GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 42 M

LEGEND

PALAEOZOIC

SILURIAN
LOWER SILURIAN
MEDINA GROUP

14	SEVERN RIVER FORMATION: light grey to buff, very finely-crystalline dolomite, fine- to medium-grained dolomitic sandstone

ORDOVICIAN
UPPER ORDOVICIAN
RICHMOND GROUP

13	Dolomite, limestone, sandstone

ARCHAEAN

12	Undivided 8-11, based almost entirely on aeromagnetic data
11	Massive, fine-grained to pegmatitic, pink granite, quartz monzonite, and granodiorite; minor syenite, monzonite, syenodiorite, quartz diorite, aplite, pegmatite
10	Massive, fine-grained to pegmatitic, white to grey, quartz monzonite, granodiorite, quartz diorite; minor granite, syenodiorite, diorite
9	9a, porphyritic quartz monzonite, granodiorite, granite, quartz diorite; augen gneiss; 9b, aphanitic to fine-grained grey quartz, feldspar, quartz-feldspar porphyry
8	Foliated, fine- to coarse-grained, white to grey granodiorite, quartz monzonite, quartz diorite; minor granite, syenodiorite, diorite
7 / 7	7a, gabbro, quartz gabbro, olivine gabbro, anorthositic gabbro, derived amphibolites; minor diorite, quartz diorite; 7b, hornblendite, garnetiferous hornblendite, pyroxenite, undifferentiated ultrabasic rocks; 7c, aphanitic to medium-grained diabase, possibly Proterozoic in part
6	Migmatite, mixed rocks; mainly quartz-biotite-feldspar gneisses
5	Undivided 1-4, based almost entirely on aeromagnetic data; 5a, undivided 1 and 3
4	Very fine- to medium-grained grey banded iron-formation; 4a, interpreted as underlying Palaeozoic strata, from aeromagnetic data
3	Phyllite; quartz-biotite-plagioclase (oligoclase-andesine) schists and gneisses, some garnetiferous; quartz latite, dacite, and associated pyroclastic rocks, conglomerate; minor staurolite schists, quartzite, interbedded basalt and amphibolite; 3a, mainly conglomerate; 3b, mainly quartz latite, dacite and associated pyroclastic rocks; 3c, amphibolite
2	Aphanitic to fine-grained light green to black, andesite, basalt, derived amphibolites; minor tuff, agglomerate, gabbro sills and dykes, quartzite, calcareous argillite
1	Phyllite; quartz-biotite-plagioclase schists and gneisses, some garnetiferous; quartz latite, dacite, and associated pyroclastic rocks; quartzite; minor staurolite- and sillimanite-bearing schists; interbedded basalt and amphibolite

Notes: Units 1-12 not necessarily in chronological order.

$\frac{13}{5}$ and $\frac{14}{5}$ indicates extension of Precambrian rocks (5) under Palaeozoic rocks based on aeromagnetic information

Drift-covered area, little or no outcrop
Sand
Geological boundary (approximate or assumed)
Geological boundary interpreted under drift-covered areas from aeromagnetic data
Bedding, tops known (inclined, vertical, overturned, p indicates pillow determination) . . . 90 p
Bedding, tops unknown (inclined, vertical)
Gneissosity, schistosity (inclined, vertical, dip unknown)
Lineation (direction and amount of plunge) . . . 47
Drag-fold in gneissosity (arrow indicates direction of plunge)
Lineament (from air photographs)
Fault (assumed)
Joints (inclined, vertical)
Glacial striae (direction of ice-movement shown, not known)
Small moraine
Drumlin, drumlinoid ridge
Esker, esker-like ridge
Raised beaches
Fossil locality . . . Ⓕ
Mineral occurrence . . . Au ✕
Potassium-Argon age (million years) . . . 2460 M.Y.●

MINERALS

Arsenopyrite	asp	Pyrite	py
Chalcopyrite	cp	Pyrrhotite	po
Galena	gn	Silver	Ag
Gold	Au	Sphalerite	sp
Magnetite	mag	Sulphides	s
Nickel	Ni	Tungsten	W

Geology by G. D. Jackson, 1961

Cartography by the Geological Survey of Canada, 1962

Mean magnetic declination, 4° 19' West, decreasing 2.8' annually. Readings vary from 2° 11'W in the SW corner to 6° 00'W in the NE corner of the map-area

PUBLISHED, 1962
COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA

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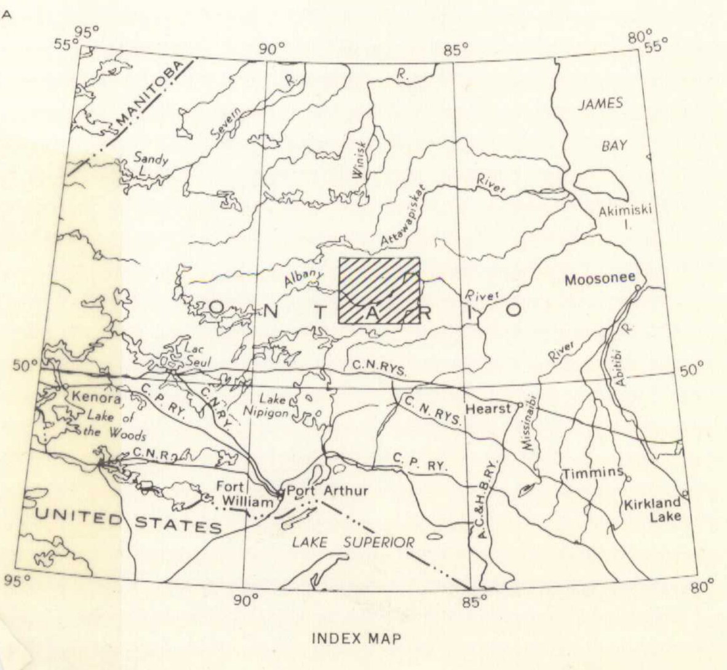

INDEX MAP

MAP 6-1962
GEOLOGY
FORT HOPE
ONTARIO

Scale: One Inch to Four Miles = $\frac{1}{253,440}$

Miles 4 2 0 4 8 12

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa

LEGEND

Winter road
Portage
Building
Wireless station
District boundary
Indian Reserve boundary
Fall and rapid
Marsh
Height in feet above mean sea-level . . . 878'

Base-map by the Surveys and Mapping Branch, 1952

DESCRIPTIVE NOTES

The map-area is best reached by float plane from Nakina or Armstrong, respectively 80 miles south and 95 miles southwest of Makokibatan Lake. Principal drainage in the area is by the Albany River system which flows eastward to James Bay.

Glacial striae indicate that the earliest recorded ice-movement was toward the southeast, but most of the glacial features now present were formed by ice moving south to southwest. During a third movement, possibly the latest, ice crossed the eastern part of the area in a westerly direction.

The area is largely mantled by a pebbly to bouldery clay till which, in many places, is overlain by sand and clay. Varved silts and clays are exposed along the north shore of Makokibatan Lake, on Gourlie Creek 7 miles above its mouth, and on Albany River 3 miles above Kagiami Falls. Prominent raised beaches occur between Gifford and Armatta Lakes, and about 6 miles northwest of Harvey Lake.

Rocks of units 1 and 3 are similar, although unit 1 contains a larger proportion of sedimentary rocks and a higher ratio of pyroclastic to volcanic rocks. The acidic flows of both units are grey on the fresh surface and commonly weather white to buff. Some contain pillow-like structures up to 2 feet long. Staurolite-bearing schists were seen in several places. At the north end of Eabamet Lake staurolite is associated with kyanite, and north of Makokibatan Lake it occurs with andalusite and graphite. Sillimanite is present in the Triangular Lake - Eabamet River area and at the junction of Wabassi and Ogoki Rivers. Conglomerate (3a) at the base of unit 3 north of Makokibatan Lake contains pebbles, cobbles, and boulders of syenodiorite, granodiorite, granite, and amphibolite. Granodiorite boulders up to 4½ feet long are present in a conglomerate bed on the north side of Makokibatan Lake. The amphibolites interbedded in units 1 and 3 (e.g. 3c) are probably meta-basalts. Cut-and-fill structures and structures resembling mud-cracks were seen in metasedimentary rocks of unit 3 north of Makokibatan Lake.

Minor bands of pyroclastic and sedimentary rocks, up to 40 feet or more in thickness, are interbedded with the andesite and basalt flows of unit 2. Pillows in the flows are commonly stretched and sheared, some being 8 feet or more in length. Along the south shore of Washi Lake units 2 and 3 are interbedded at the contact.

Though aeromagnetic data[2] indicate that sedimentary iron-formation bands (4) are present under the drift in several places, only three outcrops containing iron-formation were seen. In these it is lean, consists of interlaminated bands of quartz- and quartz-amphibole-magnetite, and has a maximum observed thickness of 4 feet. Of the three occurrences seen, one is a large inclusion in granite at the east end of Ingle Lake, and the other two are bands in volcanic rocks of unit 2, a mile southwest of Hector Lake and a mile southwest of Norton Lake. All other iron-formation shown is interpreted from aeromagnetic information[2].

Some of the gneisses along Colpitts Creek assigned to unit 5a are composed mainly of biotite and oligoclase, and may be of igneous origin.

Mixed rocks (6) are associated mainly with units 8 and 10, and two types predominate. Most of the unit is composed of well-banded gneisses that are probably true migmatites. These lit-par-lit gneisses are commonly contorted and associated with ptygmatic folding and veined gneisses. Inclusions of more mafic gneisses and amphibolites, granitized to various degrees, are abundant. In the southwest corner of the area, angular inclusions of amphibolite, and minor hornblendite and pyroxenite, are contained in a granodiorite matrix. These inclusions comprise a large part of the rock, some being more than 1,000 feet long.

Aphanitic to coarse-grained, intermediate to ultrabasic rocks (7) occur as sills, dykes, plugs, and irregular bodies throughout the area. They may be greyish green, greenish black or dark grey in colour. Sill-like bodies of dioritic to gabbroic composition (7a) are especially abundant in the Washi Lake - Kagiami Falls area, and along the north side of Washi Lake they comprise more than 50% of the rock. Some of the gabbro and diabase in the Washi Lake area contains feldspar phenocrysts up to 4 inches across. A small mass of anorthositic gabbro immediately north of the east end of Washi Lake contains olivine and clinopyroxene crystals, about which coronas of cummingtonite-grunerite and green biotite with minor blue-green hornblende have been developed. Rocks of ultrabasic composition (7b), largely hornblendites, are most abundant in the Eabamet Lake - Kagiami Falls volcanic-sedimentary belt.

A swarm of relatively-fresh-looking diabase dykes have intruded all Precambrian rocks in the area except possibly units 7a and 7b. In some places these dykes grade into a rock containing abundant pink feldspar, and south of Washi Lake one diabase dyke is cut by pink granitic veinlets. These diabase dykes are most abundant in the south-central part of the area. Most of them have a northwesterly strike, but a few trend almost at right angles to this.

Unit 8 is dominant in the southern part of the area. The degree of foliation varies greatly, and commonly it is visible on the fresh and weathered surfaces. Mafic-rich inclusions are common but not abundant. Much of the granodiorite along the south shore of Makokibatan Lake appears to have been derived from rocks of unit 3.

Porphyritic varieties of units 8, 10, and 11 are included in unit 9a. Phenocrysts of potash feldspar up to 3½ feet long were observed in pink granite north of Martin Falls. Most of the porphyritic rocks are composed of quartz monzonite and granodiorite, and the phenocrysts are mainly oligoclase with minor quartz. Granophyric and graphic intergrowths are common in units 9a, 10, and 11. Quartz- and/or feldspar-porphyry dykes intrude units 1-3, and 8.

Unit 10 is more closely associated with unit 8 than unit 11. The mafic content seems to be slightly less than that of unit 8, but is decidedly greater than that of unit 11. Dykes and sills of quartz monzonite and granodiorite intrude the sedimentary and volcanic rocks. Traces of allanite are present at one locality in the southwest corner of the area.

Massive pink granitic rocks (11) in general are the youngest granitic rocks, and at one locality may be even younger than the relatively late diabase dykes. As in unit 10 an indistinct foliation may be present locally.

Fossils collected from Palaeozoic strata (14) along the Albany River were not diagnostic. Observed strata are almost flat lying and the dolomitic sandstone is composed largely of rounded to well-rounded frosted quartz grains. No outcrops of unit 13 were found. Contacts of units 13 and 14 are modified slightly from those described in a previous publication[3]. From information obtained elsewhere the contact between units 13 and 14 is believed to represent an erosion interval.

Units 1-5 are isoclinally folded thoughout the area, and generally occupy synclinal structures. Some of the daibase dykes between Makokibatan Lake and Kagiami Falls have been deformed and faulted, indicating that locally at least, there has been deformation subsequent to the emplacement of these dykes. Intense shearing and calcification of the volcanic rocks in the Pioneer Lake area, together with the subsidiary faults indicated by shearing and topographic breaks, suggests that a large east-west fault probably extends through this area. Mineral assemblages in the various rock types in general are representative of the almandine amphibolite facies of regional metamorphism.

One of the more promising economic prospects in the area at present is the gold showing on the north side of Reserve Lake. It is being investigated by Little Long Lac Gold Mines Limited, and the country rock has the composition of a dacite. Sulphide mineralization seems to be more abundant in the Eabamet Lake - Kagiami Falls sedimentary-volcanic belt than elsewhere in the area.

The writer is grateful for the cooperation, assistance, and hospitality of officers and representatives of Little Long Lac Gold Mines Limited, Lun-Echo Gold Mines Limited, G. Le Liever and Feeley and McDermott, Oliver Iron Mines Limited, Ventures Limited, and Pickands Mather and Company—all of whom were active in the area during the past summer.

[1] Burwash, E. M.: Geology of the Fort Hope Gold Area; Ont. Dept. Mines, Ann. Rept. 1929, vol. 38, pt. 2 (1930).
[2] Geol. Surv., Canada and Ont. Dept. Mines: Aeromagnetic Maps, Nos. 972G-975G, 982G-985G, 992G-995G, 1002G-1005G (1960).
[3] Martison, N. W., et al.: Petroleum Possibilities of the James Bay Lowland Area; Ont. Dept. Mines, Ann. Rept. 1952, vol. 61, pt. 6 (1953).
[4] Prest, V. K.: Geology of the Fort Hope Area; Ont. Dept. Mines, Ann. Rept. 1942, vol. 51, pt. 3 (1944).
[5] Prest, V. K.: Geology of the Eastern Extension of the Fort Hope Area; Ont. Dept. Mines, Ann. Rept. 1942, vol. 51, pt. 3 (1944).

MAP 6-1962
FORT HOPE
ONTARIO
SHEET 42 M