

## Trip E

SOME PLEISTOCENE FEATURES OF ST. LAWRENCE COUNTY, NEW YORK (Fig. 1)

by

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## ABSTRACT

The field trip route from Potsdam to International Talc's open pit mine at Fowler crosses uneven ground moraine and a series of ice contact features. The latter have been mapped as part of the frontal Fort Covington Moraine. Kames, kettles, discontinuous eskers, and extensive sand plains are well displayed. Stop 1 will examine the core of one of these ice contact features, in Elm Creek Valley north of Edwards, New York.

Stop 2, at the International Talc open pit, will provide an opportunity to examine striae, gouges, and the remnants of highly polished flutes preserved on the bedrock surface. Patches of sand and gravel cemented to the rock surface form an unusual pavement. Drift exposures adjacent to the pit show Fort Covington sand, gravel and clay deposits. Stop 2 of this trip is same as Stop 1 of Trip D.

## INTRODUCTION

Pleistocene glacial events of a major part of St. Lawrence County have been interpreted by MacClintock and Stewart (1965). Their report on the St. Lawrence Lowland gives an excellent summary of previous investigations in the area and presents substantial evidence supporting the concept of two ice flow directions in the St. Lawrence Valley during the late Wisconsin Stage.

Using glacial striations and till fabrics as primary criteria for flow direction, MacClintock and Stewart identify an ice mass moving from northeast to southwest (Malone Glaciation) which, at maximum extent, spread over the Adirondack mountains. A later ice mass (Fort Covington Glaciation) radiating from a new source on the Ottawa Highlands moved from northwest to southeast. Malone drift, described as red-brown till and assorted ablation debris, is said to be leached usually 5 to 8 feet, whereas Fort Covington drift is grey-buff till and other debris that are leached only a foot or two. The southern boundary of Fort Covington drift extends diagonally across St. Lawrence County from Nicholville to Harrisville (Fig. 2). This uneven boundary forms many loops and re-entrants in a typically lobate pattern marked in places by strong frontal moraine topography (MacClintock and Stewart, 1965). Deglaciation accompanied by the draining of ice-dammed lakes in the lowland was followed by a westward incursion of marine water.

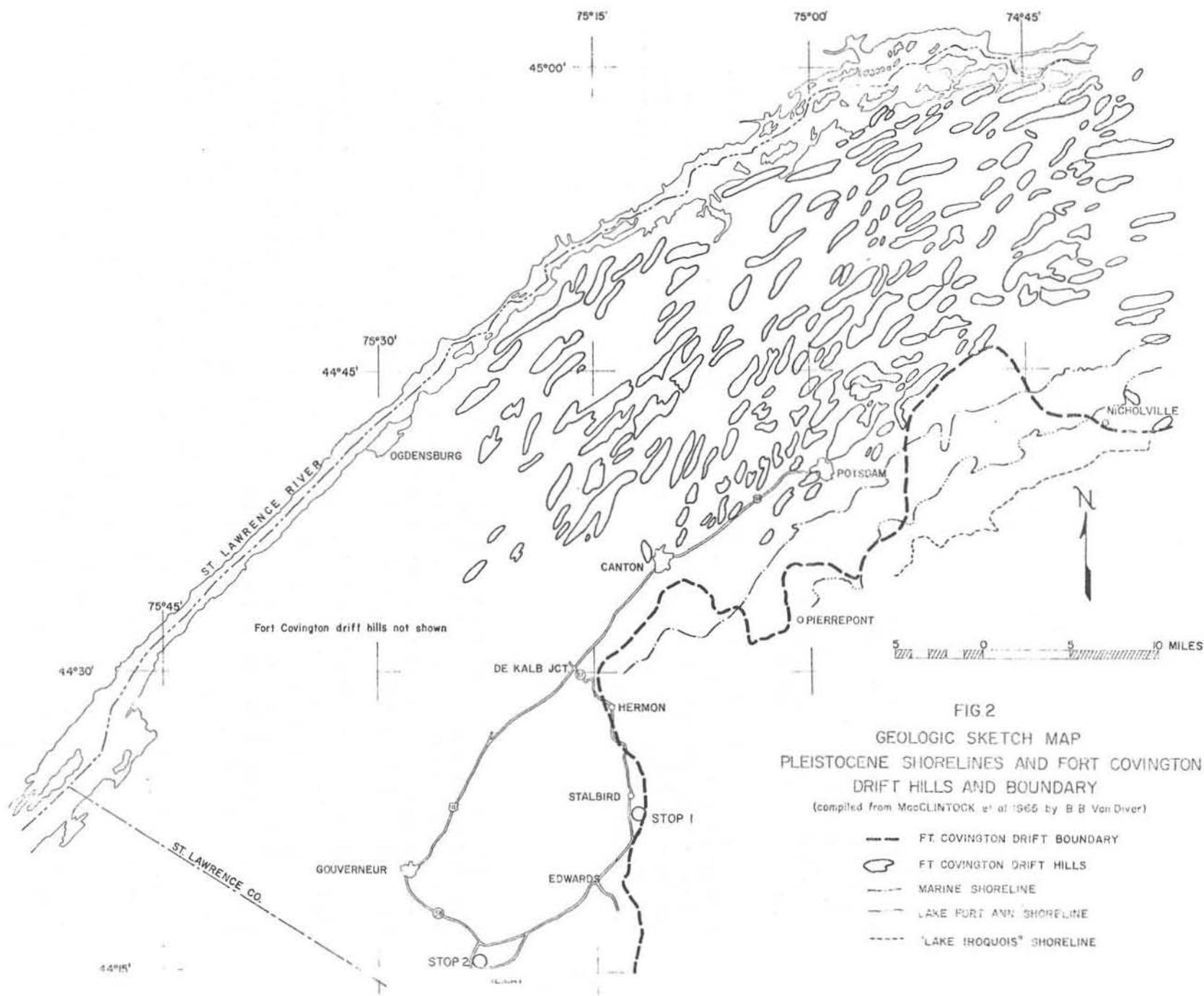


FIG 2  
 GEOLOGIC SKETCH MAP  
 PLEISTOCENE SHORELINES AND FORT COVINGTON  
 DRIFT HILLS AND BOUNDARY  
 (compiled from MacCLINTOCK, et al 1965 by B B Van Diver)

- FT. COVINGTON DRIFT BOUNDARY
- FT COVINGTON DRIFT HILLS
- - - MARINE SHORELINE
- LAKE FORT ANN SHORELINE
- - - "LAKE IROQUOIS" SHORELINE

## ACKNOWLEDGEMENT

Mr. Fred Totten and the management of International Talc Co. have kindly permitted access to the open pit operation at Fowler, N.Y.

## STOP DESCRIPTIONS

General

The field trip route along U. S. 11 between Potsdam and Canton traverses an uneven till-covered surface with several broad, ridge-like hills of till having long axes oriented approximately northeast-southwest. The hills are part of a broad belt of similarly-oriented topographic features which cover the northern portion of St. Lawrence County. Interpreted by MacClintock and Stewart as part of the recessional Fort Covington drift sheet, the hills are described as having formed perpendicular to the flow of Fort Covington ice. The hills have cores of Malone drift that have been "pushed into place" (1965, p. 7-8). Exposures into these features have not been found in the vicinity of the trip route.

Southwest of Canton the trip follows N.Y. 87 to Hermon thence via Marshville and Stalbird toward Edwards along a series of ice contact features trending approximately north-south parallel to Elm Creek valley. Where internal structures are exposed, there are varying degrees of sorting and a chaotic arrangement of stratified drift. Precambrian rock types predominate but a variety of sedimentary rocks can be found in the gravel.

These deposits lie along the Fort Covington frontal moraine and are composed of Fort Covington Drift (MacClintock and Stewart, 1965, p. 102-105).

Stop 1. Ice contact debris south of Stalbird.- This stop provides an opportunity to examine the structure and composition of a "textbook" example of ice contact debris.

Continuing south on the Marshville-Stalbird road, the trip route rejoins N.Y. 87 with a turn toward Edwards. After crossing the Oswegatchie River in Edwards, the trip continues westward on an old segment of N.Y. 58 to merge with new highway 58 (shown on Edwards 7.5' quad., 1956 ed. as "under construction") 1.2 miles west of the village. Buff Till in a steep roadcut 1/2 mile north of this location shows a fabric with a northwest maximum (MacClintock and Stewart, 1965, pp. 113,143). Continuing westward, N.Y. 58 crosses a level sand-covered surface approximately 1/2 mile wide. Rising from near the Oswegatchie River at about 700 feet to about 800 feet above mean sea level near Harrisville, the surface is composed of pebbly sand ("Fullerville Sand") interpreted as deltaic material deposited into Lake Fort Ann during retreat of the Fort Covington Ice Margin (MacClintock and Stewart, 1965, p. 113).

Approximately 1 1/2 miles west of the West Branch of the Oswegatchie the field trip route passes under the Penn-Central Railroad and turns left into the access road of International Talc's Open Pit Mine (the "Arnold Mine").

Stop 2. Open pit mine of International Talc Co.- Several glacial erosional features are preserved on the bedrock surface. Mineralogy and petrology of the mine are discussed in detail under trip D of this guidebook.

In several places the bare bedrock surface shows broad, highly polished grooves trending northeast-southwest (N 20°, azimuth). Prominent striations having a parallel orientation are well displayed in the grooves. A major set of fractures from 2-12" long can be seen across the rock surface. The fractures strike N 8° at the northeastern end of the pit but their orientation gradually swings more easterly (N 20°) toward the crest of a 15' bedrock rise. A second fracture zone west of the crest produces a series of small step-like features, some of which are slightly curved, having a strike of N 280° nearly perpendicular to both the more easterly set of features and the prominent striations. The orientation of these step-like features, and some of the associated fractures might stimulate discussion on the origin and directional properties of crescentic marks.

Patches of cemented sand and gravel adhere tightly to the bedrock in several places. Usually 1/4 inch thick, these patches are remnants of a pavement which covered the entire surface prior to the mining operation. Several flutes in the bedrock show the cemented material preserved in a vertical position.

Exposures of drift at the edges of the pit show approximately 5 feet of red-brown till overlain by oxidized sand and laminated silt and clay totalling some 30 feet. The stripping operation combined with slump of the walls prevents a clear understanding of drift relationships.

#### BIBLIOGRAPHY

- MacClintock, P. and Stewart, D. P., 1965, Pleistocene geology of the St. Lawrence Lowland, New York State Museum and Science Service, Bull. 394, 152 pages.

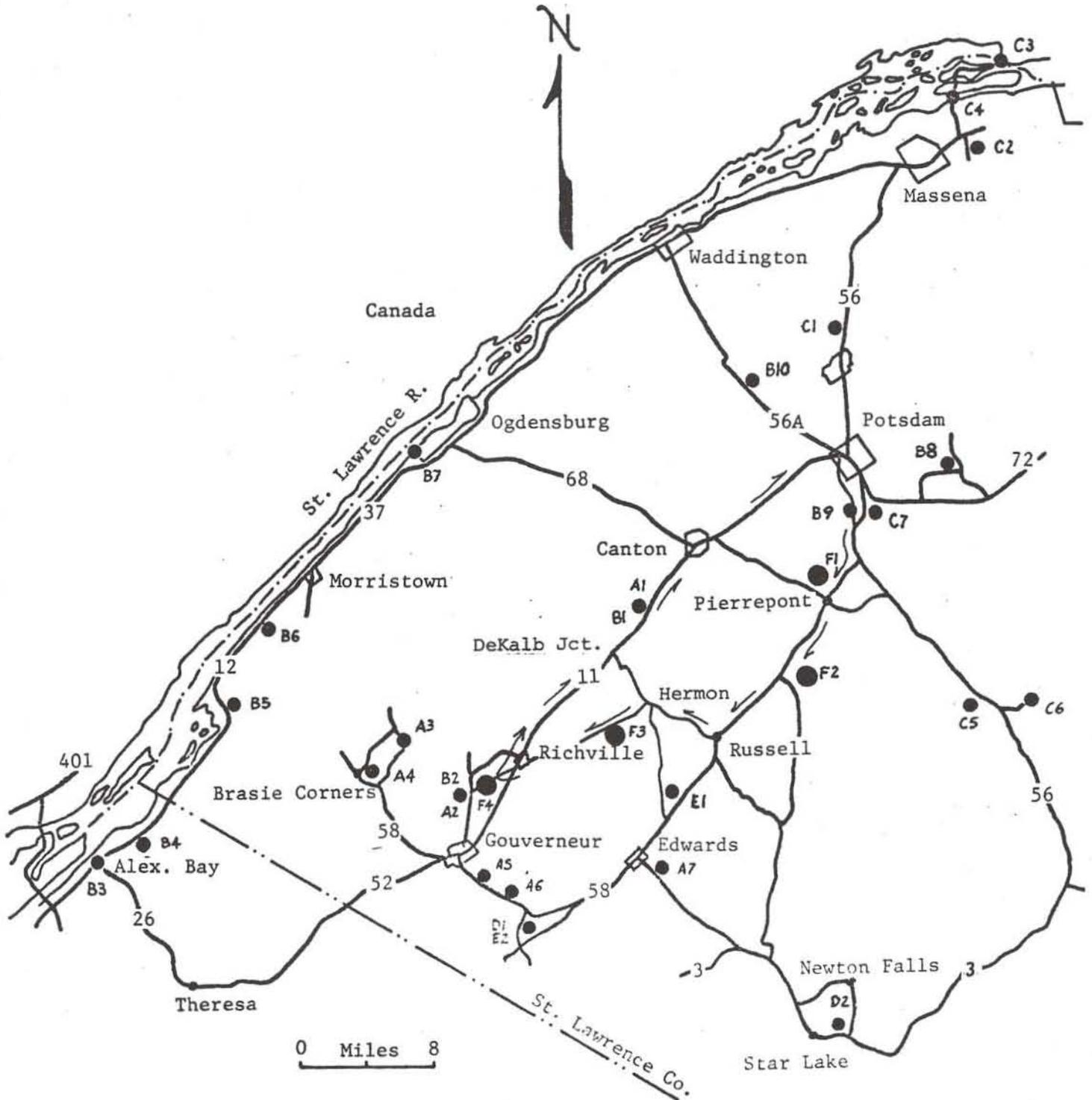


Figure 1. STOP MAP FOR TRIP F

Large dots indicate stops for this trip and arrow show route.  
 Stops for other trips in guidebook are indicated by smaller dots.

