GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 11½

LEGEND

Map-unit 3f appears on Map 33-1960, 'Montague' only.

CENOZOIC

POST-GLACIAL AND RECENT

6 Shore deposits: sand

5 Salt marsh: muck

4 Swamps: 4a, muck; 4b, peat

PLEISTOCENE

3 Glacio-fluvial deposits: 3a, esker; 3b, kame; 3c, kame terrace (includes only multiple-level terraces); 3d, kame complex (areas of multiple kames, and including eskers and crevasse fillings too small to map independently; 3e, valley-edge kame complex (includes kames extending down valley sides and probably some single-level kame terraces) — Well to poorly sorted sand and gravels, often with some admixture of washed till

3f, glacio-lacustrine deposits: fine sands, silts; 3g, outwash and other glacio-fluvial deposits exhibiting no topographic form: washed till, well to poorly sorted sands

2 Ablation moraine: loose, generally sandy till, often with streaks and pockets of sand

1 Ground moraine: 1a, sand phase; 1b, clay-sand phase; compact sand till

PALAEOZOIC

BEDROCK OUTCROPS

PERMO-CARBONIFEROUS

R Rock: red to brown, and grey sandstone; minor shale and conglomerate (drift cover generally less than 3 feet thick)

Rock outcrop ×

Bedrock shoulder on hillside

Geological boundary (defined, approximate)

Glacial striae (direction of ice-movement known, unknown)

Drumlin

Glacial groove (in till)

Gravel pit G.P.

Geology by G.H. Crowl, 1957 - 1960

Main highway

Other roads

Trail

Railway

County boundary

Post Office P

Lighthouse

Wharf

Intermittent stream

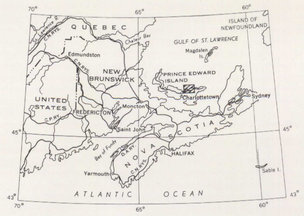
Contours (interval 100 feet) 600

Cartography by the Geological Survey of Canada, 1960

Approximate magnetic declination, 24° 30' West

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa

In response to public demand for earlier publication, Preliminary Series maps are issued in this simplified form and will be clearer to read if all or some of the map-units are hand-coloured



INDEX MAP

Adjoins Map 33-1960, "Montague"

Adjoins Map 37-1960, "Souris"

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MAP 36-1960

SURFICIAL GEOLOGY

MOUNT STEWART

KINGS AND QUEENS COUNTIES

PRINCE EDWARD ISLAND

Scale: One Inch to One Mile = 1/63,360

1 ½ 0 1 2 3 Miles

DESCRIPTIVE NOTES

The topography is largely bedrock controlled. Glacial drift cover is commonly 5 to 10 feet thick, but in many places rock is less than 3 feet below the ground surface. Bedrock is exposed at numerous places along the north shore and in the bays; inland, it appears in numerous road-cuts, but seldom in any natural exposure.

The bedrock(R), of Permo-Carboniferous age, is a monotonous series of dark red, soft sandstones, siltstones, and shales, with a few thin irregular grey layers, and no readily recognizable marker beds. Good exposures along the coast demonstrate the lack of continuity of individual beds. Large-scale, low-angle crossbedding is common in the sandstone layers. These sediments were deposited by slow-flowing streams on large deltas or alluvial fans. Coal plant fossils indicate a riverine or swampy environment.

The extensive crossbedding and the lack of continuity of beds renders difficult any determination of structural attitudes. Prominent ridges between Southampton and Strathcona and rock shoulders in many places indicate that the beds strike about N70°W. Cuesta slopes, south of Morell East and southeast of Five Houses, where bedrock is close to the surface, indicate that the strata dip about 2°-4°N. The map-area is on the north limb of an anticline whose axis extends eastward from Hillsborough Bay (southwest of the map-area).

This area was glaciated during the Wisconsin (latest Pleistocene) age. There is no evidence of older glaciations. About half of the area is covered with ground moraine deposited during the advance of ice. Some upland areas are covered with ablation moraine deposited by melting stagnant ice. Valleys are floored by ice-contact debris and extensive glacio-fluvial deposits laid down by melting ice and meltwaters from the glacier.

The ground moraine (1) is characterized by a smooth surface with little micro-relief. It is developed on a reddish brown sand till derived from local bedrock, with few pebbles and cobbles of bedrock and very few erratics. In other parts of eastern Prince Edward Island this till has been divided into the following three phases on the basis of the physical characteristics of the material: sand, clay-sand, and clay; the clay phase is not found within the Mount Stewart map-area.

The sand phase (1a) has the following characteristics: upon impact, the dry material either collapses into grains and dust, or breaks into small chips that have no cohesive strength; clay 'skins' around large quartz grains and pebbles are rare or absent; when till is wet, plasticity is low; the matrix does not contain many fines; and cut banks usually tend to slump readily. This phase has developed where bedrock is predominantly sandstone.

The clay-sand phase (1b) grades from the sand phase to a clay phase, which is exposed in the Pownal Bay district southwest of the map-area. It includes many textural and compositional gradations. The characteristics of the 'normal', or most common, clay-sand till are: when dry, the till breaks into chips that have moderate cohesive strength; clay 'skins' surrounding pebbles and large quartz grains are prominent; it is moderately plastic when wet; the matrix contains many fines; and cut banks hold up moderately well, but exhibit slumpage. This phase apparently has developed where bedrock consists of sandstone and a little shale.

Ablation moraine (2) covers a small part of the area. It commonly shows a rougher topography than that of the ground moraine; local relief of a few feet is common. It is developed on till that is generally loose, sandy, streaked with loose sand, and not compact like the basal tills.

Stratified drift (3) covers about one third of the area. It ranges from ice-contact debris to outwash features such as eskers, kames, kame complexes, and outwash that has no particular topographic expression. The materials are well to poorly sorted. All glacio-fluvial forms have a wide range in size, from 3 feet high and nearly 100 feet long to 30 feet high and more than a mile long. Poorly stratified drift occurs generally on valley floors; kames and kame terraces are common on valley flanks; and the whole complex of glacio-fluvial forms (3a-3g) extends down valley and from one valley to another.

Glacial striae are preserved on hard sandstone ledges at numerous places beneath the drift. They trend generally N60°W, approximately parallel to the structural trend of the bedrock. This indicates topographic control of at least the latest stages of ice-movement over the island. Where the direction of striae is determinate, it indicates a westward movement of ice from a centre on Cape Breton Island. Striae directions are more variable along the coast than inland. Most striae trend nearly parallel to the coast, but a few are at a high angle to it. Crag-and-tail indicates that the ice flowed eastward in the present Gulf of St. Lawrence from the Central Highlands of New Brunswick; striae at a high angle to the coastline probably indicate movement inland by that ice. Distribution of erratics and preliminary till-fabric studies suggest that the Cape Breton ice was slightly earlier than the New Brunswick ice. Extensive ablation and glacio-fluvial deposits in the western part of the map-area may mark approximate eastward limits of New Brunswick ice inland.

The area was deglaciated under conditions of ice stagnation. The ice ceased to move, and melted down from the surface rather than back from the margin. The hills appeared first; ice tongues lay in the valleys and gave rise to the complex and anastomosing pattern of glacio-fluvial deposits.

Swamps (4) occur in undrained depressions and where drainage has been impeded. Most of them contain muck (4a), but a few contain peat (4b). The latter are not exploited. Salt marshes (5) are found at sheltered points along the coast.

Shore deposits (6) comprise beaches, bars, spits, and dunes. Much of the sand is being actively shifted by wind and waves; in a few places, dunes are moving inland.

Sand and gravel pits have been opened in some of the eskers and kames. The sand is not high quality, as it is commonly contaminated with silt. The gravel is derived from local soft sandstone; the pebbles are too soft to withstand abrasion.

MAP 36-1960
MOUNT STEWART
PRINCE EDWARD ISLAND
SHEET 11 ½