GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 53 L

LEGEND

ARCHAEAN OR PROTEROZOIC

10	Gabbro and lamprophyre dykes
9	Massive and foliated granitoid rocks, with inclusions of 1, 7, and 8; minor aplite and pegmatite sills and dykes
8	Hybrid gneisses; lit-par-lit gneisses, migmatite
7	Amphibolite, hornblende meta-gabbro
6	OXFORD GROUP (5, 6) (ISLAND LAKE GROUP ?) Greywacke; arkose, quartzite, slaty metasediments; 6a, type areas of Oxford group rocks; 6b, metamorphosed equivalents, largely micaceous schists; in part identical with 3
5	Conglomerate; minor interbedded micaceous quartzite

ARCHAEAN

4	HAYES RIVER GROUP (2-4) Altered basic and ultrabasic rocks; serpentinite, peridotite and pyroxenite sills, olivine gabbro
3	Mostly pyroclastic rocks; tuff, agglomerate, volcanic breccia; greywacke and slaty metasediments; minor iron-formation; minor flows; locally identical to 6
2	Greenstone; massive andesitic and basaltic flows, pillow lavas; subordinate dacite and pyroclastic rocks; 2b, hornblende schist
1	Fine- to medium-grained, white, biotite granodiorite-gneiss

Geological boundary (approximate, assumed)
Limit of geological mapping
Strike and dip (dip and tops known, overturned)
Gneissosity, schistosity, foliation (inclined, vertical, dip unknown)
Lineament (from air photographs), represents jointing in granitic rocks for the most part
Fault (assumed)
Anticline (approximate)
Syncline (approximate)
Glacial striae (direction of ice-movement known)
Mineral occurrence (asbestos, asb; copper, Cu; gold, Au; iron-formation, Fe; spodumene, spd) . . . ×Au

Geology by J. F. Wright, 1931, and H. A. Quinn, 1956

Geological compilation and marginal notes by K. L. Currie, 1961

Cartography by the Geological Survey of Canada, 1961

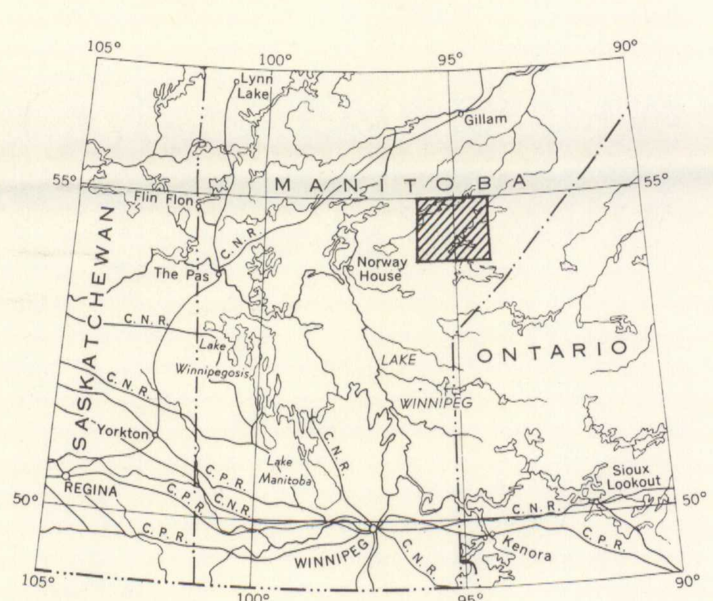
Winter road
Portage
Surveyed line
Indian Reserve boundary
Electric power line
Fall or rapid
Marsh
Height in feet above mean sea-level

Base-map prepared by the Surveys and Mapping Branch, 1951

Approximate magnetic declination, 7° 01' East

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



INDEX MAP

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PRINTED BY THE SURVEYS AND MAPPING BRANCH

MAP 21-1961

GEOLOGY

OXFORD HOUSE

MANITOBA

Scale: One Inch to Four Miles = 1/253,440

Miles

4 2 0 4 8 12

DESCRIPTIVE NOTES

The area may be reached by chartered aircraft from Ilford or Norway House. A winter road from Ilford runs to Oxford House and Gods Lake. Well-used canoe routes exist on Hayes River, Island Lake River, and several others. Outcrops are abundant along the major rivers and lakes. The latest glacial striae trend S25° W.

Wright[1,2] outlined the principal features of the geology. His conclusions have been modified but not essentially altered by Dix[3], Quinn, and Barry[4,5]. The oldest rocks are white or grey quartz-biotite-feldspar gneisses (1), composed of strongly foliated quartz-feldspar fabrics with disseminated biotite. The composition of the rocks is generally granodioritic, but considerable variations occur. Locally, bands of amphibolite and biotite schist comprise up to 15% of the rock. Bluish quartz 'eyes' about 1/4 inch long occur in places.

The lower part of the Hayes River group (2) consists of massive, fine-grained, chlorite-rich greenstones, with numerous flows of pillow lava. The massive flows show prominent jointing. Considerable flinty grey dacite occurs at the north end of Knee Lake. Amygdaloidal and porphyritic flows outcrop around Oxford Lake. Hornblende-plagioclase schists (2b), oocurring at various places in the map-area, have been grouped with the lavas, with which they show marked similarities in composition and mode of occurrence. On air photographs, the lower boundary of the greenstones is commonly marked by a curving linear feature.

The upper part of the flows (2) is interbedded with pyroclastic and sedimentary rocks (3). Flows are rare in the upper part of the Hayes River group. The pyroclastic rocks consist of tuffs, volcanic breccias, and lesser amounts of agglomerate. Welded tuffs and crystal tuffs occur around the west end of Oxford Lake. The tuff and agglomerate commonly show bedding. Small boulders of granite-gneiss are found in the agglomerate, suggesting that it grades to conglomerate. The sedimentary rocks consisting of greywacke and slaty green argillite, make up about 10% of the unit. They are interbedded with the tuffs and increase in amount toward the top of the Hayes River group. At the top they probably comprise 60% of this unit. Distinction between argillite, tuff, and sheared greenstone is commonly exceedingly difficult.

Ultrabasic rocks (4) occur as small dykes and sills, exclusively associated with the Hayes River group. They consist of coarse, moderately serpentinized peridotite and pyroxenite grading to olivine gabbro. No bodies more than a mile long are known. Small amounts of harsh asbestos occur in sills on the north shore of Knee Lake.

The nonconformity separating the Hayes River (2-4) and Oxford (5, 6) groups is exposed south of Carghill Island in Oxford Lake. At the base of the Oxford, a few feet of micaceous quartzite is overlain by thick lenses of conglomerate (5). The boulders are from the Hayes River volcanic rocks and a white granite-gneiss (1?), whereas the matrix is grey or green, commonly chloritic, greywacke that, at least locally, is tuffaceous. The Oxford conglomerate (5) resembles the Hayes River agglomerate-conglomerate (3) so closely that geologists disagree on the status of many of the outcrop areas. There is agreement however that the rocks are distinct in the type area around Oxford Lake.

The relation of the Oxford group to the lithologically similar Island Lake group which outcrops just to the south of the map-area, is not definitely known. Quinn[6] stated that the Island Lake group disconformably overlies the Hayes River group. Therefore it must be as old or older than the Oxford group which, at least locally, nonconformably overlies the Hayes River. The Island Lake rocks however have a lower grade of metamorphism than the Oxford rocks, and they appear younger. In view of the lithological similarities of the two, and the fact that both appear as roughly parallel synclinal remnants, the two groups are assumed to be correlative.

The upper part of the Oxford group consists principally of black, fine-grained greywacke and nodular micaceous schists, with lesser amounts of quartzite, arkose, and slaty argillite. The quartz-rich sediments are characteristic of the Oxford group but are of limited areal extent. Generally, units 5 and 6 cannot be distinguished from lithologically similar parts of unit 3, and, except for the outcrops on the east shore of Oxford Lake and the exposures in Gods Lake, no rocks in the area may be assigned with certainty to the Oxford group.

Hornblende-rich rocks (7) cut all the metasedimentary rocks. They generally have the form of very elongate sills locally cutting across the bedding. They are commonly gneissic and may show ophitic textures. Calcic plagioclase and sphene are important ingredients. Some of these rocks may represent coarsely recrystalline lava flows.

Hybrid gneisses (8) include all those rocks of a generally granitic character that show recognizable remnants of other rocks. Around some of the greenstone belts are highly altered zones of lit-par-lit gneisses of granite and biotite schist and amphibolite. South of Michikinabish Lake is a broad, east-trending dome of quartz-rich rock of granitic appearance, which would be mapped as granite-gneiss (1) if it did not show well-developed crossbeds. Structurally, these rocks appear correlative to the granite-gneisses (1) and they probably represent metamorphosed sedimentary rocks older than the Hayes River group.

Sixty per cent of the area is underlain by granitic rocks (9). These rocks are generally poor in mafic minerals. Compositions vary markedly over small areas, but granodiorite is the most abundant rock type. Quartz-orthoclase porphyries occur as plugs intrusive into the other granitic rocks.

Late basic dykes (10) are rare and small in this area. They show no definite trend. Most are gabbros; a few are lamprophyres.

The structural geology of the area is not completely known. The Oxford Lake - Knee Lake belt consists of a cross-folded northeast-trending synclinorium. The cross-folding produces the S-shaped outcrop pattern and the marked broadening of the folds at the east end of Oxford Lake. A fault through Oxford Lake with relative movement south side northeast and down is indicated by the outcrop pattern. A roughly parallel fault may pass through the length of Knee Lake. The Hungry River - Colen Lake greenstone belt reproduces the Oxford Lake pattern on a smaller scale. South and east of Knee Lake the structure is unknown. Two important problems are the disposition of the Colen Lake greenstone, and the main belt of Oxford sedimentary rocks which disappear south of Magill Lake. The structure passing through Gods Lake is a cross-folded syncline. No connection between the Gods Lake volcanic rocks and those at Knee Lake can be shown, but a link from Fishing Eagle Lake to the north end of Gods Lake cannot be ruled out. At Gods Lake Narrows there is a rapid change in the strike of the rocks, accompanied by the appearance of a belt of Oxford metasedimentary rocks. This requires either major unconformity between the Oxford and Hayes River groups or a system of southeast-trending faults. Neither is satisfactory in the light of present information. Nothing is known about the structure of the belts of greenstone and metasedimentary rocks south of Gods Lake Narrows. The picture is obscured by disagreement on whether the metasedimentary rocks belong to the Hayes River group or the Oxford group.

Gold deposits are known at a number of localities near Gods Lake and Knee Lake. Prospecting for gold has also been carried out around Oxford Lake. More recently, several copper-nickel prospects have been staked near Oxford Lake. Occurrences of galena and sphalerite have been reported around Knife Lake, south of Gods Lake. In all these cases the deposits are in Hayes River strata (2), mostly in heavily sheared tuffs. Dykes and plugs of quartz porphyry (9) are generally associated with the gold deposits, whereas basic rocks (4) are commonly associated with the base-metal deposits. The smaller greenstone belts south of Oxford Lake have not been intensively prospected, but some sulphide mineralization is reported there. Narrow bands of magnetite iron-formation occur in tuffs around Knee Lake. All known deposits are too thin and low grade to be of commercial interest. The same applies to the Knee Lake asbestos showings. Although considerable prospecting has been done, with indifferent results, the greenstone belts still seem promising areas for base-metal deposits. In particular, the less-prospected areas south of Oxford Lake are worthy of attention.

[1] Wright, J. F.: Oxford House Area, Manitoba; Geol. Surv., Canada, Sum. Rept. 1931, pt. C (1931).
[2] Wright, J. F.: Oxford House Sheet, Manitoba; Geol. Surv., Canada, Map 305A with marginal notes (1934).
[3] Dix, W. F.: Gods Lake Area; Mines Branch, Manitoba, Prel. Rept. 47-4 (1948)
[4] Barry, G. S.: Oxford House - Knee Lake area; Mines Branch, Manitoba, Pub. 58-3 (1959).
[5] Barry, G. S.: Western Oxford Lake - Carghill Island Area; Mines Branch, Manitoba, Pub. 59-2 (1960).
[6] Quinn, H. A.: Island Lake, Manitoba-Ontario: Geol. Surv., Canada, Map 26-1960 (1960).

MAP 21-1961
OXFORD HOUSE
MANITOBA
SHEET 53 L