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O. L. Hughes

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By

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The logs that follow (Tables I-III) provide preliminary information on the results of three borings in Carr, Lamarche, and Clute townships, respectively. The borings were made for the Geological Survey during April, May, November, and December, 1960, by the Testing Laboratories of the Development Engineering Branch, Department of Public Works. The advice and cooperation of the staff of the Testing Laboratories are gratefully acknowledged.

Studies of the surficial geology of the area have been made by Antevs (1925, 1928)[1] and the writer (1956, 1959a, 1959b, 1960). The borings were made to supplement observations from exposures as to thickness, extent, and continuity of Pleistocene stratigraphic units of the region, particularly the varved clay; to provide samples for soil tests to determine the degree of precompression of the varved clay; and to provide incidental information on the availability of ground water and the nature of underlying bedrock. Specifically, the data on bore-hole No. 1 supplement information from Iroquois Falls map-area (Hughes, 1959a), and the data on bore-holes No. 2 and 3 supplement information from Smooth Rock map-area (Hughes, 1956).

The typical stratigraphic succession of the region is (1) sandy boulder till overlying bedrock of Precambrian age, (2) glacio-fluvial sand and gravel, (3) Barlow-Ojibway varved clay (Timiskaming varve series of Antevs, 1925, 1928), (4) Cochrane till, and (5) Cochrane sediments, in part varved.

Units 1 and 3 are rather continuous sheets throughout the region; unit 4 is a more or less continuous sheet in Smooth Rock map-area, and extends into the northwestern corner of Iroquois Falls map-area. Unit 2 occurs mainly as broad, south-trending ridges of gravel and sand (esker complexes); varved clay of unit 3 laps up onto the flanks of the ridges, and clay till of unit 4 forms a discontinuous cover over the ridges within the extent of the latter unit. Unit 5 has patchy distribution on top of unit 4. In addition, bog deposits are widespread on the gently undulant surface that characterizes the region.

Unit 3 is divisible into the following three sequences (Hughes 1959b, p. 35): 'Lower' varves (Nos. 1527 and below of Antevs' 'Timiskaming' series); 'Frederickhouse' varves (Nos. 1528 to 2014 of Timiskaming series); and 'Connaught' varves, a sequence consisting of 60 or more varves overlying the Frederickhouse sequence. The Connaught sequence is distinguished as such only south of the limit of Cochrane till (unit 4); it is probably in part correlative with unit 4 and unit 5 (Cochrane sediments).

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[1] Dates or names and dates in parentheses refer to publications listed in the References.

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Antevs, Ernst

1925: Retreat of the Last Ice-sheet in Eastern Canada; Geol. Surv., Canada, Mem. 146.

1928: The Last Glaciation; Am. Geog. Soc., Research Ser. No. 17.

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1959b: Surficial Geology of Smooth Rock and Iroquois Falls Map-areas, Cochrane District, Ontario; Univ. Kansas, Lawrence, Kansas, unpub. Ph.D. dissertation.

1960: Surficial Geology of Kirkland Lake, Timiskaming and Cochrane Districts, Ontario; Geol. Surv., Canada, Map 1-1960.

TABLE I

Bore-hole No. 1. NE Corner, Lot 5, Concession 2, Carr Township

Thickness (feet)	Depth from Surface (feet)	Stratigraphic Unit and Unit No.		Description
3	0 - 3			Clayey silt; uppermost 1.5 feet consists of soil profile
9	3 - 12	Barlow-Ojibway varved clay (Connaught sequence)[1]	(3)	Varved clay with tan-brown silt layers, chocolate-brown clay layers; varves 1 - 2 cm at top, 6 - 10 cm at base; clay layers thin, sharply defined
10	12 - 22	Barlow-Ojibway varved clay (Connaught sequence)[2]		Clay, massive; chocolate-brown at top, dark grey-brown at base
16	22 - 38	Barlow-Ojibway varved clay (Frederickhouse sequence)		Varved clay; varves are thin or indistinguishable in uppermost 20 cm; below, thin clayey varves 0.5 to 1 cm thick grade downward to varves with 0.5 to 2 cm silt, 0.5 to 1.5 cm clay
22	38 - 60	Barlow-Ojibway varved clay (Lower sequence)		Varved clay; thin clayey varves 1 cm thick at top, grading downward into varves 5 cm or more thick (lowermost samples disturbed)
43	60 - 103	Sandy boulder till	(1)	Till, light grey, sandy, with abundant pebbles, cobbles, and boulders
9	103 - 112 (0.3 foot of core recovered)	Precambrian bedrock		Argillite, dark grey to black; bedding dips about 30°; typical of argillaceous sediments associated with Keewatin volcanic rocks in the area (V.K. Prest, personal communication)

[1]These varves are termed 'Connaught sequence' on the basis of physical character and their stratigraphic position above the Frederickhouse sequence; they have not been correlated with typical Connaught sequence varves (exposed along the southwest shore of Frederickhouse Lake) by means of varve diagrams.

[2]A massive clay layer 5 to 15 feet thick lies near the base of the Connaught sequence in exposures on either side of Black River from Matheson to the mouth of the river, and adjacent to Abitibi River from Twin Falls to below Iroquois Falls.

TABLE II

Bore-hole No. 2. NE Corner, Lot 12, Concession 2, Lamarche Township

Thickness (feet)	Depth from Surface (feet)	Stratigraphic Unit and Unit No.	Description
1	0 - 1		Topsoil, organic, dark chocolate-brown
7	1 - 8	Cochrane sediments (5)	Varved silt and clay; light tan silt layers 2 to 8 cm thick containing grit and pebbles, alternating with chocolate-brown clay layers 1 to 3 cm thick; laminae much disturbed by root growth and frost action
2	8 - 10	Cochrane sediments	Silty clay, grey-brown, with grit and pebbles; weak stratification.
22	10 - 32	Cochrane till (4)	Silty clay till with grit, pebbles, and rare boulders; grey-brown at top, dark grey at base
19	32 - 51	Barlow-Ojibway varved clay (Frederickhouse sequence) (3)	Varved silt and clay; uppermost 1 foot is glacially disturbed; grades downward more or less regularly from varves with silt layers 0.5 to 0.8 cm thick and clay layers 1 cm thick, to varves with silt layers 3 to 6 cm thick and clay layers 1.5 to 2 cm thick
12	51 - 63	Barlow-Ojibway varved clay (Lower sequence)	Varved silt, fine-grained sand, and clay; at top, varves consist of silt layers 1.5 to 3 cm thick, and clay layers 0.4 to 1 cm thick; these grade downward to thick proximal varves with silt and fine-grained sand layers 15 cm to a metre or more thick, and clay layers 1 to 2 cm thick.
62.5	63 - 125.5	Sandy boulder till (1)	Till, sandy, with abundant pebbles, cobbles, and boulders; probable lenses of washed sand and gravel[1]
	125.5 - 135 (40 feet of core recovered)	Precambrian bedrock	Dark green meta-tuff; minor pyrite on steeply dipping, slickensided shear surfaces. In thin section[2] it is "uniformly very fine grained, weakly bedded green rock with a few chloritized fractures. The beds are lensoid in shape and rarely exceed 25 mm in length or a few mm in thickness. The prominent ones consist of uniformly fine grained quartz interspersed with oriented needles of amphibole and less commonly with anhedral grains of calcite. Much of the rock is a fine-grained aggregate of amphibole and chlorite with abundant plagioclase and quartz. Plagioclase occurs in fresh well-twinned laths locally abundant and often crosscutting the schistosity. Calcite and epidote anhedra are disseminated through the matrix and the former is also present in veinlets" (Sample No. DB 1515)

[1]The hole yielded an artesian flow of water at the rate of about 300 gal. per hour; the water is probably derived from one or more sand or gravel lenses near the base of the sandy boulder till. The sandy boulder till is exposed at the surface in a low ellipsoidal hill (drumlin?) 1 mile north and 1 mile west of the drill site.

[2]Petrographic description by K.R. Dawson, Geological Survey of Canada.

TABLE III

Bore-hole No. 3. NW 1/4, Lot 12, Concession 6, Clute Township

Thickness (feet)	Depth from Surface (feet)	Stratigraphic Unit and Unit No.	Description
1	0 - 1		Silty clay topsoil, organic, brownish black
6	1 - 7	Cochrane sediments (5)	Varved silt and clay; varves with silt layer 10 cm thick and clay layer 1 cm thick grade downward into varves with silt layer 30 cm thick and clay layer 1 to 3 cm thick; silt layers contain abundant detrital fragments of clay derived by erosion from earlier-deposited clay, signifying deposition in a very shallow lake
9	7 - 16	Cochrane sediments (5)	Silt, light grey, grading downward into fine-grained sand
19.5	16 - 35.5	Cochrane till (4)	Silty clay till with grit, pebbles, and rare boulders
19.5	35.5 - 55	Barlow-Ojibway varved clay (Frederickhouse sequence) (2)	Varved silt and clay; glacially disturbed in uppermost 1 foot; clayey varves 1 to 2 cm thick at top, grading to varves with 6 to 9 cm silt and 1.5 to 2 cm clay, at base
46	55 - 101	Sandy boulder till (1)	Till, sandy, with abundant pebbles, cobbles, and boulders; possibly with lenses of washed sand and gravel
11	101 - 112	Precambrian bedrock	No core recovered

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