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GEOLOGY CALLANDER BAY AREA

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North Bay, Ontario.  
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INTRODUCTION

A regional geological reconnaissance program was initiated in the North Bay area, in the spring of 1956, with the object of exploring for favourable columbium and uranium bearing areas. During the course of this work significant mineralogical and structural features were observed in the vicinity of Callander, Ontario. Detailed examination revealed rocks on Islands A & B, North Hinsworth Township, very closely resembling those found in the vicinity of the Beaucauge columbium-uranium deposits.

LOCATION

The town of Callander is situated eight miles south of the city of North Bay, Ontario, on the main highway and on the Canadian National Railways mainline to Toronto. Islands A & B\*, North Hinsworth Township, lie two miles west of the town of Callander, in the western part of the Southeast Bay of Lake Nipissing. Locally this bay is called Callander Bay.

HISTORY

The earliest commercial activity in the Lake Nipissing district was centred in Callander Bay as this was the starting point in the transshipment of large pine logs to the Kainuskong, Mattawa, and Ottawa rivers.

Later with the coming of the Canadian National and Canadian Pacific railways several sawmills operated on the shore of the bay. One of these is still in existence drawing its logs from the Sturgeon River across the lake.

\* called Darling Island on the topographic maps.

The shoreline of Callander Bay is a popular summer resort centre.

At the time of the initial work at Beausage Mines Limited on the Manitou Islands, there was a flurry of prospecting activity along the south and east shore of Lake Mipissing. Apparently nothing of interest was discovered. Several diamond drill holes are reported to have been drilled east of the Town of Callander, and north of Callander Bay. No reports of this work have been published.

Following the discovery of rocks favourable for columbium ore bodies on Islands A and B, four claims numbered P84399 - P84402 inc. were staked on the north shore of Callander Bay. The remainder of the shoreline and all of the islands in the lake are privately owned and the property owners own the mineral rights. The land under Lake Mipissing was withdrawn from staking by order in council dated April 30, 1912.

Chapter 236, Section 39 subsection (c) of the Mining Act of Ontario is believed to be the part of the act dealing with such land as the bed of Lake Mipissing. It states as follows:-

"39. No mining claim shall be staked out or recorded on any land (c) which has been reserved or set apart by the Department of Lands and Forests for summer resort purposes, except where the Minister of Mines certifies in writing that in his opinion discovery of valuable mineral in place has been made."

The only way of obtaining mineral development privileges for the area covered by water is by means of a License of Occupation. Application for the area shown by cross hatching on the enclosed map was submitted on July 9, 1956. This area is described as follows:-

"The area of the South East Bay of Lake Mississauga, North Himsworth Township, bounded on the south by Lots 3, 4, 5, 11, 12, 14, 15, Conc. XXV, Lots 5, 6, 7, 8, 9 & 10 Conc. XXIV, on the east by Lot 2 Conc. XIII, Lots 2 & 3 Conc. XIV, on the north by Lots 4, 5, 6, 7, 8, 11, Conc. XV, the north boundary of North Himsworth Township, and on the east by the line between Lots 15 & 16, Conc. XVI, XVII, & XVIII; this license to include the mineral rights to Islands A, B, C, D, E, & F North Himsworth Township or any of these of which the mining rights remain with the Crown; and also the mineral rights to Lots 9 & 10, Conc. XVIII, North Himsworth Township. This is an area of about 3900 acres."

Chapter 236, Section 196 subsection (2) of the Mining Act of Ontario provides for the disposition of such land at the discretion of the Minister. It states as follows:-

"196 (2) Notwithstanding anything in this Act, in special circumstances the Minister may, subject to approval of the Lieutenant-Governor in Council, issue a License of Occupation, lease or patent of any mining lands or mining rights on such terms and conditions as he may deem expedient."

The Deputy Minister of Mines of Ontario, Dr. Rickaby and the provincial geologist Dr. Hurst visited Islands A & B on July 13, 1956 and appeared to be convinced that the showings on Islands A & B constituted a "discovery."

At the suggestion of the Department of Mines an attempt was made to prevent any stir or excitement over the showings on the islands. For this reason, prospecting and geological mapping have been of a reconnaissance nature only. However, from what we know at present it appears that the lake bed is the favourable area and that shoreline property would only be necessary as a means of access.

#### TOPOGRAPHY

The topography of the North Bay district, as is typical of

the Canadian Shield, consists of low rounded hills separated by lakes and glacial deposits.

Callander Bay is a nearly circular, almost closed off, indentation of Lake Nipissing. The shoreline of the lake is commonly sandy, or consists of smooth rounded granite hummocks. However, in the region of the Manitou Islands and Island A & B the shoreline is more abrupt and composed of broken angular blocks of syenitic gneiss.

GENERAL GEOLOGY

The rocks in the Lake Nipissing district are typical Grenville type, light buff coloured, biotite-hornblende granitic gneisses. They are medium to coarse grained and generally have a well developed gneissosity, though in certain localities they grade into massive granitic rocks. Banding due to initial differences in composition of the rock is common and it appears that for the most part they are paragneisses. The gneissosity usually strikes slightly west of north and dips steeply. The average composition of the rock is about 25% quartz, 50% cream grey feldspar, and 25% biotite-hornblende assemblage.

In the Callander Bay area the typical granitic gneisses are in many places altered to a shattered, pink, slightly radioactive gneiss with a lower than normal quartz content, and noticeable acmite content. Such rock occurs in places along the south shore of Callander Bay and to the north of the bay. It is prominently displayed in the large road cut just south of Callander.

There is a large mass of diabase striking north-south running through the town of Callander. In places this intrusive shows two or more phases of intrusion. One of these is rich in nepheline, and appears to have the composition of a nepheline syenite.

#### GEOLOGY ISLANDS A & B

On Islands A & B the rocks are pink to red, fine-medium grained syenite gneisses. They consist of about 70% pink potash feldspar and 30% biotite-acmite material with small amounts of quartz, calcite, apatite, pyrite, and magnetite. The syenite gneiss is intimately cut by fine fractures filled with hematite, acmite, biotite, calcite and apatite. In several localities the rocks are highly shattered and consist of angular fragments of syenite in a matrix of calcite, biotite, acmite and magnetite. On the west and east shore of Island B the matrix consists of about 50% biotite, 30% acmite and lesser amounts of calcite, apatite, pyrite, magnetite and feldspar. The exposures of breccia on Island A consist of syenite in a matrix of calcite. In all cases the matrix material is radioactive (up to 10 times normal) and contains up to .05%  $Cb_2O_5$ . While the percentage of columbium in the samples obtained to date is low, it is appreciably higher than the normal gneiss and when accompanied by the aforementioned minerals is an important criterion of columbium deposits. It might be mentioned that samples assaying .26%  $Cb_2O_5$  were obtained from very narrow fractures in the granitic gneisses on the mainland a mile and a half north of the islands, but this is not considered to be as diagnostic feature of the presence columbium concentrations since the host rocks are relatively unaltered.

## ECONOMIC GEOLOGY

The following features are common to the geology of the Beaucage ore deposits on the Manitou Islands and to Islands A & B:-

1. Bedrock composition and mineralogy; low silica, high soda and iron rock composed of pink potash feldspar and acmite with lesser amounts of calcite, biotite, magnetite, pyrite, apatite and fluorite.
2. Island wide shattering of the rocks.
3. Circular outline of the Manitou Islands and circular shape of Callander Bay.
4. Lack of quartz in a region of quartz rich rocks.
5. Intensely brecciated zones with filling and replacement of these zones by iron, phosphorus, soda and fluorine-rich material consisting of the minerals acmite, calcite, biotite, apatite, red potash feldspar, and fluorite.
6. Values in columbium and uranium.
7. Presence of fine-medium grained carbonate as a thick unit and as breccia filling on the Manitou Islands, and the carbonate as a matrix in the syenite breccia on the east side of Island A.

The chemical and textural similarity between these islands in Callander Bay and the host rocks of the Beaucage ore masses on Newman Island are remarkable. Yet such rocks are extremely rare. The only similar areas are also reported to contain significant concentrations of columbium.

Rowe 1955 describes the Newman Island deposit of Beaucage

### Mines:

"The Newman deposit and the two other columbium deposits have been found within a circular-shaped band of rocks that consists chiefly of acmite-potash feldspar rock, and marbles. Relic textures and minerals suggest that the rocks formed chiefly from plagioclase-quartz-potash feldspar granulite (fensitization)."

He stresses (1954) the importance of the actinolite calcite assemblage in an area of normal granitic rocks in his Recommendation to Prospectors.

"In prospecting for such deposits and deposits of the Newman type, the association of columbium with alkalic rocks is important. Attention should be paid to the accessory minerals of alkalic rocks of metamorphic, intrusive, or volcanic origin because these accessory minerals may be columbium minerals or certain titanium and zirconium minerals that contain appreciable amounts of columbium (Fleischer, Murata, Fletcher and Marten, 1952). Zones of contact metasomatism about alkalic intrusive rocks also merit attention, particularly if these zones contain carbonate-rich rocks."

A significant feature of the Callander Bay area is the nepheline rich intrusive which cuts through the town of Callander. The columbium deposits at Oka, Quebec; Nemegos, Ontario; and Nemegosenda Lake, Ontario, are all connected with nepheline rich intrusive rocks. This intrusive may indicate slightly different conditions in the Callander area (there are no nepheline intrusives in the Manitou Islands area) and it is possible that if there is columbium ore in the Callander Bay district that it might be of a somewhat different character. It might even be more amenable to normal metallurgical processes, or perhaps a deposit of higher grade might be uncovered.

Any economic deposit in the Callander area would have the distinct advantage of being considerably closer to, or under the mainland.

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Rowe, R. B. Association of Columbium Minerals and Alkaline Rocks Canadian Mining Journal, March, 1955.

Rowe R. B. Notes on Geology and Mineralogy of the Newman Columbium-Uranium Deposit, Lake Nipissing, Ontario, Geological Survey of Canada, Paper 54-5.



### RECOMMENDATIONS FOR DEVELOPMENT OF THE CALLANDER AREA

Attempts to secure ground in the Callander area have been restricted to the area underlying Callander Bay because all the shoreline area is privately held and shore geological studies indicate that the south and west sides of the bay are unfavourable for columbium deposits, and suggest that the north shore is of questionable importance. The situation along the east side of the bay is uncertain, but inasmuch as it is overlain by the Town of Callander, it seems out of the question.

The author believes that the company need not obtain mineral rights to ground outside the area of Callander Bay at present; however, after an aeromagnetic survey of the area has been completed this problem should be reviewed.

The information obtained from magnetometer surveys has proved to be most helpful in locating ore masses at Beausage Mines, and also at other columbium properties in Canada. All the known pyrochlore deposits contain an abnormally high percentage of magnetite. With this in mind it is recommended that preliminary investigation of the potential of the Callander Bay area consist of airborne and ground magnetometer surveys, followed by diamond drilling of any anomalies found. To take advantage of the ice cover of the lake the surface work should start during the first week of January.

Specifically I suggest the following program:-

1. Aeromagnetic survey of an area of 12 square miles to include the area of Callander Bay and the ground lying immediately to the north and east of the bay (see accompanying map). Line spacing to be 660' for east-west lines and 1320' for north south lines. Flight

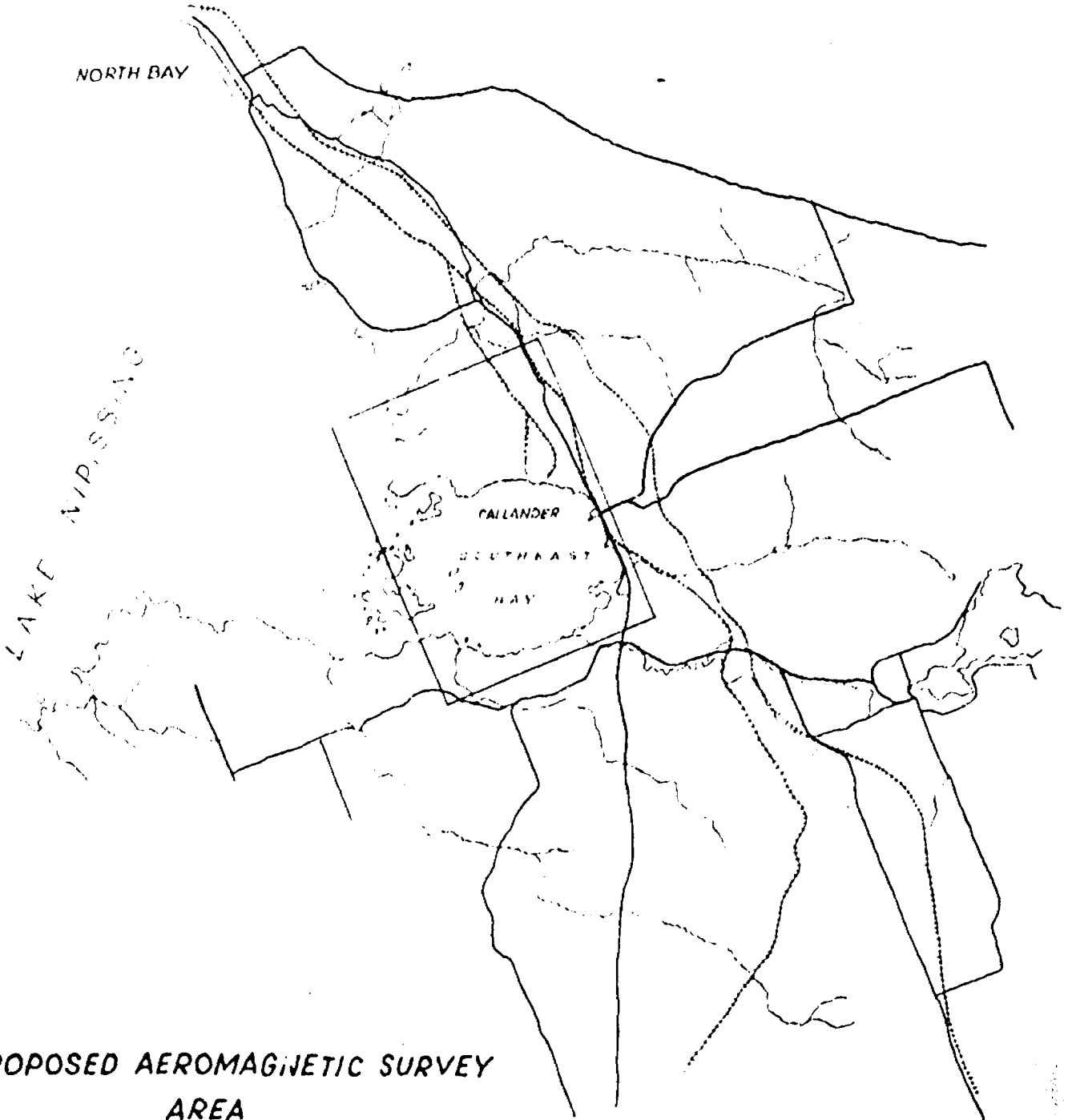
height to be 300' or as close to this as possible. A similar survey of 6 square miles carried out during October 1953 cost \$2020. Survey should be completed by December 15th.

2. Ground magnetometer survey of any interesting areas picked up in 1. above. Grid lines to be laid out at 200 foot intervals at right angles to main anomaly direction, and preferably east west or north south. This work should begin during the first week of January. Area to be covered and cost would be dependent on results of 1. above. Ground magnetometer surveys cost about \$125. per line mile in the North Bay area.
3. Diamond drilling on sections at 200' intervals of any magnetic anomalies uncovered in the above program. In the event that no strong anomalies are uncovered it would be advisable to do at least 2000' of drilling to determine the significance of magnetic irregularities and the effect of depth of water and silt. The experience at Beaucage has been that differences in magnetic intensity of 300 gammas on the ground and 150 gammas from the air are significant. Cost of diamond drilling in the North Bay area is about \$3.25 per foot.

**BEAUCAGE MINES LTD.**

**NORTH BAY**

ONTARIO



**PROPOSED AEROMAGNETIC SURVEY  
AREA**

**SCALE 1 INCHES = 2 MILES**

**OCTOBER 1956**

# BEAUCAGE MINES LTD.

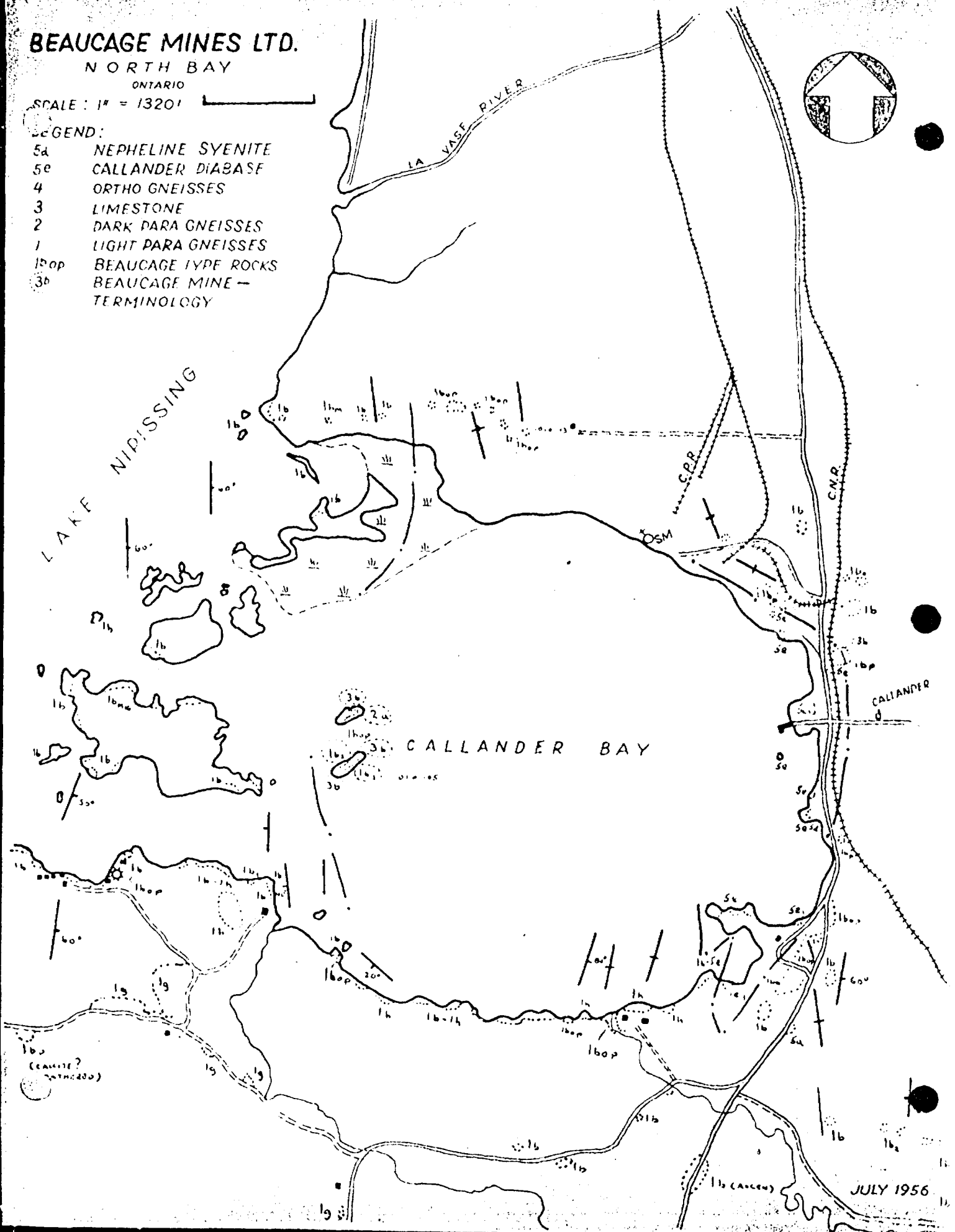
NORTH BAY

ONTARIO

SCALE: 1" = 1320'

## LEGEND:

- 5a NEPHELINE SYENITE
- 5e CALLANDER DIABASE
- 4 ORTHO GNEISSES
- 3 LIMESTONE
- 2 DARK PARA GNEISSES
- 1 LIGHT PARA GNEISSES
- 1bop BEAUCAGE TYPE ROCKS
- 3b BEAUCAGE MINE - TERMINOLOGY



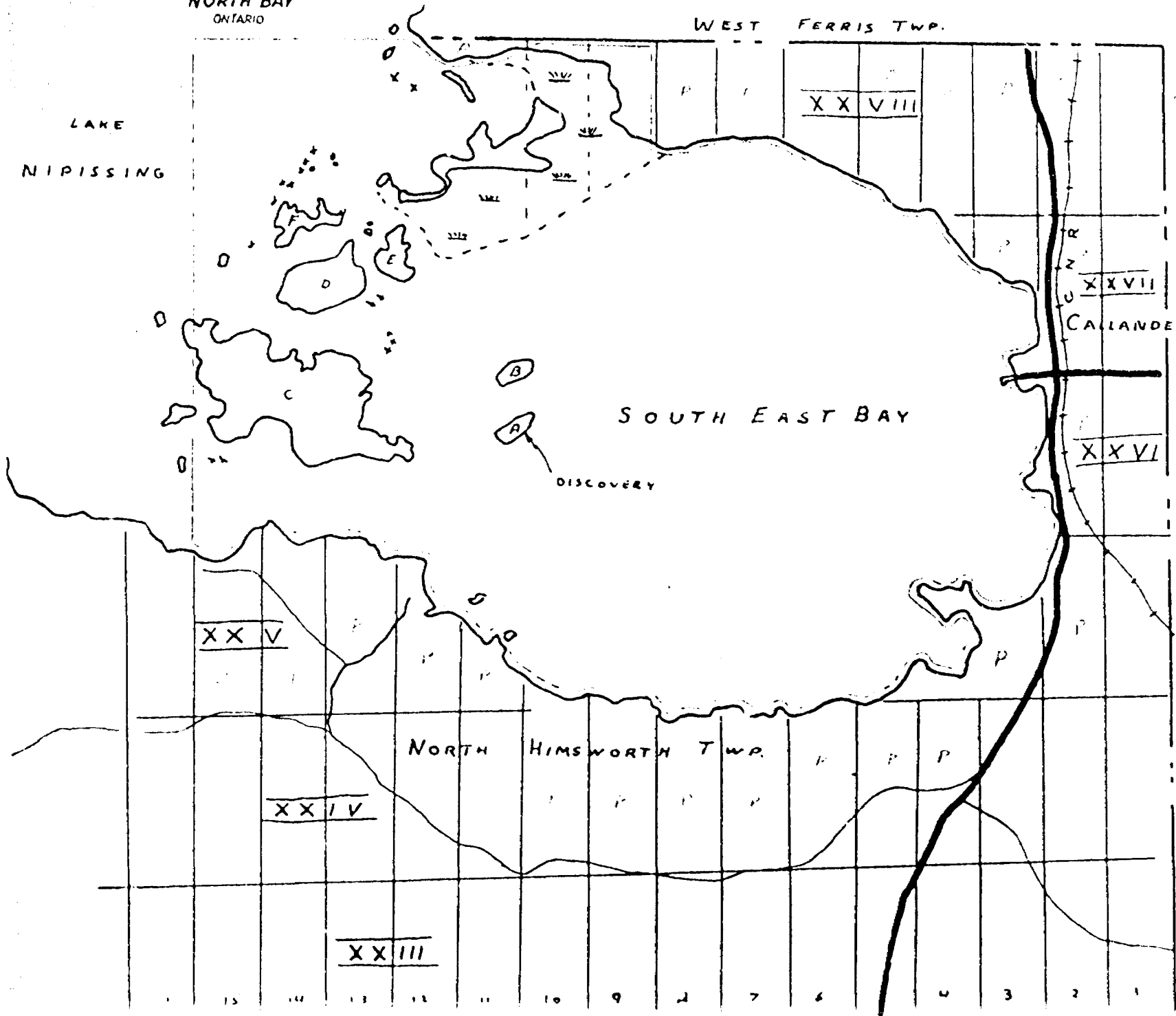
JULY 1956

# BOUCAGE MINES LTD.

NORTH BAY  
ONTARIO

WEST FERRIS TWP.

LAKE  
NIPISSING



SOUTH EAST BAY

DISCOVERY

NORTH HIMSWORTH TWP.

EAST FERRIS TWP.

CUNR  
CALLANDER



AREA REFERRED TO IN APPLICATION  
FOR LICENSE OR OCCUPATION

SCALE 1" = 40 CH.

1" = 40 CHAINS.