on page 26 of this report, the Hook Lake area shales justify further description.

On the northern side of Hook Lake and west of Gerido Lake there occurs a basin structure 2 miles wide and 3 to 4 miles long. The rocks outcropping within the structure dip inwards at low to moderate angles and consist of a shale sequence at the bottom and gabbros, 'blotchy'

gabbros and basic lavas at the top. The upper sections of the shales carry heavily disseminated to massive sulphides, mostly pyrite and/or pyrrhotite with occasional chalcopyrite. These sulphides occur within the shales all the way around the basin rim, wherever the shales are seen to outcrop.

### Ultrabasic Deposits

Disseminated and massive sulphide mineralization associated with ultrabasic rocks has been encountered at the southern end of the Trough, particularly in the area between the northern end of Murdock Lake and Doublet Lake to the southeast. Baragar (1967) describes these deposits as being "localized at or near the base of ultrabasic sills". The sulphide minerals are mainly pyrrhotite-pentlandite and chalcopyrite, and the gangue is the serpentinized peridotite host rock. Magnetite is said to be an important associate of the sulphide minerals.

All the known occurrences are believed to be small although tonnage and grade of individual deposits have not been published. The Chance Lake sulphide zone, one of the larger deposits in the area, is reported to be at least 30 feet thick. An excess of nickel over copper in deposits associated with ultrabasic rocks is a characteristic of this type of deposit here and throughout the world.

Low grade disseminated sulphides containing nickel and copper occur within breccia zones and as disseminations within and around ultrabasic plugs and sills to the west of Kyak Bay at the northern end of the Trough. Structural controls appear to be more important in these occurrences and the ratio of nickel to copper is approximately 1:1.

The nature and environment of the nickel-copper mineral occurrences at the southern end of the Trough suggests a close analogy with the nickel-copper mineralization within the Cape Smith - Wakeham Bay belt.

There appears to be considerable potential for important nickel-copper deposits existing throughout the Trough; the potentially favourable ultrabasic horizons are both in the south and at the northern end. Reconnaissance work carried out during the field season indicated that in the northern areas the ultrabasic horizons were more numerous than published

map sheets presently indicate. However, many of the horizons identified were narrow, which may be significant for ore potential.

On the other hand, the copper-nickel sulphide deposits that occur within the ultrabasics while frequently of high grade are usually small in area and are difficult exploration targets. Prospecting for these deposits could possibly be facilitated by employing the rock geochemical sampling technique developed by Cameron and others at the G.S.C. for identifying the more favourable ore producing ultrabasic horizons.

#### Other Types of Deposits

Asbestos deposits are known to occur throughout the Labrador Trough. These occurrences are usually either chrysotile deposits associated with ultramafic sills and serpentites or crocidolite deposits in the iron formations along the western half of the Trough. In some cases asbestos deposits appeared to be related to fracture zones associated with prominent cross faulting. Most of the known occurrences are small but the one at Cateron Lake is said to be of some economic interest. (Map 4, Baragar (1967), G.S.C. Memoir 344.)

Mineralized quartz/carbonate veins occur widely throughout the Trough. They are important in the Romanet Lake area where the mineralization occurs within brecciated and fractured horizons of competent rocks in the vicinity of major fault zones. The competent rocks are usually quartzites and the incompetent rocks the basic lavas.

Similarly small gash veins infilled with quartz and massive sulphides occur within lavas between strongly sheared zones in the vicinity of Pio Lake (see Map 2).

While some of these epigenetic deposits contain spectacular sulphides they do not appear to be potentially large tonnage producers and therefore are probably not attractive exploration targets in this remote area.

DESCRIPTION OF CLAIM GROUPS

(1) The Mutch Lake Claim Group (Map No. 4)

Township: 6426

Location: Approximately latitude 58°31', longitude 69°29'

<u>Claim Nos.</u>	<u>Expiry Date</u>
305075, 1 to 5 inclusive	July 29, 1972
306238; " "	June 6, 1972
306239; " "	June 10, 1972
306240; " "	" " "
306241; " "	June 11, 1972
306242; " "	" " "
<del>306243</del> 306245; " "	July 29, 1972

A total of 35 claims and an area of approximately 2 square miles.

The Mutch Lake claim group occurs on the eastern side of the greenstone belt 18 miles south of the Leaf Inlet. On the eastern side of Mutch Lake there outcrops a sequence of north-northeast trending lavas, gabbros, 'blotchy' gabbro horizons and minor shale beds. These rocks all appear to dip very steeply to the east. Two zones of mineralized 'blotchy' gabbro are exposed along the eastern side of Mutch Lake. The property has been investigated before and a number of trenches have been cut on the southern most mineralized area. No assessment work, however, was found on file at the Quebec Department of Mines.

The salient features of the southern and most prominent area of mineralization are:

- (1) The mineralized gabbro appears to pinch out towards the north,
- (2) the anorthositic phase has a gabbroic or ultrabasic margin along the east side,
- (3) moderate disseminated mineralization is exposed over an area of 150' x 200' and further weakly disseminated mineralization is exposed over a wide area for more than 500 feet south along strike.

Chip samples were collected over a total length of 221 feet from six old trenches blasted into the areas of strongest limonite staining. A visual assessment indicated that in these areas disseminated sulphides were present to the extent of approximately 2-4% by volume. Assays from the samples ranged from 0.76% copper to 0.21% copper, and 0.30% nickel to 0.09% nickel, see Table 3. The simple arithmetic average of all copper and nickel assays gave averages of 0.39% copper and 0.15% nickel, i.e. a copper: nickel ratio of 2.6.

The trenches from which these samples were taken were mostly only about 18" deep but all exposed fresh mineralization and unaltered 'blotchy' gabbro. A thin 2 to 6" crust of oxidized and leached gabbro with some occasional malachite staining was revealed in most of the trenches.

At the northern end of Mutch Lake another outcropping zone of oxidized 'blotchy' gabbro was discovered; there are no trenches cut across this mineralization. In a few places fresh rock was exposed revealing minor amounts of disseminated pyrrhotite and chalcopyrite. This 'blotchy' gabbro horizon appears to be parallel to the gabbro that hosts the mineralization further to the south.

Table 3

Mutch Lake Showing

(Note: All samples are mineralized 'blotchy' gabbro)

<u>Trench No.</u>	<u>Sample No.</u>	<u>Length</u>	<u>Cu %</u>	<u>Ni %</u>	<u>Ag oz./ton</u>	<u>Fe %</u>	<u>S %</u>	<u>Remarks</u>
1	801	14.5'	0.38	0.18	Nil	9.60	1.90	F.W. of B.G., <2% sul., po. and ccp.
2	802	15.5'	0.62	0.30	"	11.29	2.99	F.W. of B.G., <2% sul., po. and ccp.
	803	13.5'	0.36	0.11	"	8.42	1.44	2-4% sul., po. and ccp.
3	804	14.5'	0.76	0.21	"	9.30	2.06	Approx. 5% sul., po. and
	805	15'	0.21	0.09	"	7.42	1.08	<4% sul., po. and ccp.
4	806	23'	0.38	0.13	"	9.01	1.65	5% sul., po. and ccp.
	807	24'	0.29	0.12	"	7.92	1.08	<4% sul., po. and ccp.
5	808	17'	0.35	0.11	"	7.22	1.18	<4% sul., po. and ccp.
	809	20.8'	0.30	0.13	"	8.41	1.29	wkly. ox., 5% sul., po. and ccp.
	810	18'	0.35	0.14	"	7.12	1.03	2.5% sul., po. and ccp.
	811	20'	0.30	0.09	"	7.72	1.19	<2% sul., po. and ccp.
6	812	15'	0.55	0.18	"	9.80	1.91	<4% sul., po. and ccp.
7	813	10'	0.28	0.14	"	9.70	1.49	2-4% sul., po. and ccp.

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(2) Harveng Lake Claim Group (Map No. 5)

Township: 6044

Location: Latitude 58°18'N, longitude 69°58'W

<u>Claim Nos.</u>	<u>Expiry Date</u>
306297; 1 to 5 inclusive	July 28, 1972
306298; " "	July 30, 1972
306299; " "	July 30, 1972

A total of 15 claims and an area of approximately 1 square mile.

The rocks outcropping on these claims are, from east to west, fine-grained pillow lavas, gabbros and 'blotchy' gabbros with a few thin interbedded shales. The rocks strike approximately north-south and dip steeply to the east. The gabbroic rocks are best exposed along and on top of a very prominent, steep, west facing slope. The claim group appears to lie on the west limb of a synclinal fold structure. The mineralization exposed on the claims was previously staked as the Andre No. 2 claim group by the Hollinger interests who carried out geological mapping, trenching and sampling.

The mineralization occurs as disseminated pyrrhotite and chalcopyrite throughout the 'blotchy' gabbro. The best showing outcrops along the top edge of a cliff adjacent to post 3, Claim 5, 306297 and consists of a zone of heavily limonite-stained 'blotchy' gabbro, in places strongly oxidized, for a strike length of 500 feet and over minimum widths of 25 feet. At three locations near the south end of the claim group trenches had been cut across the width of the mineralization exposing heavy disseminations of pyrrhotite and some occasional chalcopyrite. Within the vicinity of this showing two additional sub-parallel zones of poorly exposed mineralized 'blotchy' gabbro were also observed.

Chip sampling indicated consistently low grade copper mineralization with negligible nickel. Values ranged between .30% and .12% copper and 0.12% and 0.06% nickel with average values of .22% copper and .10% nickel, see Table 4.

Despite the apparently low values indicated by the chip sampling, the property is attractive because the mineralization occurs irregularly along what appears to be three separate zones over a strike length of at least 1600 feet. Locally the sulphides may constitute in excess of 10% by volume and it is quite possible that the chalcophile elements may increase at depth or along strike.

Table 4Harveng Lake Showing

<u>Trench No.</u>	<u>Sample No.</u>	<u>Length</u>	<u>Cu %</u>	<u>Ni %</u>	<u>Ag oz./ton</u>	<u>Fe %</u>	<u>S %</u>	<u>Remarks</u>
2	833	15'	0.25	0.11	Nil	17.82	7.01	5% sul., po. and ccp.
	834	10'	0.30	0.12	"	20.30	7.83	5% sul., po. and ccp.
1	835	15'	0.21	0.08	"	12.17	2.58	5% sul., po.
	836	15'	0.12	0.08	"	20.09	8.60	5% sul., po.
3	837	20'	0.18	0.06	"	10.59	2.52	5% sul., po.
	838	20'	0.21	0.11	"	25.14	11.28	10% sul., po.
	839	20'	0.25	0.11	"	22.97	9.58	10% sul., po. and ccp.

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(4) The Holannah Lake - Sauve Lake Claim Group (Map No. 7)

Townships: 5944, 5945, 5844, 5845  
Location: Approximately latitude 58°02'N,  
                  longitude 69°47'W.

<u>Claim Nos.</u>	<u>Expiry Date</u>
305099; 1 to 5	May 6, 1972
305100; "	May 7, 1972
305101; "	May 9, 1972
305102; "	May 10, 1972
305103; "	May 11, 1972
305104; "	May 12, 1972
305105; 2 to 5	May 6, 1972
305106; "	May 7, 1972
305107; 1 to 5	May 9, 1972
305108; "	May 10, 1972
305110; 4 to 5	May 13, 1972
306243; 1 to 5	June 13, 1972
306244; 1 to 5	June 13, 1972
306245; "	June 14, 1972
306246; "	June 14, 1972
306247; "	June 15, 1972

A total of 75 claims requiring 15,000 hours of assessment work.

This property is north of and contiguous to the Hollinger Leslie No. 2 and Erickson No. 1 deposits. The rocks outcropping on the claim group are comprised of shales, gabbros, 'blotchy' gabbro and fine-grained basaltic lavas. The rocks form two adjacent synclinal fold structures faulted one against the other.

The Sauve claims contain at least two well mineralized horizons in black shales and the northern extension of the Erickson and Leslie deposits. There are also other scattered rust zones throughout the entire claim block indicating the presence of some sulphides both in the gabbroic sequence and in the shales.

A grab sample of the shales containing massive banded sulphides consisting primarily of pyrrhotite with visible chalcopyrite, both disseminated and in fractures, assayed 0.22% Cu, Tr., Zn. and 0.01% Ni.

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(5) The Big 'M' Claim Group (Map No. 8)

Township: 5845

Location: Approximately latitude 57°59'N,  
                  longitude 69°43'W.

The question of ownership of the Big 'M' showing remained unresolved at the end of the field season and, therefore, work carried out is not included in this report as it is not applicable for assessment work.



The western mineralized 'blotchy' gabbro horizon extends along the eastern side of Massive Lake down to the southern boundary of the property 1/2 mile west of Surprise Lake. Small isolated patches of mineralized 'blotchy' gabbro occur intermittently along the strike of this horizon. Of particular interest is a lens of massive sulphides which occurs within a mafic phase of the 'blotchy' gabbro horizon on the southeastern corner of Massive Lake. The lens has a maximum width of 3 feet and consists of pyrrhotite and chalcopyrite and gives a positive test for nickel with the dimethyl powder. The lens appears to be approximately 50 feet long and pinches out both to the north and south. At the southern end of the belt, 1/2 mile west of the northern end of Surprise Lake, there outcrops another narrow zone of mineralized 'blotchy' gabbro. This mineralization occurs as small lenses along a strike length of approximately 150 feet. The lenses are up to 15 feet long and 2 feet wide. Winkie drilling has been done previously on all of these mineralized zones.

The frequency of interesting mineral occurrences and the proximity of the Leslie No. 2 showing indicates that this property is of considerable interest.

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(9) The Folding Lake Claim Group (Map No. 12)

Township: 5945  
Location: Approximately latitude 58°08'N,  
          longitude 69°34'W

<u>Claim Nos.</u>	<u>Expiry Date</u>
309618; 1 to 5	August 26, 1972
309619; 1 to 3	August 25, 1972

Total 8 claims and an area of 1/2 square mile

This small claim group covers a mineralized shale exposed in a series of trenches east of Folding Lake. The sequence of rock types on the claim group, going from east to west, includes shales, gabbroic rocks of variable grain size and texture and fine-grained basaltic lavas covering the east limb of a major syncline which plunges to the southeast. The mineralized shales situated about 1/2 mile east of the axis of the syncline have previously been examined by a consortium of companies which included International Nickel. A number of trenches were dug and three diamond drill holes put down. No results of this work are available on file at the Quebec Department of Natural Resources.

The shales revealed in the trenches are mineralized primarily with disseminated but locally massive pyrite and pyrrhotite with traces of chalcopryrite. Sulphides occur throughout the shales which are at least 100 feet wide but are more heavily concentrated near the top of the shale bed adjacent to the overlying medium-grained gabbro. Previous trenching exposed mineralization over a strike length of 1800 feet.

Disseminated mineralization also occurs within the gabbro close to its upper contact with the mineralized shale. This mineralization often has a higher than average content of chalcopryrite as for example Trench #7 which visually would average about 1% copper. A multiple grab sample from a number of trenches along this gabbro-shale contact assayed 0.4% Cu, 0.67% Zn and 0.08% Ni.

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(10) Other Showings (Map Nos. 2 and 3)

Other showings in mineralized gabbroic rocks visited during the field season included Lac St. Pio (No. 11), Hook Lake (No. 13 and 14), Erickson No. 7 (No. 25) and the Mercier River showing (No. 26). None of these showings were sufficiently mineralized to warrant staking at the time.

The Lac St. Pierre showing consists of a small outcrop 150 feet long and about 20 feet wide of medium-grained gabbro carrying sparsely disseminated pyrrhotite and chalcopyrite. Other scattered limonite stained outcrops indicating the presence of some sulphides occurred both on strike to the east and to the west; some trenching had previously been done but only weak mineralization was exposed.

The Hook Lake showings occur in 'blotchy' gabbros which are found within the basin structure north of Hook Lake. These showings are small and not strongly mineralized but they deserve a closer look in view of their proximity to the weakly cupriferous sulphide-rich shales that occur in the footwall of the gabbro sequence.

The Erickson No. 7 and the Mercier River showings are both small outcrops of weakly mineralized 'blotchy' gabbro which have previously been investigated by the Hollinger interests. The showings occur in areas of poor rock exposure and are unimpressive.

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CERTIFICATE OF QUALIFICATION

I, Orval E. Leigh, residing at 40 Rumsey Road, Toronto, Ontario, do hereby certify that:

1. I am a consulting geologist associated with the firm Derry, Michener & Booth since January 1st, 1969.
2. I am a graduate of the University of Toronto, Faculty of Applied Science and Engineering with a degree of B.A.Sc. (1958) Applied Geology, and have been practising my profession since graduation.
3. I am a registered Professional Engineer in the Province of Ontario and the Province of Manitoba.
4. Derry, Michener & Booth have a 5% interest in the properties described in this report.
5. The field work described in this report was directed in the field by Mr. R. P. Hewitt under my supervision.
6. The properties were visited during the period May 20th to May 27th, 1970 and August 27th to September 2nd, 1970.

  
Orval E. Leigh, P.Eng.



Toronto, Ontario.  
December 15th, 1970.

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APPENDIX I

SUMMARY OF ROCK GEOCHEMICAL SAMPLING  
LABRADOR TROUGH PROJECT

DERRY, MICHENER & BOOTH

SUMMARY OF ROCK GEOCHEMICAL SAMPLING  
LABRADOR TROUGH PROJECT

Introduction

During the 1970 field program, 107 rock specimens were collected from various mineralized areas within the project boundaries and analyzed by hot extractable geochemical methods. Eighty-seven of the specimens consisted of sedimentary host rocks and associated sulphides and the remaining 20 are basic intrusive and volcanic rocks either mineralized or associated with mineralization.

The sampling was largely of a reconnaissance nature in keeping with the general objectives of the 1970 program as a start in a rock geochemical orientation study. The object of this type of sampling, particularly in areas of sedimentary (stratabound) sulphide zones is to indicate the trace metal characteristics of known exposed ore zones as a yardstick against which to assess the potential of less exposed zones. The data collected will form part of a continuing build-up of rock geochemical knowledge of the area as the exploration program continues.

The sediments, metagabbros and three of the volcanic rock specimens were analyzed for copper, lead, zinc, cobalt, molybdenum and arsenic by hot acid extractable methods and for silver by potassium cyanide extraction. The gabbros and the two remaining volcanic rock specimens were analyzed similarly but for copper, nickel, cobalt, chromium and silver only.

In Appendix I the geochemical results are tabulated by rock type and geographical location, together with a brief description of the type of rock and sulphide content. Map GC-1, an overlay of Map 2 which accompanies the 1970 Summary Report on the Labrador Trough project, indicates the location of the sampled areas.

Discussion of Results

Samples PH-1 to PH-6, taken from the surface exposure of the Prud'homme deposit, which is reported to have an average grade of 2.05% Cu and 2.39% Zn, indicate severe leaching of zinc, as might be expected, with less severe leaching of copper. Copper and zinc values from three surface specimens average 6600 ppm (0.66% Cu) and 1040 ppm (0.10% Zn). Disregarding possible effects of zoning in the deposit, these values represent 0.33% of the reported average copper grade and 0.05% of the zinc grade.

For comparative purposes, the following tabulation shows the average values obtained for copper and zinc from surface exposures of sulphide in the Folding Lake claims, Francine Lake, Hook Lake and the Prud'homme zones:

		<u>Cu</u> <u>(ppm)</u>	<u>Zn</u> <u>(ppm)</u>	<u>Ag</u> <u>(ppm)</u>
Folding Lake	(8 samples)	2,530	3,088	0.1
Francine Lake	(3 samples)	320	640	0.1
Prud'homme	(3 samples)	6,600	1,040	0.4
Hook Lake	(33 samples)	370	522	0.1

The above comparison would suggest that the Folding Lake area deserves further detailed examination based on the comparative copper and zinc geochemical values. It is interesting to note that the silver content in talus samples from the Prud'homme range from 1.1 to 17.4 ppm indicating enrichment of the silver content by weathering and there is a similar enrichment of lead. Unfortunately the topography of the Folding Lake zone has not resulted in the development of talus and therefore no comparison can be made in this respect. This could be a very useful indicator, however, on certain other deposits such as the Francine Lake zone, for example, which visually appears to be barren and no enrichment in silver or lead was detected in the one sample of talus analyzed.

More sampling is required to allow conclusions to be drawn concerning the importance of cobalt, molybdenum and arsenic values as economic indicators.

Successive, semi-massive to massive sulphide samples HL-4, 5, 6 and 8 from northwest of Hook Lake gave higher than average zinc values (average 1300 ppm) and slightly higher than average copper values. Elsewhere on the zone sample HL-1 gave zinc values of 2.5 times the average and sample HL-37 midway along the sulphide exposure gave encouraging values in copper, lead, zinc and silver. These three sections along the zone should be resampled during the 1971 program.

The sampling completed in 1970 on the intrusive and volcanic rocks was insufficient to allow meaningful comparisons between known and unknown deposits. The only immediately obvious feature is the similarity between the metal content of samples from Schindler Lake and from the Big 'M' zones although much more sampling is required to confirm this preliminary observation.



Orval E. Leigh  
DERRY, MICHENER & BOOTH

February 4, 1971

SAMPLE NUMBER	"A" MINERALIZED SEDIMENTS	TOTAL CU. PPM	TOTAL PB. PPM	TOTAL ZN. PPM	TOTAL CO. PPM	KCN AG. PPM	TOTAL MO. PPM	TOTAL AS. PPM
(Containing over 10% sulphides)								
<u>ST. PIERRE LAKE - (TWP. 5945) - (Exact location not known)</u>								
Hol. 1	Recrystallized, thinly banded tuffs - py., ccp., sph & gal.	32500	840	50000	160	32.0	8	144
<u>PIO LAKE - (TWP. 6445) - (Premium Iron)</u>								
Pl-1	Black shale - po. & ccp.	15500	24	26	60	.1	4	10
<u>LUCILLE LAKE - (TWP. 6445) - (North of Leaf River)</u>								
H-1	Interbedded shales and fine grained lavas	370	21	22	118	<.1	10	26
H-2	Interbedded shales and fine grained lavas	160	28	45	48	.1	8	24
<u>FRANCINE LAKE - (TWP. 5946)</u>								
TH-1	Black shale with 10-15% diss. py.	160	37	790	64	<.1	8	64
TH-2	Black shale with 10-15% diss. py.	250	34	800	34	<.1	14	14
TH-3	Clay sample from foot of slope	50	17	30	10	<.1	<2	6
TH-4	Rock fragments from talus	410	29	60	22	.1	12	26
TH-5	Composite chips from pyritic black shale over entire gossan	570	36	350	98	.1	10	40
<u>FOLDING LAKE - (TWP. 5945) - (North of Claim Group)</u>								
C-1	Graphitic black shale - +10% diss. py. & po.	40	160	20	44	.8	34	90
C-2	As above but leached	170	16	80	16	.1	6	34
C-3	Similar to C-1	100	43	60	62	.2	10	34
C-4	Graphitic shale - sulphide content not given	230	16	100	26	.1	20	<2
C-5	Shale - well leached	860	19	140	18	.1	10	<2
C-6	Shale - 20% py. (bedded)	390	37	40	52	.1	8	32
C-7	Siltstone near meta-gabbro contact	140	43	130	54	.1	6	<2
<u>FOLDING LAKE - (TWP. 5945) - (claim group)</u>								
C-8	Shale, siltstone and graphite	1850	17	30	90	<.1	10	<2
C-9	Siliceous sediments - minor graphite, 10-15% diss. po.	590	26	120	74	<.1	18	20
C-10	Massive po. in shales	4200	880	14000	158	.1	8	<2
C-13	Siliceous shales - massive po.	690	27	100	140	.1	14	30
C-14	Massive po. in shales	410	150	3500	66	.1	14	40
C-16	Siliceous sediments - massive po. & < 10% ccp.	9750	150	4100	300	.1	2	14

SAMPLE NUMBER	"A" MINERALIZED SEDIMENTS (CONTD.)	TOTAL CU. PPM	TOTAL PB. PPM	TOTAL ZN. PPM	TOTAL CO. PPM	KCN AG. PPM	TOTAL MD. PPM	TOTAL AS. PPM
C-18	Siliceous sediments - massive po. & traces ccp.	1900	140	2800	420	.1	4	128
C-20	Sediments (shale?) - massive po.	850	35	60	74	.1	18	96
<u>PRUD'HOMME DEPOSIT - PARTINGTON #2 - (TWP. 6044)</u>								
PH-1	Massive py. with traces ccp. & limonite - North O.C.	6250	290	2700	420	.9	3	256
PH-2	Massive py. with traces ccp. & limonite - Middle O.C.	7250	52	190	460	.1	2	84
PH-3	Massive py. with traces ccp. & limonite - South O.C.	6500	110	230	380	.3	3	36
PH-4	Talus chips - South O.C.	970	32	50	92	1.1	12	44
PH-5	Talus chips - Middle O.C.	1700	170	90	52	2.6	4	184
PH-6	Talus chips - North O.C.	550	2650	110	34	17.4	3	300
<u>HELLENCOURT LAKE - (TWP. 5945)</u>								
A-41-1	Shale - 15-20% sulphides	680	25	20	56	.1	4	120
A-41-2	Shale - 15-20% sulphides	400	24	20	88	.1	8	72
A-41-3	Shale - 15-20% sulphides	70	13	60	20	< .1	< 2	24
<u>A-40 - 0.7 MILES SOUTH OF A-41 (Same Horizon)</u>								
A-40-1	Shale - 15% po. with traces ccp.	130	40	20	52	.1	10	10
A-40-2	Shale - 15% po. with traces ccp.	210	19	80	40	.1	< 2	< 2
<u>HOOK LAKE - (TWP. 5944)</u>								
(i) <u>Semi-Massive to Massive Sulphides</u>								
HL-1	Top of shale sequence	380	46	1350	110	< .1	8	30
HL-3	Well mineralized shales	170	46	90	100	.2	8	76
HL-4	Sulphide chips with trace ccp.	740	50	1600	122	< .1	12	14
HL-5	Sulphide chips	340	46	860	90	< .1	8	24
HL-6	Well mineralized with po. & py.	420	120	2800	360	< .1	12	50
HL-8	Well mineralized	400	130	90	148	< .1	8	90
HL-11	Well mineralized shale	330	31	580	76	< .1	6	36
HL-12	Well mineralized shale	650	38	410	78	< .1	8	34
HL-15	Massive, finely banded granular py.	190	55	120	112	.1	6	74
HL-17	Massive, finely banded granular py. (no visible ccp.)	260	31	240	76	< .1	8	60
HL-19	Massive, finely banded granular py.	210	34	750	102	< .1	8	50
HL-21	Massive, finely banded granular py. (no visible ccp.)	360	32	550	92	< .1	10	24

SAMPLE NUMBER	(i) <u>Semi-Massive to Massive Sulphides (contd.)</u>	TOTAL	TOTAL	TOTAL	TOTAL	KCN	TOTAL	TOTAL
		CU. PPM	PB. PPM	ZN. PPM	CO. PPM	AG. PPM	MO. PPM	AS. PPM
HL-23	No description available	240	40	290	60	.1	8	34
HL-25	Massive finely banded py.	250	26	340	88	.1	8	24
HL-27	Massive finely banded py. (no visible ccp.)	260	38	290	88	< .1	13	34
HL-29	Massive and diss. py.	270	34	410	58	< .1	8	34
HL-31	Massive py. with minor shale	170	24	380	50	< .1	8	34
HL-33	No description available	140	32	100	94	< .1	12	36
HL-35	Massive finely banded py. in shale	320	22	300	58	.1	12	34
HL-37	Massive granular py.	1650	1100	2000	70	1.5	8	24
HL-39	No description available	360	21	370	56	.1	8	< 2
HL-41	Massive finely banded granular py. in shale	380	29	690	62	< .1	10	20
HL-43	Massive finely banded py. in shale	390	37	80	58	< .1	12	34
HL-45	Py. in shale & siltstone	320	19	270	68	.1	8	< 2
HL-47	Bedded granular py. (no visible ccp.)	540	470	440	116	.1	10	40
HL-49	Massive finely banded py. (no visible ccp.)	300	27	420	98	< .1	6	< 2
HL-51	Massive finely banded py. in shale	290	83	120	62	< .1	12	< 2
HL-53	Massive finely banded py.	280	50	360	54	< .1	12	34
HL-55	Massive finely banded py.	430	23	240	78	.1	8	< 2
HL-57	Massive finely banded py.	270	24	50	88	.1	16	< 2
HL-59	Massive finely banded py.	330	48	310	80	.1	8	34
HL-60	Semi-massive disseminated py. in siltstone	440	21	20	148	.1	4	< 2
HL-61	Massive finely banded py. in shale	220	39	310	52	< .1	8	64

HOOK LAKE - (TWP. 5944)

(ii) Sediments with up to 15% sulphides

HL-2	Black Shales	130	24	90	70	.3	13	36
HL-7	Shales. With some sulphides	570	79	40	106	< .1	12	60
HL-10	Black Shales	280	30	140	142	< .1	7	50
HL-13	Shale with some sulphides	580	21	60	48	< .1	4	14
HL-14	Shale with 10-15% diss. po.	210	30	170	78	< .1	7	44
HL-16	Shale (leached)	180	25	180	46	.1	8	36
HL-18	Shale	160	16	180	50	< .1	6	30
HL-20	Shale - < 10% py.	140	21	220	30	< .1	8	12
HL-24	Shale (graphitic) < 10% py.	80	42	50	36	.1	15	34

SAMPLE NUMBER	(ii) <u>Sediments with up to 15% sulphides (contd.)</u>	TOTAL	TOTAL	TOTAL	TOTAL	KCN	TOTAL	TOTAL
		CU. PPM	PB. PPM	ZN. PPM	CO. PPM	AG. PPM	MO. PPM	AS. PPM
HL-28	Shale	70	55	50	20	2.1	40	34
HL-30	Shale	20	15	20	16	.9	20	24
HL-38	Leached shale < 15% py.	210	20	150	34	.1	10	5
HL-40	Leached shale - well mineralized	160	22	540	36	< .1	4	< .2
HL-44	Shale	80	23	120	38	< .1	6	24
HL-46	Graphitic shale - <10% py.	30	53	90	30	.3	17	36
HL-48	Shale	70	39	40	10	.4	17	14
HL-50	Shale - < 7% py.	60	25	50	24	.4	10	24
HL-52	Shale with py.	100	64	60	62	.6	18	70
HL-58	Shale	220	520	200	30	2.1	18	50

"B" MINERALIZED INTRUSIVES

(B-1) Gabbros

		TOTAL	TOTAL	TOTAL	TOTAL	KCN
		CU. PPM	NI. PPM	CO. PPM	CR. PPM	AG. PPM
<u>SCHINDLER LAKE - (TWP. 6545)</u>						
SH-1	Massive sulphides from lenses in blotchy gabbro	22500	27500	1020	33	< .1
SH-2	Ultramafic intrusive beside blotchy gabbro	18000	520	38	33	< .1
<u>HARVENG LAKE - (TWP. 6044) -(Claim Group)</u>						
HARV 1	Mineralized blotchy gabbro - Trench 3	3700	960	220	33	< .1
<u>BIG "M" CLAIM GROUP - (TWP. 5844)</u>						
BM-1	Semi-massive sulphides from ultramafic zone - Trench 1	37000	200	128	59	< .1
BM-2	Massive sulphides from mafics and shales	7500	4500	300	59	< .1
BM-3	Semi-massive sulphides in blotchy gabbro	11500	4000	340	73	< .1

<u>SAMPLE NUMBER</u>	<u>(B-2) Metagabbros</u>	<u>TOTAL CU. PPM</u>	<u>TOTAL PB. PPM</u>	<u>TOTAL ZN. PPM</u>	<u>TOTAL CO. PPM</u>	<u>KCN AG. PPM</u>	<u>TOTAL MO. PPM</u>	<u>TOTAL AS. PPM</u>
<u>FOLDING LAKE - (TWP. 5945) - (Claim Group)</u>								
C-11	Near shale contact - 15% diss. po.	750	22	4750	22	.1	2	< 2
C-15	Metagabbro with trace of sulphides	220	18	70	18	.1	< 2	< 2
C-17	Fine grained near contact - (no visible mineralization)	1450	26	310	24	.1	2	10
C-19	Medium grained - trace of po.	90	16	210	26	.1	2	20

HELLANCOURT LAKE - (TWP. 5945)

A-41-4	Metagabbro	100	15	70	40	< .1	< 2	< 2
A-41-5	Metagabbro	80	16	80	38	.1	< 2	< 2

(B-3) Ultramafics

LAC ST. PIERRE - (TWP. 5945)

		<u>TOTAL CU. PPM</u>	<u>TOTAL NI. PPM</u>	<u>TOTAL CO. PPM</u>	<u>TOTAL CR. PPM</u>	<u>KCN AG. PPM</u>
MAFIC 1	Medium & fine grained untrabasic (no sulphides)	110	590	76	285	< .1
MAFIC 2	Medium & fine grained ultrabasic (trace sulphides)	130	650	84	387	< .1
MAFIC 3	Medium & fine grained ultrabasic (trace sulphides)	50	680	84	370	< .1

"C" MINERALIZED VOLCANICS

PIO LAKE - (TWP. 6445)

PL-2	Semi-massive po. in lavas	2450	390	42	33	< .1
PL-3	Sheared lavas with diss. sulphides & trace ccp.	210000	3000	110	87	< .1

<u>SAMPLE NUMBER</u>	<u>"C" MINERALIZED VOLCANICS (CONTD.)</u>	<u>TOTAL CU. PPM</u>	<u>TOTAL PB. PPM</u>	<u>TOTAL ZN. PPM</u>	<u>TOTAL CO. PPM</u>	<u>KCN AG. PPM</u>	<u>TOTAL MO. PPM</u>	<u>TOTAL AS. PPM</u>
<u>FOLDING LAKE - (TWP. 5945) - (Claim Group)</u>								
C-12	Basic volcanics with diss. po.	80	39	120	48	.1	8	< 2
C-21	Intermediate volcanics with diss. po.	2000	18	70	36	.1	2	26
C-22	Leached volcanics & shales near massive po.	780	21	30	140	.1	4	24