GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 42 A NE

MAP 46-1959
SURFICIAL GEOLOGY
IROQUOIS FALLS
COCHRANE DISTRICT
ONTARIO

Scale: One Inch to Two Miles = 1/126,720

Miles 2 1 0 2 4 6

LEGEND

CENOZOIC

5 ORGANIC DEPOSITS: open and semi-open bogs consisting of woody sphagnum peat, minor sedge peat and gyttja

4 COCHRANE DEPOSITS: clay till and associated sediments

3 BARLOW-OJIBWAY DEPOSITS: 3a, varved sediments, varved glacial-lake deposits; 3b, sand and gravel, shore and near-shore deposits

2 GLACIO-FLUVIAL DEPOSITS: sand and gravel; in part mantled by Barlow-Ojibway varved sediments and Cochrane deposits

1 GLACIAL DEPOSITS: grey sandy boulder till with minor contained stratified drift; in part thinly mantled by Barlow-Ojibway sand and gravel

PRECAMBRIAN

R Bedrock outcrop: in part with thin discontinuous drift cover

Bedrock outcrop, observed or interpreted from air-photos

Bedrock outcrop, reported from various sources

Geological boundaries (defined, approximate, transitional or arbitrary)

Glacial striae (oldest of crossed sets indicated by bar)

Esker ridge or median ridge of outwash plains

Erosional and constructional shorelines of glacial Lake Barlow-Ojibway

Dunes, mainly upsiloidal type, developed on glacio-fluvial deposits and Barlow-Ojibway sand

Scarp

Gravel or sandpit GP.

Mine or quarry

Fill, mine waste, tailings

Geology by O. L. Hughes, 1955, 1956

Main highway (101)

Other roads

Trails

Power transmission line

Township boundary

Intermittent stream

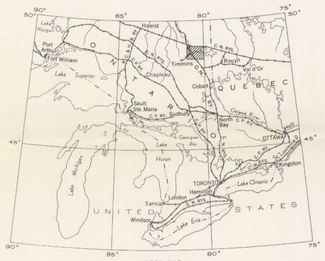
Height in feet above mean sea-level 895

Cartography by the Geological Survey of Canada, 1959

Approximate magnetic declination, 10° 20' West

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

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.



INDEX MAP

PUBLISHED, 1960.
COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA

PRINTED BY THE SURVEYS AND MAPPING BRANCH

DESCRIPTIVE NOTES

Glacial deposits (1) form an almost continuous sheet in the subsurface, but are exposed only on the crests of drumlins and on the flanks of bedrock hills. At the surface, the deposits have been modified by wave-action of glacial Lake Barlow-Ojibway to beach deposits of boulders, gravel or sand, or to lag concentrates of boulders. Thickness of the unit varies from a thin wedge against bedrock hills, to 100 feet or more within drumlins, but typical thickness is 10 to 30 feet.

Glacio-fluvial deposits (2) are confined mainly to elongate esker complexes, which have been much flattened and otherwise modified by wave erosion. In the median parts of the large esker complexes, sand and gravel attains thicknesses of 100 feet or more.

Barlow-Ojibway varved clay (3a) mantles underlying Glacial deposits and laps up onto the flanks of esker complexes, bedrock hills and drumlins. The unit consists of silt-clay or sand-clay couplets (varves) which range in thickness from several feet at the base to a few millimetres near the top. The varves are much contorted and sheared where overlain by clay till of the Cochrane deposits (4). Average thickness of the unit is about 45 feet. Barlow-Ojibway sand and gravel (3b) occurs as beach ridges of boulders, sand or gravel on the flanks of bedrock hills and eskers, or as aprons of sand extending outward over varved clay. The constituent material was derived by wave erosion and sorting of Glacial deposits (1) and Glacio-fluvial deposits (2). Typical thickness is 5 to 15 feet.

A large tract in the southeast extremity of the map-area is occupied by dunes (symbol), which are mainly upsiloidal or U-shaped. External form and internal structure of the dunes indicate that the effective dune-forming winds were west-northwest, as they are today. The sand was derived mainly from deposits of lacustrine sand, and to a lesser extent from the Glacio-fluvial deposits. The dunes have been stable for at least 4,500 years except for minor activity following forest fires.

Clay till of the Cochrane deposits (4) mantles all older deposits in the northwestern part of the map-area and a large area to the west and north. The till ranges in thickness from a few feet to about 25 feet; locally it is overlain by stratified glacial-lake sediments up to 15 feet thick.

Poorly drained interstream areas are occupied by organic deposits (5) up to 15 feet thick, consisting mainly of woody sphagnum peat.

History

During the Wisconsin glaciation, the area was overriden by a continental ice-sheet that laid down glacial till containing lenses of gravel. The latest direction of movement of the ice, as indicated by striae, orientation of drumlins and till fabric, was south-southeast. Concurrent with northward retreat of the ice-margin, the area was occupied by glacial Lake Barlow-Ojibway; the lake extended from the south end of Lake Timiskaming northward across the continental divide, which was then depressed below the level of the outlet through the Timiskaming gorge.

Subglacial streams, debouching into the lake at the ice-margin, deposited sand and gravel as the ice-margin retreated, forming the elongate esker complexes. Silt and clay carried by the subglacial streams were deposited on the lake bottom as annual layers or varves.

With further northward retreat of the ice-margin, isostatic adjustment produced differential uplift to the north, with resultant shallowing of the glacial lake. As the lake level dropped, relative to land, bedrock knobs appeared as islands and were swept free of drift by wave erosion. Beaches were constructed on the flanks of bedrock hills and esker complexes, and broad boulder-strewn wave-cut platforms were developed on some of the esker complexes. Sand washed from glacial and glacio-fluvial deposits was carried offshore to form a veneer over varved clay.

When the ice-margin had retreated an unknown distance north of lat. 49° 35' N, a lobe of ice expanded southward to reach the northwest corner of the map-area, depositing Cochrane till. Thin deposits of lacustrine sediments were deposited in a shallow glacial lake (or lakes) which persisted along the margin of the lobe as it retreated after a brief stand.

Economic Geology

The large esker complexes provide abundant supplies of gravel and sand. Esker or median ridges, indicated by a chevron symbol on the map are potential sources of coarse gravel. Locally, notably in Coulson and Guibord townships, gravel beaches have been exploited for road metal. Whereas gravel and sand of the esker complexes extends to depths of 40 feet or more, beach deposits are only a few feet thick over bedrock or unsorted till, and are a minor source of sand and gravel. Boulder beaches provide coarse fill, and are a potential source of material for crushing.

Sand of dunes has been used for road fill, but is too fine grained for other purposes. The surface of the sand dunes is bonded by roots and by a podsolic soil; when these are removed the surface is impassable for ordinary wheeled vehicles unless gravel or other surfacing material is applied. Wind erosion occurs when the dune sand is cultivated or burned over, and continues until covering vegetation is re-established.

Varved clay of the area is suitable for the manufacture of common brick and tile, but present demand probably is insufficient to warrant a plant of economic size.

Abundant groundwater is available from the gravel and sand of the esker complexes. Where varved clay laps up onto the flanks of the esker complexes, flowing or non-flowing artesian wells are obtained by drilling through the clay into the underlying gravel. Water may also be obtained from thick sandy varves at the base of the varved clay, from gravel lenses within the glacial deposits, and from lacustrine and eolian deposits.

The extensive plain underlain by Barlow-Ojibway varved clay or Cochrane deposits constitutes most of the arable land of northern Ontario. Much of the plain is occupied by bog which would require extensive drainage to permit cultivation. There is however sufficient well-drained land, some of it cleared but abandoned, to permit considerable expansion of agriculture before drainage programs are required.

MAP 46-1959
IROQUOIS FALLS
ONTARIO
SHEET 42 A NE