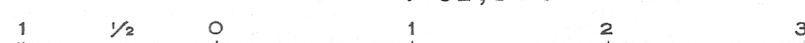


PRELIMINARY MAP 47-21 A

BARRIE
SIMCOE COUNTY
ONTARIO

Scale: - 1:62,500



Surveyed by the Topographical Survey.
Cartography by the
Drafting and Reproducing Division, 1947.

PLEISTOCENE DEPOSITS OF BARRIE MAP-AREA

Barrie map-area is everywhere floored by glacial and lacustrine deposits of Pleistocene age. These deposits are thick, and nowhere have wells reached the underlying Palaeozoic bedrock. Three broad glacial valleys occur in the area. One of these valleys, includes Little Lake, and extends eastward as an arm from the main valley now occupied by the drainage systems of Nottawasaga and Coldwater Rivers. The town of Barrie is situated in another valley through which part of the waters of glacial Lake Algonquin flowed eastward into Lake Simcoe and thence to the Trent outlet. A third valley extends from Kempenfeldt Bay southward through the centre of the map-area. The areas immediately bordering the glacial valleys are topographically irregular and dissected, and are occupied mainly by sand and gravel of kame origin. Inland from these valleys the country is flat to undulating, and is floored by ground moraine till, or by outwash sand and gravel. A few drumlin-like hills occur in the eastern part of the area, and become more prominent in the extreme southeastern part.

Drainage is varied; the sandy outwash and kame deposits in the western part of the map-area are well drained, but in the glacial valleys where the water-table is high the streams are sluggish and there are many swamps. Swamps also occur where drainage is impeded, in areas underlain by clayey till, as in the northeastern part of the area.

Deposits of glacial origin include ground moraine, drumlins, and ice-block ridges. Flat to gently undulating ground moraine covers the greatest part of the map-area. The morainic material varies from a compact calcareous boulder-clay till to a loose sandy till. It is generally thick, except in those areas bordering the kame or outwash deposits where it may be underlain or interbedded with sands and gravels. Till is also exposed in areas bordering Lake Simcoe, where the lacustrine deposits of glacial Lake Algonquin were thin and subsequently washed away during lower levels of the lake. Loose sandy till merges in places into kame or outwash sands and gravels, and the boundary between the two is extremely difficult to define. Areas of clearly defined sand or sand and gravel are mapped as kame or outwash, but it is possible that much of the material mapped as sandy till is glacio-fluvial in origin.

The few drumlin-like hills that occur in the southern part of the area are part of the drumlin field that extends southward to Bradford. Ice-block ridges are conspicuous in the northeastern part of the map-area and are circular, oval, or elongated in plan. The circular and oval types vary from 50 to 300 feet in diameter and the elongated types are from 50 to 1000 feet in length. They are generally sinuous, and may be solitary or branching. The ridges are hemi-elliptical in section, rise from 5 to 20 feet above the surrounding area, and are about 50 feet wide. The material is a sandy till with some sand and silt, and differs little from the material surrounding the ridge. These ridges occur in fields and are roughly aligned parallel with the direction of ice movement. They are thought to originate from a stagnant ice-field, where, as the ice was separated into blocks during melting, the detrital material slumped down from the sides of the block.

The kame and outwash deposits are of glacio-fluvial origin. Most of the former occur along the sides of glacial valleys. During the final advance of the Wisconsin ice-sheet, the ice moved as lobes down these valleys and when it melted drift material was washed onto the valley sides in irregular mounds. This material is generally poorly sorted sand and gravel, but in places may include stratified sands. Outwash deposits lie mainly in the southwestern part of the map-area. The country there is flat to very gently undulating, and the deposits are mainly of sand and gravel. South of Barrie the outwash merges with kame deposits along the valley slopes, and varies in thickness from 1 or 2 feet to 30 feet or more. The outwash overlies till, and has tended to subside the relief of irregular till deposits.

Deposits of glacio-lacustrine origin include beach sands and gravels, lacustrine sand, silt, and clay, and varved clay. Well-sorted and stratified beach sands and gravels are widespread along the main Algonquin and lower Algonquin shorelines. The best developed and thickest deposits occur across the mouths of bays on Lake Algonquin and on wave-built terraces. They are lacking on wave-cut terraces, where till formed the shoreline and where the energy of the waves was expended on large boulders and in eroding and transporting material into deeper water. Minor deposits of sand and gravel form beach ridges parallel with the shorelines. Lacustrine sands are predominant in the glacial valleys that were occupied by the former Lake Algonquin, and on the terraces below the main Algonquin shoreline around Lake Simcoe and Kempenfeldt Bay. The deposits are thickest on wave-built terraces, and are thin or lacking on wave-cut terraces. The sand is generally well sorted or stratified, but locally is mixed with gravel or grades into silt and clay. Clay is generally lacking, and where deposited near shore in Lake Algonquin it was removed during later stages of the lake. Isolated occurrences of varved clay are found in con. 14, Innisfil tp., on Highway No. 27, and in con. 5, lot 9, Innisfil tp. Both of these are at higher elevations than Lake Algonquin, and suggest either bodily transportation by ice, or a much higher and earlier lake stage than Lake Algonquin.

Recent deposits of muck and peat occur in swamps, and are the results of poor drainage. They are most abundant at elevations below the Algonquin shoreline, where the water-table is high and the swamp underlain by saturated sand, silt, or clay, although they also occur in depressions in ground moraine with impeded drainage underlain by a compact boulder clay.

The main Algonquin shoreline is a conspicuous feature in this map-area, ranging from 60 feet above the level of Lake Simcoe in the south to 80 feet above the lake in the north. The highest bluffs extend along the north shore of Kempenfeldt Bay, where the shore material is mainly a boulder-clay till. Where kame deposits form the shore, they merge with the terrace without a definite break in the slope. A wide, shallow-water terrace to the south of Kempenfeldt Bay prevented waves from exerting their full force on the shore bluffs, which are consequently, inconspicuous. The lower Algonquin shorelines are generally lacking in Barrie map-area, due to the nature of the material and the sheltered positions of the shorelines. They are marked by a few beach ridges on the south side of Kempenfeldt Bay.

Evidence of a lake level higher than that of Lake Algonquin is indicated by numerous occurrences of deposits of well-sorted and stratified gravel and sand at an elevation of about 100 feet above the main Algonquin shoreline. These deposits are too uniform to be of kame origin. It seems probable that this upper lake level was maintained for only a short time, as the deposits are shallow and the shoreline is nowhere continuous nor well developed. They are most numerous in Oro and Innisfil townships, and have been used locally for gravel. Similar sand and gravel deposits occur in the area at an elevation of about 1,000 feet. They are underlain by outwash material, and as one of the varved clay deposits also occurs at this elevation it is possible that they too mark a temporary level of one of the earliest glacial lakes.