SURFICIAL MATERIALS - BURIN PENINSULA, NEWFOUNDLAND

by

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MARGINAL NOTES AND LEGEND

Quaternary History

The oldest deposits on the southeastern coast of Newfoundland are probably pre-Wisconsinan in age, mid-Wisconsinan ice cover was limited, and the late-Wisconsinan ice margin lay near the mainland of Newfoundland (Grant, 1977 and Tucker & McCann, 1978, in press). Evidence for these events is derived from morphogenetic mapping of surficial deposits, and studies of infrequent multiple-till sections, raised glaciomarine features, periglacial forms and weathering phenomena (Tucker, 1979; Grant, 1975a; Widmer, 1950, Van Alstine, 1948).

Trace element and stratigraphic analyses suggest that the oldest till units may be Illinoian. A continuous bench cut in rock at 4 m a.s.l. exists along both coasts of the peninsula. This was probably cut by a high interglacial sea level (Grant, 1975a, Widmer, 1950) and probably relates to the Sangamonian Stage. Early-Wisconsinan ice flow was from the island of Newfoundland towards the southeast, across the Burin Peninsula. Marine deposits at Dantzic Cove and Salmonier Pond underlain by a silty, sandy till and overlain by a sandy till, contain foraminifera of proposed mid-Wisconsinan age. A 20 m a.s.l. raised bench on the Burin Peninsula, and a discontinuous wash limit at approximately the same elevation are thought to be products of mid-Wisconsinan overlap.

Onshore-directed striae with sequentially weathered facets, and marine sands incorporated in till, indicate that a later ice movement (late, mid-Wisconsinan?) was from an ice cap on the shelf south of the peninsula (Grant, 1975a), and from ice domed to the northeast on the Placentia Bay coast. A late-Wisconsinan, glacial limit, marked by eskers and general ice stagnation terrain, occurs between Terrenceville and Swift Current. The associated marine limit has been recorded at 18 m a.s.l. in upper Fortune Bay and 11 m a.s.l. at the head of Plancentia Bay.

In situ wood found below high tide at Little St. Lawrence (1080 ± 50 B.P., G.S.C. 2631), and peat covered by marine deposits, located near Point May (5360 ± 70 B.P., G.S.C. 2613), show that the lower portion of the peninsula is submergent. This may in part be as a result of fore-bulge collapse related to the late-Wisconsinan ice limit (Grant, 1977; Clark and Farrell, 1978). Permafrost activity, following deglaciation, is indicated by the presence of fossil ice wedge casts situated in stratified deposits related to this event.

Map Designation Scheme

Individual map units are designated by a series of letters. For example:

genetic and processes modifier

textural modifier — $sF^{G}a$ — morphological modifier

primary level of subdivision

This is an adaptation of a scheme developed for use in Labrador (Fulton et al., 1975) and used for other Open File maps of Newfoundland (Grant, 1974, 1975b, and Vanderveer, 1977).

1. Primary levels of subdivision

Related sediments are grouped into eight broad materials, genetic categories. The categories used are:

(T) Till deposits - considered to be direct deposits of ice action, but some of the in situ material may have had fines removed by meltwater. Till is generally unsorted to poorly sorted, unstratified to partly stratified clay, silt, sand, pebble and boulder-sized material. The uppermost till on the Burin Peninsula is sandy with minimal clay and contains subrounded to subangular cobbles and boulders. Lower till units are more variable and are discussed in greater detail by Tucker (1979).

(L) Lacustrine deposits - clay, silt and fine grained sand, generally well washed and well stratified. They are defined as materials that have been deposited in quiet, fresh water.

(M) Marine deposits - clay, silt, sand and gravel, well stratified to moderately stratified and in some places containing marine fossils. Marine deposits are laid down in salt or brackish water or are located in an area that might reasonably be considered to have contained salt water at the time of deposit formation. The division between fluvial and marine deposits presents a problem at delta fronts. Fluvial is restricted to deposits apparently cut or planed by running water; unmodified slopes and areas obviously modified by wave action are referred to as marine. Marine deposits mapped on the Burin Peninsula, are sand-gravel textured and the term generally refers to relict deposits.

(F) Fluvial deposits - clay, silt, sand and gravel, well stratified and sorted to moderately stratified and sorted; detrital material laid down by running water. Fluvial deposits in this area consist mainly of sand and gravel and locally include washed bedrock, bouldery channel deposits and channel fillings of silt and clay.

(C) Colluvial deposits - texture ranging from clay and silt to rubble and boulders, generally poorly sorted and massive to crudely stratified. They are defined as loose materials accumulated on and at the front of slopes by various processes of mass movement and are derived from various parent materials, especially till and weathered rock.

(E) Eolian - is applied to all deposits arranged by wind, such as sands and other loose materials along shores, etc. Burin Peninsula eolian deposits are confined to limited zones of reworked beach material along the south coast and several of the larger lakes.

(R) Rock - used to denote bare or moss covered bedrock and areas where near-surface rock severely restricts the growth of trees.

(O) Organic deposits - peat, muck and marl generally unstratified and locally containing inorganic detritus. Organic deposits are materials of organic origin which commonly accumulate in and around closed basins or on gentle slopes. Burin Peninsula bogs consist of Sphagnum and sedge deposits, commonly 1-4 m deep which in many places contain and interfinger with open water.

2. Textural Modifiers

Textural modifiers are placed with the landform material as a lower case prefix in order of size. The designator gF would denote a gravelly fluvial deposit.

(r) rubbly - angular, fragmented material, no specific size
(b) bouldery - >-8ϕ
(g) gravelly - >-1 , <-8ϕ
(s) sandy - >4ϕ, <-1ϕ
(ȿ) silty - >8ϕ, <4ϕ
(c) clayey - <8ϕ

3. Morphological Modifiers

The morphological modifier expresses the pattern of the landform or genetic category. It is located as a lower case subscript in order of overprint. 'Th' would indicate an area of hummocky till. Where a sequence of geomorphic processes has produced a multiaspect or compound terrain fabric, the geomorphic modifier suffixes are appended in the inferred order of superposition. "Tvlh" means that a veneer of till has been molded into a smeared or drumlinoid form and then mantled with hummocky till during ablation.

(p) plain - flat and deep
(m) rolling - undulating and deep
(h) hummocky - sharply undulating
(r) ridged
(k) kettled -undulating with numerous, distinct ice block depressions
(v) veneer - <3 m
(b) blanket - >3 m, <10 m
(a) apron
(t) terraced
(l) lineated - fractured bedrock or fluted till
(s) steep slope
(f) fan

4. Genetic and Process Modifiers

This category is used to denote modern and past processes. The symbol appears as an upper case superscript such as F^{G}, which in this case indicates that the fluvial deposit is related to glacial activity. The symbols are arranged in order of overprint on the area.

(D) deflated
(G) glaciated
(W) weathered, washed or winnowed
(E) eroded by meltwater
(V) gullied or dissected
(S) soliflucted (relict)

Complex Units

1. Lateral Relationships Tv=O, Tv/O, Tv:O

An equal sign (=), a slash (/) and a colon (:) are used where two or more classes of terrain are interspersed in a mosaic or repeating pattern on a scale too small to warrant meaningful differentiation, the connecting symbol indicates the proportion of each component in the combination. "Tv=O" means that 50% of the area is underlain by thin till, and 50% is organic (bog or fen). "Tv/O" is 60-70% till veneer, and 40-30% organic-cover. "Tv:O" indicates that 90-95% of the enclosed terrain is covered by thin till and the remainder is organic.

2. Transitional Associations $F^{G}p$-Mt, $F^{GE}hr$-$T^{WE}h$

Locally, two or more terrain units are juxtaposed by reason of related origin, temporal sequence, or ambiguous geomorphic distinction. Such situations are identified by a compound designation marked by a hyphen. Examples are: an outwash plain that slopes down and is transitional to a marine terrace ($F^{G}p$-Mt), or pitted glaciofluvial topography that blends with hummocky disintegration moraine ($F^{GE}hr$-$T^{WE}h$).

3. Stratigraphic Sequence Ov / Mv / Tl

Natural exposures are rare, except along coasts, and road cuts are shallow, but where materials of different origin or texture are known or can be reasonably inferred to be superimposed, the sequence is indicated in conventional order using horizontal separators, such as, "Ov / Mv / Tl", which indicates that thin muskeg has developed over a marine mantle on drumlinoid till. Rock is occasionally used in the lowermost position of a unit designator if it is known to be present yet not readily apparent on the air photos because the overlying material is more-or-less continuous.

4. Designator Examples

$sgF^{G}v$-ȿsTr-O - A complex of sandy, gravelly, thin glaciofluvial material, silty, sandy till ridges, and organic cover.

$R^{G}l$:sTvhr - Between 90-95% of this unit is fractured, glaciated rock and the remaining material sandy, hummocky and ridged till veneer.

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LEGEND

Longitudinal ice-flow features: drumlin, drumlinoid, fluting, stoss-and-lee hill; direction of ice movement known, unknown

Transverse ice-flow features, crestline of end moraine; prominent and continuous, subdued and broken

Ribbed moraine, De Geer moraine, minor moraine

Esker, crevasse filling; direction of flow known, unknown

Depressional lineament along fracture of fault trace

Abandoned channel of former meltwater stream

Emerged shorelines of former proglacial lake or marine submergence

Scarp of terrace, bench, delta, or ice margin

Kettle hole, sinkhole

Location of radiocarbon-dated organic material

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704
JUNE 1980
GEOLOGICAL SURVEY
COMMISSION GÉOLOGIQUE
OTTAWA

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