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AN UNUSUAL DEGLACIATION FEATURE NEAR THOMSON STATION, CUMBERLAND COUNTY, NOVA SCOTIA

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A small area near Thomson Station has tree-covered ridges and grassy depressions that appear to have been formed by burial of small ice blocks by glaciofluvial material during the final stages of stagnation of the last ice sheet.

Introduction

During the course of an examination of part of Cumberland County, N.S., I encountered a curious system of tree-covered ridges near Thomson Station, 7.5 km southeast of the town of Oxford. A reconnaissance study was made, and the conclusions reached are presented here.

The area in question is 0.8 km south of Thomson Station and lies just to the east of Colonel Brook and a short distance west of a bend in Tillit Brook (Fig 1). The region is covered by the national topographic series map 11E/12 and by black and white air photographs N.S. A18579-35/36, and color air photographs 75052-60/61. Colonel Brook is a tributary of Griffin Brook, which flows down the north slope of the Cobequid Mountains, but the area flattens near the junction of these 2 streams some 3 km south of Thomson Station. The topography in the vicinity of Thomson Station is gently undulating, but the locality under consideration is rather flat and lies at an elevation of about 30 to 35 m above sea level. It will be seen from Figure 1 that there is an abrupt drop to stream level at the 100-ft contour line surrounding the area. These are possibly kame terraces, which also flank the valley of Griffin Brook.

The area is underlain by rocks of Pennsylvanian age, consisting mainly of grey and red sandstones. Shales and conglomerate with some coal seams are also present. The bedrock is covered by till, capped by glacial sands and gravels that show evidence of re-working by water. The soils are loams and sandy soils, often very stony, assigned to the Hansford and Hebert series (Nowland & McDougall 1973). They are of poor agricultural quality, but have medium to high fertility for forest. At the present time they support second growth forests of red spruce, red pine, and jack pine, with some birch and balsam fir.

Description

Attention was drawn to the area by its cratered-like appearance on aerial photos (Fig 2). A visit showed the existence of numerous shallow circular depressions intersected by a system of sinuous ridges (Fig 3). The ridges themselves were at an elevation generally accordant with the surface of the surrounding area, so the depressions lie below this surface. The ridges support a jack pine forest with a high density crown closure. As a result, the floor is devoid of plant growth and carpeted with needles. In contrast, the depressions are practically devoid of tree growth except for an occasional birch or alder. The vegation consists of moss, grass, and small shrubs.

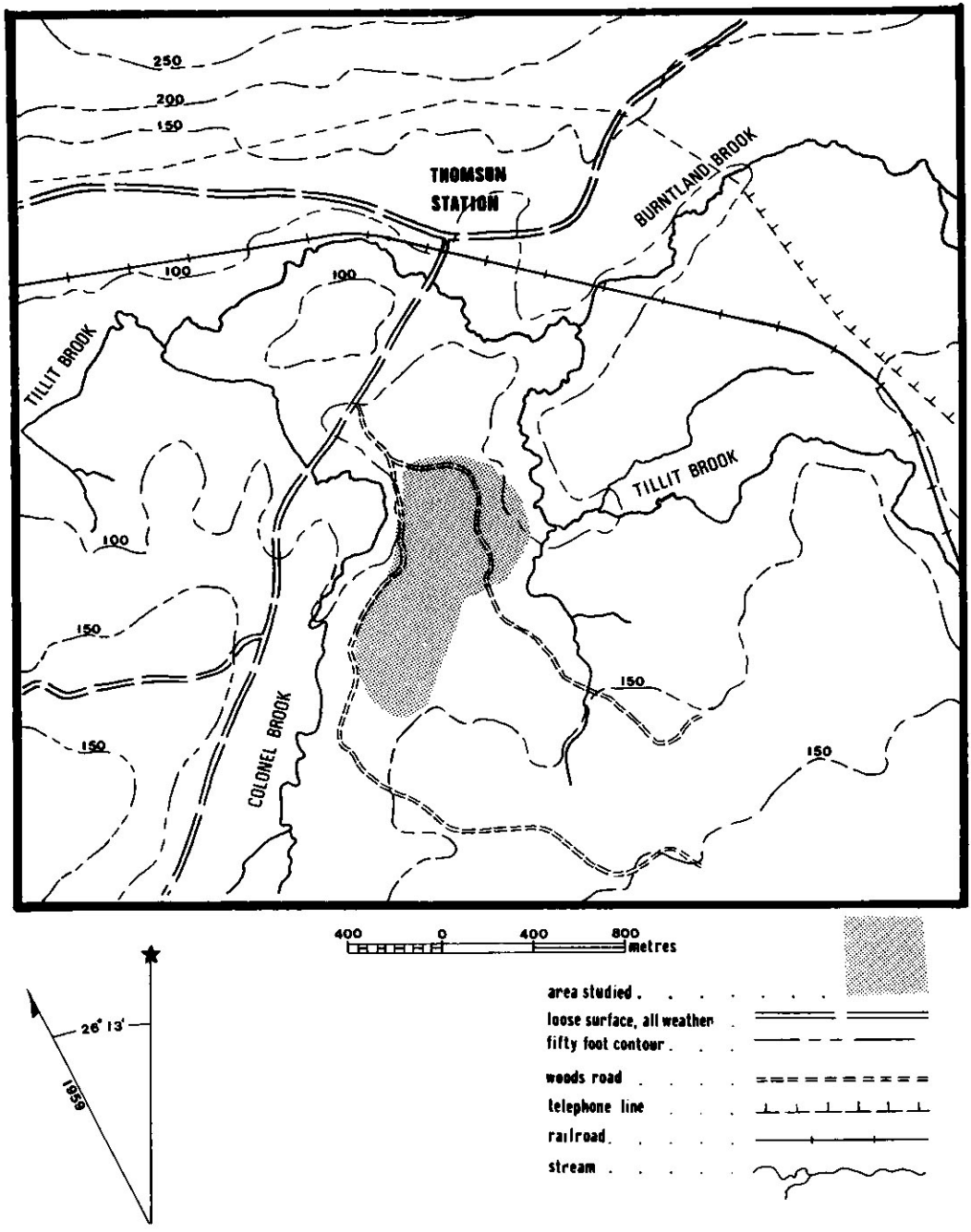


Fig 1 - Topographic map showing the location of the study area.

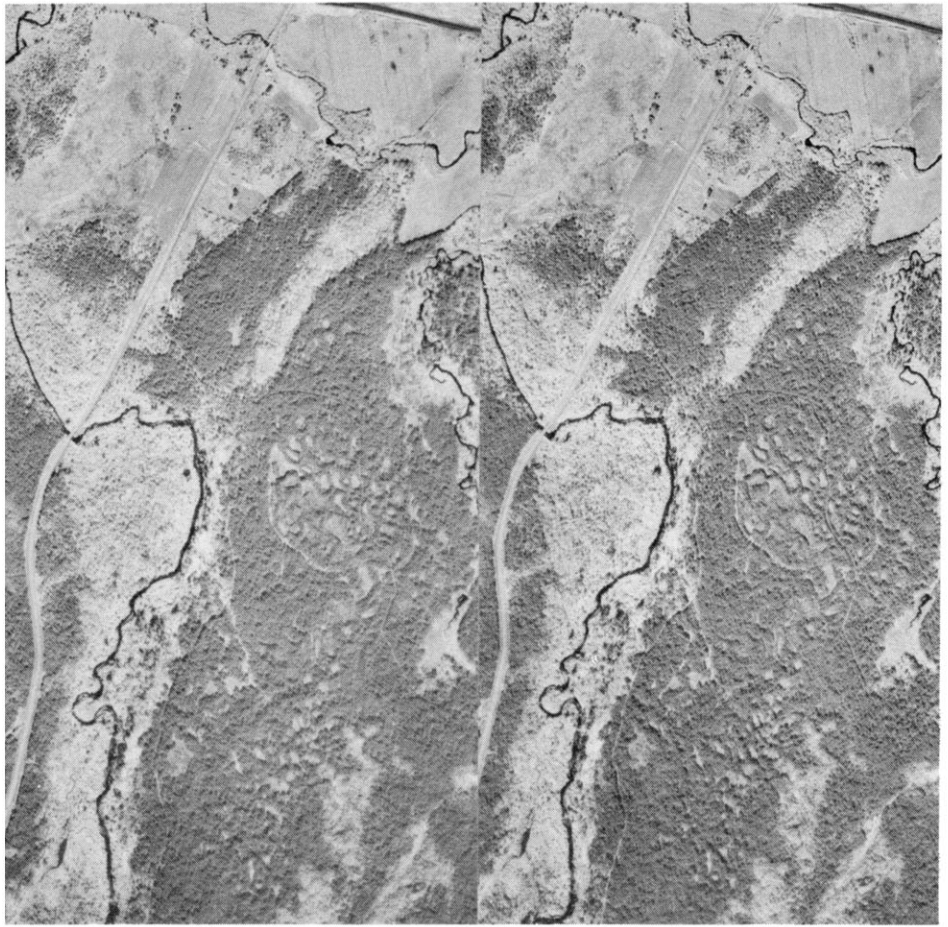


Fig 2 - Stereo pair of air photographs of the area, showing the tree-covered ridges and treeless depressions (N.S. A18579-35/36).

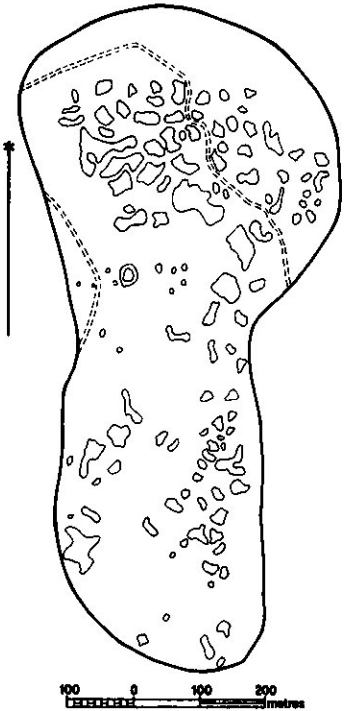


Fig 3 - Sketch map of the area, drawn from the air photographs

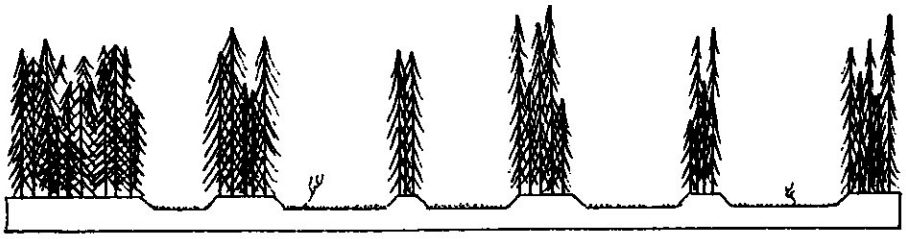


Fig 4 - Sketch profile to show the general relations of the ridges and depressions.

The border between each ridge and depression is sharply defined by a drop of 0.3 to 0.5 m in about the same horizontal distance. The tops of the ridges are flat, as also are the floors of the depressions (Fig 4). The depressions vary in size and details of their outlines but many are roughly circular and about 12 to 15 m in diameter.

After selecting a typical example of this system, a number of soil pits were dug. The results are shown schematically in Figure 5, with an inferred profile pattern.

In the center of the depression a 28 cm layer of black loam was found under 8 cm of litter, a fermented layer, and humus. Under this blanket lay more than 43 cm of silty clay loam with a strongly leached character.

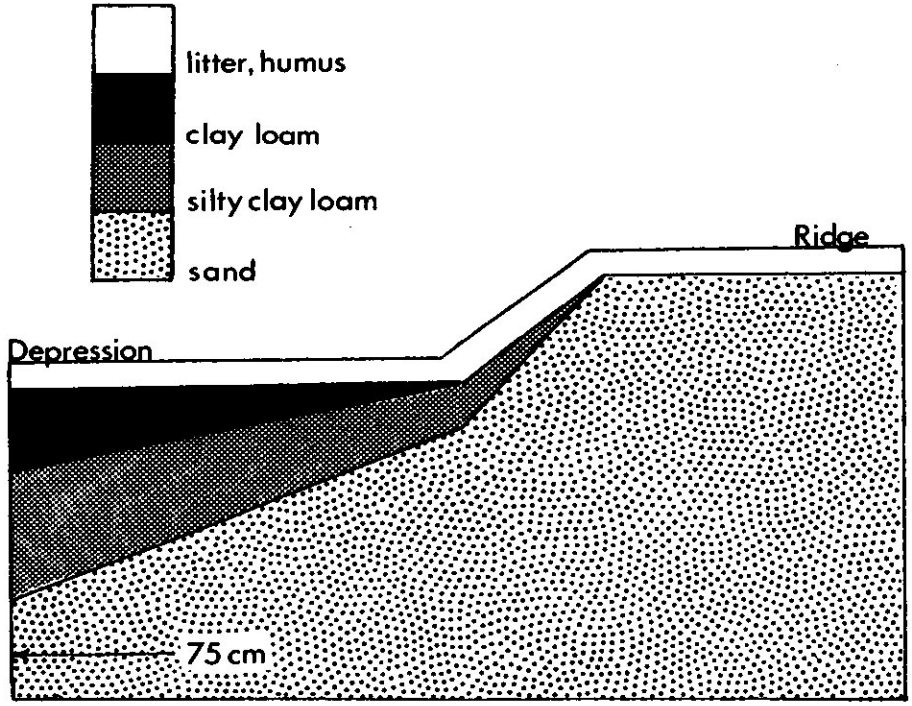
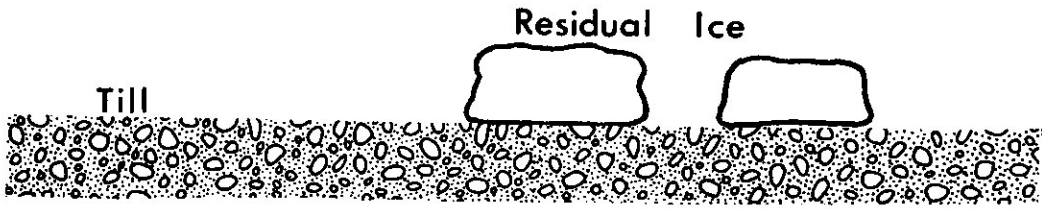
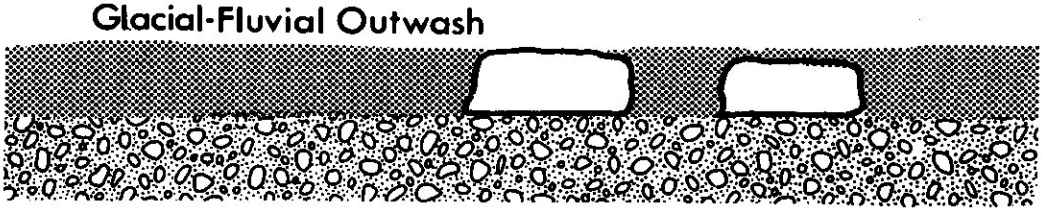


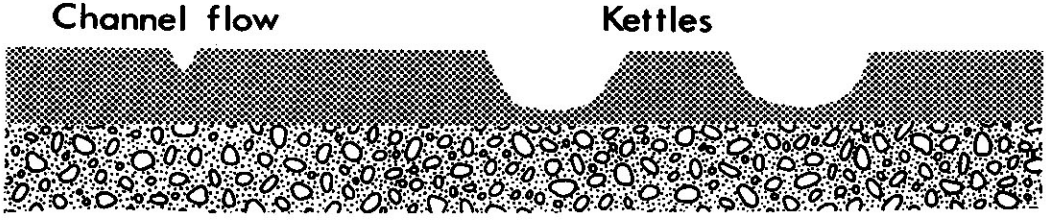
Fig 5 - Schematic diagram to show the relations of the layers found in the soil pits.



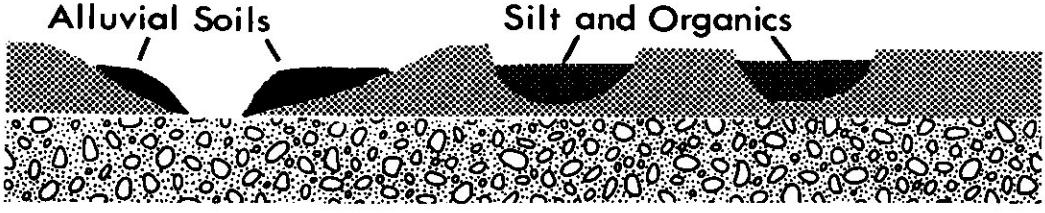
Glacial till and residual ice blocks left by melting glacier



Torrential meltwater loaded with sediment buries till and ice blocks



Ice blocks melt, causing collapse of sediment covering. The diminished drainage has formed a new stream which has started to cut into the sediment.



Fluctuation of stream flow and load has caused downcutting and deposition of alluvial soil. The depressions have filled with decomposed vegetation and clay and silt from ground runoff.

Fig 6 - Diagrammatic reconstruction of the inferred origin of the features as small kettle holes resulting from the dissolution of buried ice blocks.

At the margin between ridge and depression, the pit showed 8 cm of black loam under a 5 cm layer of litter, ferment, and humus. The same silty clay loam was present with a thickness of 13 cm. This was underlain by more than 30 cm of a coarse red sand. On the ridge, a pit produced more than 50 cm of coarse red sand under 10 cm of litter, ferment, and humus.

Drainage ranged from poor in the depressions to well drained on the ridges.

Inferences

As the area shows strong evidence of glacial activity, it is suggested that these depressional features were formed in a manner similar to that of the more usual kettle holes. The inferred sequence of events is shown in Figure 6. Following the deposition of the basal till (which is exposed in Colonel Brook) the area was covered by residual ice blocks that became partly buried by coarse glaciofluvial sediment carried by meltwater from the dissolution of the glacier. These blocks eventually melted, leaving depressions that have been partly filled by silt and decomposed vegetation. Eventually they will be filled completely and disappear. Meanwhile, the damp environment in the depressions will only support moss, grass and occasional trees.

Acknowledgments

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Reference

Nowland, J.L. and **MacDougall, J.I.** 1973. *Soils of Cumberland County, Nova Scotia.* Agriculture Canada, Ottawa.