GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 53E

LEGEND

PRECAMBRIAN

- 10 Diabase, gabbro
- 9 Pegmatite; aplite; muscovite granite
- 8 Granite, granodiorite, quartz monzonite, and allied rocks; minor syenite and quartz-diorite; includes areas of 5 and 6
- 7 Peridotite, pyroxenite, serpentinite and minor serpentinized volcanic rocks; 7a, minor gabbro and diorite; (probably older than 3, 4)
- 6 Granite-gneiss and inclusions of 1 and 2
- 5 Mixed gneisses: hybrid gneiss; lit-par-lit gneiss; migmatite; intimate mixtures of sedimentary, volcanic, and granitic material
- ISLAND LAKE SERIES (3, 4)
- 4 Arkose, arkosic quartzite
- 3 Conglomerate
- HAYES RIVER GROUP (1, 2)
- 2 Greywacke, arkose, argillite, quartzite, slate, conglomerate, and iron-formation; derived schists; may include some 3 and 4
- 1 Basalt, andesite, dacite; greenstone; minor rhyolite, trachyte, chert, iron-formation, jasper, jaspilite, tuff, and agglomerate; 1a, minor amphibolite and hornblende-plagioclase gneiss; may include some 2 and 5

Rock outcrops observed and interpreted from aircraft . . . AIR
Geological boundary (defined, approximate or assumed)
Bedding (inclined, vertical, overturned)
Bedding (dip known, top unknown)
Bedding (top known, dip unknown)
Gneissosity (inclined, vertical, dip unknown)
Lineation (inclined)
Lineament (from air photographs)
Fault (defined, approximate, assumed)
Anticline (approximate)
Syncline (defined, approximate)
Glacial striae (direction of ice-movement known)
Drift ridge (direction of ice-movement known)
Esker
Glacial lake beaches
Mineral zone
Magnetic attraction . . . M
Carbonate and carbonatized rocks . . . C
Mineral occurrence . . . X Ni
Shaft

MINERAL SYMBOLS

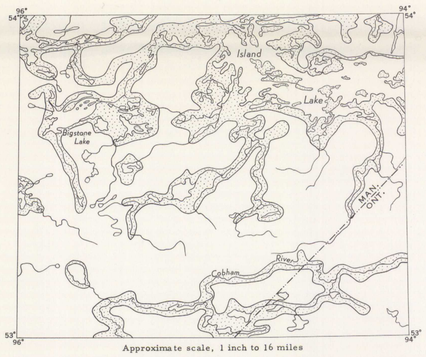
Antimony	Sb	Nickel	Ni
Asbestos	asb	Pyrite	py
Chalcopyrite	cp	Pyrrhotite	po
Cobalt	Co	Quartz	q
Copper	Cu	Silver	Ag
Gold	Au	Sulphides	s
Iron-formation	if	Tantalite-columbite	ta-cb
Lead	Pb	Tourmaline	tl
		Zinc	Zn

Geology by H.A. Quinn, 1956

Winter road
Portage
Building
Interprovincial boundary
Indian reserve boundary
Falls and rapids
Marsh
Reef
Height in feet above mean sea-level . . . 747

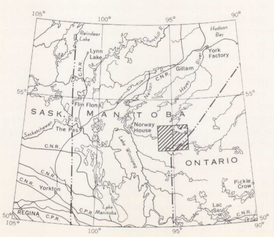
Cartography by the Geological Survey of Canada, 1960

Approximate magnetic declination, 6° 48' East



Approximate scale, 1 inch to 16 miles

Areas covered by canoe and ground traverses



INDEX MAP

MAP 26-1960
GEOLOGY
ISLAND LAKE
MANITOBA-ONTARIO

Scale: One Inch to Four Miles = 1/253,440
Miles
4 2 0 4 8 12

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

In response to public demand for earlier publication, Preliminary Series maps are issued in this simplified form and will be clearer to read if all or some of the map-units are hand-coloured

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

Geographical names subject to revision

DESCRIPTIVE NOTES

The area is most conveniently reached by aircraft from Norway House, Wabowden, Ilford, and Lac du Bonnet, Manitoba and from Red Lake, Ontario.

Glacial striae, polish, grooves, roches moutonnées, and rare drift ridges indicate that the last ice-advance was southwesterly. The ice left a widespread, rather thin mantle of glacial till, but outcrops are generally abundant except along Banksian River and in some of the large swamp and muskeg areas about Hudwin Lake. Relief is generally low, rarely exceeding 150 feet.

The Hayes River group[5] is a complex of volcanic and sedimentary rocks (1 and 2) of Archaean age. The volcanic rocks (1) consist mainly of andesite and dacite flows. Locally, especially where the belts of volcanic rocks are thin, they consist of more metamorphosed rocks (1a) and may grade into hybrid gneiss (5). Along shear zones, volcanic rocks have been altered to schists containing much carbonate, chlorite, sericite, serpentine, tremolite and/or actinolite. Most of the sedimentary rocks (2) lie stratigraphically above the volcanic rocks (1), but some are interbedded with them. The conglomerate occurs in lenticular beds up to 35 feet thick and several miles long. Its matrix is commonly greywacke. The greywacke of the Azure Lake belt has locally been replaced extensively by calcite. Much of the sedimentary rock (2) in Cochrane Bay may be equivalent in age to the Island Lake series.

The Island Lake series overlies the Hayes River group disconformably. These younger, coarse, clastic sedimentary rocks consist of a basal conglomerate (3), about 60% of the series, which grades upward into arkose and arkosic quartzite (4). At Sinclair Island the conglomerate has a maximum calculated thickness of 6,000 feet. Primary structures are prolific in the arkose, notably near its top where the beds are thinner and less massive. These structures include graded bedding, crossbedding, scour and fill, ripple-marks, and compaction deformation.

The mixed gneisses (5) are intermediate in overall composition between the older rocks (1-4) and the granitic rocks (6, 8, 9). They consist mainly of paragneiss, hornblende-plagioclase gneiss, amphibolite, and schist containing between 25 and 75% granite-gneiss (6), granite (8), or pegmatite (9).

The granite-gneiss (6) varies in composition, colour and grain size and commonly contains remnants of the older rocks (1-5). As the latter increase in quantity the granite-gneiss grades into hybrid gneiss (5).

The basic to ultrabasic intrusive rocks (7) occur mainly as sills in or adjacent to the volcanic rocks (1). Although most are less than 200 feet wide one sill has a width of more than 1,000 feet. The most common of these rocks is a series of persistent sills of peridotite, pyroxenite, and serpentinite in the Island Lake belt of Hayes River rocks. Outcrops of these soft and easily eroded rocks are rare. In Island Lake they outcrop mainly on small reefs, points of islands, and in narrow, low, linear depressions. The weathered surfaces of the ultrabasic rocks are commonly brownish coloured, with a rough surface, and a rather characteristic polygonal fracture-pattern. Some sills contain substantial nickel. The sills and dykes of gabbro and diorite (7a) associated with units 1 and 2 are commonly massive, medium to coarse grained, and contain small amounts of disseminated sulphide.

Unit 8 includes many varieties of granitic rocks, the most abundant being massive, medium- to coarse-grained, light grey and pink granites. Pink biotite granite intrudes grey biotite granite and grey hornblende granite, and the latter intrudes granodiorite.

Dykes and sills of red pegmatite and aplite (9) are common throughout the area. Most of them consist of quartz and red microcline with smaller amounts of muscovite, biotite, and magnetite. A white pegmatite, in which the feldspar is albite, intrudes paragneiss on the north shore of Gorman Lake. This dyke contains tourmaline, molybdenite, tantalite-columbite, pyrite, and chalcopyrite. A body of massive, medium-grained, white muscovite granite occurs about 5 miles south of the eastern part of Stevenson Lake.

Northerly trending late basic dykes (10), up to 500 feet wide, of fresh massive diabase and gabbro, are fairly common in the northern part of the area. None was found in rocks of the Island Lake series (3, 4).

The three main easterly trending belts of layered rocks are, from north to south, the Island Lake belt, the Bigstone Lake - Wapus Bay belt, and the Azure Lake belt. All appear to be synclines or remnants of synclines. In the eastern part of Island Lake the major structure is a doubly plunging syncline with the disconformable Island Lake series in its central part. Outside the borders of this syncline, and to the west, the Hayes River rocks pass into isoclinal folds. Cross-folds, with associated drag-folds, are common in the eastern and western parts of Island Lake.

Major strike faults occur along a westerly trending zone that extends from Island Lake across the entire northern part of the area, a distance of some 80 miles. The Island Lake fault zone probably also contains major thrust faults. It has a steep dip and is marked by linear topographic depressions, strongly foliated schists, tabular bodies of sheared, serpentinized ultrabasic rocks (7), serpentinized volcanic rocks, and abundant occurrences of both base and precious metals. Cross-faults trending north to north-northeast occur at Island Lake. Most show small, right-hand displacement.

Base and precious metals occur in all three of the main easterly trending belts of layered rocks. The most favourable prospecting ground, however, is probably along and near the Island Lake fault zone. The volcanic, sedimentary, and ultrabasic rocks there have been sheared, drag-folded, carbonatized, sericitized, and chloritized, and they contain appreciable amounts of millerite, pentlandite, pyrrhotite (some nickeliferous), chalcopyrite, gold, silver, pyrite, galena, sphalerite, asbestos, and magnetite.

High-grade gold ore was discovered in 1931 by Tom Wass on an islet about a mile west of Heart Island. Island Lake Mines Ltd. sank a shaft 271 feet and a 50-ton mill began producing in April 1934. To the end of that year 6,984 tons of ore was milled, from which 4,288 ounces of gold was recovered— an average of 0.61 ounce per ton. The mine ceased production in March 1935.

About 1934 R. Jowsey and associates sank a 50-foot shaft and did some drifting on a gold-bearing quartz vein about 2½ miles east of Deer Rapid, just east of Stevenson Lake.

In 1937 Ministik Lake Gold Mines Ltd. sank a shaft 235 feet deep on an auriferous quartz vein on the south shore of High Rock Island.

In 1947 and 1948 San Antonio Gold Mines Ltd. staked and explored 108 mining claims at Bigstone Lake. Visible gold was found in several quartz veins but no ore shoots were proven by 7,200 feet of diamond-drilling.

Gold occurs in a quartz vein about 30 inches wide, in hybrid gneisses about 6 miles southeast of Varveclay Lake. The quartz contains fine- to coarse-grained galena and pyrite, with smaller amounts of fine-grained pyrrhotite and chalcopyrite.

In 1953 Sand River Gold Mining Company Limited explored a group of 51 mining claims at Knight Lake. Only small amounts of nickel and copper were found.

In January 1956 two groups of 67 mining claims in the western part of Island Lake were optioned by the Canadian Nickel Company from the Rex Island Mining Syndicate (Tom Wass and associates). These long, narrow, southeasterly trending groups of claims cover discoveries of nickel made by Wass, mainly in ultrabasic sills of similar trend. An aeromagnetic Survey in April 1956 showed many anomalies at Island Lake and led to the immediate staking of a few hundred additional claims there by the Canadian Nickel Company. The company began diamond-drill exploration of its optioned claims and of the magnetic anomalies early in 1956 and has continued this work for 4 years. It is reported to have disclosed a body of low-grade copper-nickel ore about 200 feet north of Rat Portage on Linklater Island. The orebody is said to be about 200 feet wide, 10,000 feet long and indicated by diamond-drilling to a depth of 2,000 feet. It trends southeasterly across Linklater Island along the Island Lake fault zone. It consists mainly of disseminated millerite, pentlandite, nickeliferous pyrrhotite, pyrite, chalcopyrite, and magnetite, in a sheared, serpentinized sill of peridotite and adjacent highly altered volcanic and sedimentary rocks of the Hayes River group.

In the eastern part of Island Lake a sill of peridotite was discovered in 1956 on a reef about 1 1/4 miles north of Loonfoot Island. A selected sample of its contained sulphides assayed 0.72% nickel and 0.02% cobalt.

RELATED PUBLICATIONS

[1]Derry, D.R., and MacKenzie, G.S.: Geology of the Ontario Boundary (12th Base Line to Latitude 54); Ont. Dept. Mines, Ann. Rept. 1931, vol.40, pt.2, pp.1-20.

[2]McIntosh, R.T.: Bigstone Lake Area, Manitoba; Dept. Mines Nat. Resources, Manitoba, Geol. Rept. 38-1, pp.5-12, 1941.

[3]McMurchy, R.C.: Geology of the Island Lake Area, Manitoba; Precambrian, vol.17, No.9, pp.4-9, 17, 1944.

[4]Quinn, H.A., and Meinert, R.J.: The Island Lake Series, Island Lake, Manitoba; Precambrian, vol.32, No.4, pp.15-22, 24-25, 34, 1959.

[5]Wright, J.F.: Island Lake Area, Manitoba; Geol. Surv., Canada, Sum. Rept. 1927, pt.B, pp.54-80, 1928, (Map 211A reissued 1935).

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