ONTARIO DEPARTMENT OF MINES

PRELIMINARY GEOLOGICAL MAP No. P.585

OPERATION MAPLE MOUNTAIN
LADY EVELYN LAKE SHEET

DISTRICTS OF NIPISSING, SUDBURY AND TIMISKAMING

Scale 1 inch to 1 mile

NTS Reference: 41 P/1, 41 P/8, 41 P/9
GSC Aeromagnetic Maps: 1503G, 1504G, 1505G

Adjoins Map No. P.584

ODM 4476, 4598

LEGEND
SMOOTHWATER LAKE SHEET AND LADY EVELYN LAKE SHEET

CENOZOIC
- RECENT
  - Stream, lake, and swamp deposits
- PLEISTOCENE
  - Glacial, glaciofluvial, and glaciolacustrine deposits

UNCONFORMITY

PRECAMBRIAN
PROTEROZOIC

LATE DIABASE INTRUSIONS
- 15 Diabase
- 15a Olivine diabase

INTRUSIVE CONTACT

GABBROIC INTRUSIONS[a]
- 14 Undifferentiated[b]
- 14a Pyroxene gabbro, diabase[b]
- 14b Hornblende gabbro, metagabbro[b]
- 14c Granophyre[b]
- 14d Epidote amphibolite

INTRUSIVE CONTACT

HURONIAN SUPERGROUP
COBALT GROUP

Bar River Formation
- 13 Undifferentiated
- 13a Sandstone

Gordon Lake Formation[a]
- 12 Undifferentiated
- 12a Sandstone
- 12b Argillite, siltstone
- 12c Chert, chert breccia

Lorrain Formation[a]
- 11 Undifferentiated
- 11a Green and grey micaceous pebbly sandstone
- 11b Feldspathic sandstone
- 11c White sandstone
- 11d Ferruginous sandstone
- 11e Argillaceous sandstone, greywacke
- 11f Conglomerate

Gowganda Formation[a]
- 10 Undifferentiated
- 10a Pebbly mudstone - polymictic paraconglomerate, greywacke or siltstone matrix
- 10b Polymictic paraconglomerate, greywacke or siltstone matrix
- 10c Sandstone, feldspathic sandstone, greywacke
- 10d Argillite, siltstone
- 10e Laminated argillite

QUIRKE LAKE GROUP[c]

Serpent Formation[a,c]
- 9 Undifferentiated
- 9a Sandstone
- 9b Argillite, siltstone

Espanola Formation[c]
- 8 Limestone, siltstone

Bruce Formation[a,c]
- 7 Undifferentiated
- 7a Polymictic conglomerate
- 7b Sandstone

HOUGH LAKE GROUP[c]

Mississagi Formation[a,c]
- 6 Undifferentiated
- 6a Sandstone
- 6b Argillite, siltstone
- 6c Polymictic conglomerate

UNCONFORMITY

ARCHEAN

EARLY MAFIC INTRUSIONS[c]
- 5 Gabbro, metagabbro, diabase

INTRUSIVE CONTACT

GRANITIC ROCKS[a]
- 4 Undifferentiated
- 4a Quartz monzonite, granodiorite
- 4b Porphyritic quartz monzonite, granodiorite

GNEISS, MIGMATITE[a,c]
- 3 Undifferentiated
- 3a Quartz-feldspar gneiss, migmatite
- 3b Mafic migmatite, agmatite

FELSIC METAVOLCANICS AND METASEDIMENTS[a]
- 2 Undifferentiated
- 2a Rhyolite, intermediate metavolcanics
- 2b Felsic tuff, breccia, agglomerate
- 2c Sandstone, argillite, conglomerate[d]
- 2d Felsic schist

MAFIC METAVOLCANICS[a]
- 1 Undifferentiated
- 1a Basalt, andesite
- 1b Amphibolite, amphibolite schist
- 1c Diabase

IF Iron formation

Breccia

a. The rocks of these units are subdivided lithologically and the order does not imply age relationship within the groups.
b. Nipissing-type
c. Not present on the Lady Evelyn Lake Sheet.
d. Timiskaming-type.

GEOLOGICAL AND MINING SYMBOLS

- Glacial striae.
- Esker.
- Small bedrock outcrop.
- Area of bedrock outcrop.
- Bedding, horizontal.
- Bedding, top unknown; (inclined, vertical).
- Bedding, top (arrow) from grain gradation; (inclined, vertical, overturned).
- Bedding, top (arrow) from cross bedding; (inclined, vertical, overturned).
- Gneissosity, (horizontal, inclined, vertical).
- Foliation; (horizontal, inclined, vertical).
- Lineation with plunge.
- Geological boundary, observed.
- Geological boundary, position interpreted.
- Geological boundary, deduced from geophysics.
- Fault; (observed, assumed).
- Lineament.
- Drag folds with plunge.
- Anticline, syncline, with plunge.
- Vein, vein network. Width in inches.
- Shaft.
- MA Magnetic attraction.
- RA Radioactivity.

MARGINAL NOTES

Location: The Lady Evelyn Lake area, located between Sudbury and Gowganda, is bounded by latitudes 47°03'45" and 47°35'45" and longitudes 80°00' and 80°30' an area of about 830 square miles. Points in the north and east are accessible by gravel road from Latchford on Highway 11, and by private lumber roads. Access to the interior is possible by float-equipped aircraft.

Mineral Exploration: Exploration has been carried out for silver, gold, and base metals, mainly in the northern part of the area. During 1969, a large group of claims along the Lady Evelyn River in Klock and Barr Townships was being explored for copper, zinc, and precious metals.

General Geology: The area is underlain by Precambrian rocks which are unconformably overlain by unconsolidated Cenozoic deposits of sand, gravel, and clay of glacial and glaciofluvial origin.

Precambrian rocks include metavolcanics and granite of Archean age, Huronian metasediments of Proterozoic age, and mafic intrusions of Proterozoic age. Metamorphosed basalt, andesite, rhyolite, and agglomerate, with lenses of iron formation, occur in the southeast where they are intruded by granitic rocks of quartz monzonite-granodiorite composition.

The Huronian metasediments are divisible into four lithostratigraphic units which are correlated with the Gowganda, Lorrain, Gordon Lake, and Bar River Formations.

The Gowganda Formation, 3,000 to 5,000 feet thick, is divisible into a lower sequence of pebbly mudstone, polymictic boulder conglomerate, sandstone, and argillite, and an upper sequence of laminated argillite, siltstone, and minor sandstone and conglomerate. Rapid variations in thickness and the presence of basal rubble indicates the Gowganda was deposited on an irregular topographic surface, probably formed by horst and graben faulting.

The Lorrain Formation, which conformably overlies the Gowganda, is apparently 5,000 feet thick and is divisible into several lithologic members. The basal member is a few hundred to possibly a thousand feet thick and consists of subgreywacke, protoquartzite, greywacke, and arkose. Above is a thick unit of coarse-grained, green micaceous sandstone which contains scattered quartz pebbles and lenses of quartz-pebble conglomerate. The succeeding member consists of feldspathic, hematitic, and white micaceous sandstones which commonly contain kaolinite. The upper member comprises a few hundred feet of thin-bedded, fine-grained, hematitic orthoquartzite.

Rocks of the Gordon Lake Formation conformably overlie the Lorrain and include approximately 1,000 feet of interbedded fine-grained sandstone, green argillite, chert, and chert breccia.

The Bar River Formation, the uppermost sedimentary unit, is at least 1,000 feet thick, and consists of fine- to medium-grained pink and white orthoquartzite.

The Huronian metasediments are dominantly clastic, and display features such as crossbedding, graded bedding, ripple marks, laminated bedding, and slump structures indicative of deposition under shallow water conditions, probably by fluviatile processes in a deltaic environment. The Gowganda Formation is possibly of glacial or marine glacial origin. Crossbedding studies show that the main depositional currents flowed from north to south.

Nipissing Diabase bodies dated at 2,150 million years (Fairbairn, H.W., et al. 1969) and late olivine diabase dikes dated at 1,200 million years (Van Schmus 1965), inturde the older rocks. The Nipissing Diabase intrusions, which consist of pyroxene and hornblende gabbro with minor granophyre, are commonly in the form of basins and dome whose contacts are transgressive toward the structural-stratigraphic trends in the country rocks.

Structural Geology: The chief structural feature of the area, the main Huronian depositional basin, was probably formed in part by faulting.

There are two main fault systems, one striking northwest, the other northeast. These are probably steeply-dipping normal faults and vertical movement on them has produced a system of horsts and grabens which controlled deposition of the Huronian sediments. They may also have controlled emplacemen of the Nipissing Diabase to some extent. In addition to the early fault movements, there have been post-Huronian, post-Nipissing, and post-olivine diabase movements as well.

The major folds are open dome and basin structures with low, variable axial plunges. Orientation of fold axes is variable, but three main trends, N70W, N55E, and north-south to northwest, are discernible. Cleavages approximately parallel to the major fold axes are sporadically present. Intensity of folding was low throughout the area. Apparently the north-south trending fold set is older than the east-west sets.

Metamorphism: The Archean metavolcanics have mineral assemblages characteristic of the almandine amphibolite facies of regional metamorphism and in part have been granitized and are migmatitic. The Huronian rocks and Nipissing Diabase are weakly metamorphosed and have compositions charactaristic of the green-schist facies (chlorite grade).

Economic Geology: Most of the sulphide mineral occurrences are associated with Nipissing Diabase intrusions. In Whitson, Van Nostrand, Speight, and Delhi Townships lead and silver mineralization occur in quartz-carbonate veins filling fractures in and near bodies of diabase. The main minerals are galena, native silver, and Co-Ni-Fe arsenides. In Cynthia and Barr Townships, copper, with minor amounts of lead, zinc, and minor to trace amounts of nickel, cobalt, gold, and silver occur in quartz-carbonate veins associated with the diabase, and as disseminations in the altered diabase. Sulphide mineralization, mainly pyrite, chalcopyrite, galena, and sphalerite, is most common in metamorphosed diabases which contain appreciable amounts of granophyre.

Part of the Kokoko Lake iron formation is exposed around Ferrim Lake in Cynthia Township. Trenching and diamond drilling by Dominion Gulf Company in this area indicates the magnetite-jasper-chert iron formation is 300 to 1,000 feet thick and grades 25 to 40 percent iron over widths of 500 feet (Dominion Gulf Ltd., Kokoko Lake, Chambers and Cynthia Townships. Ontario Department of Mines Assessment File, Resident Geologist's Office, Kirkland Lake).

References:

Fairbairn, H.W., Hurley, P.M., Card, K.D., and Knight, C.J. 1969: Correlation of radiometric ages of Nipissing diabase and Huronian metasediments with Proterozoic orogenic events in Ontario; Canadian Jour. Earth Sci., Vol. 6, p.489-497.

Van Schmus, R. 1965: The geochronology of the Blind River Bruce Mines area, Ontario, Canada; Jour. Geol. Vol. 73, p.755-780.

METAL AND MINERAL REFERENCE
FOR P.584 AND P.585

Ag .....Silver	Ni .....Nickel
Au .....Gold	Pb .....Lead
Co .....Cobalt	py .....Pyrite
cp .....Chalcopyrite	q.c.v. ....Quartz-carbonate vein
Cu .....Copper	q.v. .....Quartz vein
c.v. .....Carbonate vein	S .....Sulphides
ery .....Erythrite	sp .....Sphalerite
Fe .....Iron	U .....Uranium
gal .....Galena	Zn .....Zinc
nc .....Niccolite	

LIST OF MINERAL OCCURRENCES

No.	Name	Township	Metal
1.	Argentium Silver Mines Ltd.	Van Nostrand	Ag, Co
2.	Argentium Silver Mines Ltd. (White Reserve Mine)	Whitson	Ag, Co
3.	Argentium Silver Mines Ltd.	Speight	Ag, Cu
4.	Armstrong, W.S. (Estate)	Speight	Ag, Co
5.	Barter Lake	Cole	sulphide
6.	Coppersand Lake	Cynthia	Cu
7.	King, Henry	Speight	Ag, Co
8.	Kokoko Lake	Cynthia	Fe
9.	Lady Evelyn Lake	Leo	sulphide
10.	Lady Evelyn River	Barr	Cu, Zn
11.	Moore, William	Speight	Ag, Co
12.	New Delhi Mines Ltd.	Delhi	Ag, Pb
13.	Sucker Gut Lake	Leo	sulphide
14.	Walton, Harold A. (Bradley Donaldson Mine)	Auld	Ag
15.	Welsh, Beatrice M. (Triangle Mine)	Auld	Ag

SOURCES OF INFORMATION

Geology of Speight (Map P.573), Auld (Map P.579), Whitson (Map P.580), and Van Nostrand (Map P.566) Townships by W.H. McIlwaine, 1969.
Geology of Seagram (Map P.570) and part of Clary Townships by H.D. Meyn, 1969.
Geology of the remaining townships by K.D. Card, 1969.
Ontario Dept. Mines Map 35c, Anima-Nipissing Lake area, 1926.
Ontario Dept. Mines Map 1954-1, Township of Delhi, 1954.
Ontario Dept. Mines Map 2057, Northwestern Timagami area, 1964.
Ontario Dept. Mines Map P.301, Maple Mountain Sheet, 1965.
Geol. Surv. Canada Map 179A, Onaping, 1917.
Maps and plans of mining companies.
Geol. Surv. Canada, Aeromagnetic maps 1503G, Obabika Lake, and 1504G, Lady Evelyn Lake.
Base map derived from maps of Forest Resources Inventory, Ontario Department of Lands and Forests.
Magnetic declination approximately 10°30'W, 1969.

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