PLATE I

QUATERNARY GEOLOGY OF THE ITASCA - ST. CROIX MORAINE INTERLOBATE AREA, NORTH-CENTRAL MINNESOTA

By

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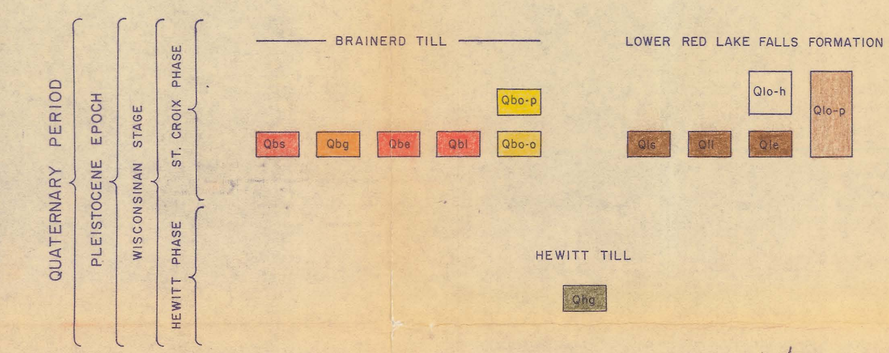
Scale 1:126,720
(one inch equals two miles)

0 1 2 3 4 miles

0 1 2 3 4 5 6 kilometers

EXPLANATION

GEOLOGIC COLUMN



MAP UNITS

BRAINERD TILL. Yellowish to reddish brown glacial sediment containing abundant igneous and metamorphic clasts, moderate amounts of iron-rich clasts and rare carbonate.

Q_{bs} - ST. CROIX MORAINE: Supraglacial sediment associated with ice stagnation; interbedded flowtills and glaciofluvial sediments, generally coarse-grained; pronounced hummocky topography, local relief to 43 m, hillslope angles to 24°.

Q_{bg} - ST. CROIX MORAINE: Basal till expressed as ground moraine; compact, unsorted glacial sediment with a moderately undulating surface; local relief up to 20 m, hillslope angles generally less than 4°.

Q_{bo-o} - OSHAWA OUTWASH PLAIN: Proglacial fluvial sediments, primarily sand and gravel, poorly to moderately well sorted, in places plane-bedded and cross-bedded; gently sloping surface; pronounced dump ridge at head of outwash plain.

Q_{bo-p} - PINE RIVER OUTWASH PLAIN: Proglacial fluvial sediments, primarily sand and gravel, poorly to moderately well sorted, in places plane-bedded and cross-bedded; irregular topography composed of gently sloping surfaces interrupted by many lakes and drained depressions.

Q_{bl} - LAKE PLAIN: Fine-grained lacustrine sediments, mostly sand and silt; land surface is flat to gently sloping, surrounded by irregular topography of lower elevation.

Q_{le} - ESKER: Fluvial sediment, ranging in size from sand to boulders; bedding structures common; occurs as a sinuous ridge, 10-15 m above surrounding sediments.

LOWER RED LAKE FALLS TILL. Light olive brown to yellowish brown glacial sediment, often clayey, containing abundant crystalline clasts, moderate amounts of carbonate clasts and rare iron-rich clasts.

Q_{ls} - ITASCA MORAINE. Supraglacial sediment associated with ice stagnation; mostly interbedded flowtills and glaciofluvial sediments, with a pronounced hummocky topography; linear, subparallel ridges are common; local relief up to 70 m, hillslope angles up to 27°.

Q_{lo-p} - PARK RAPIDS OUTWASH PLAIN: Proglacial fluvial sediments; primarily sand and gravel, generally moderately well sorted, in places plane-bedded and cross-bedded.

- Q_{lo-p1} - ZONE 1: Northern portion; very irregular topography composed of gently to moderately sloping surfaces interrupted by many randomly oriented lakes and drained depressions.
- Q_{lo-p2} - ZONE 2: Central portion; gently sloping surface interrupted by northeast-southwest oriented lakes and drained depressions.
- Q_{lo-p3} - ZONE 3: Southern portion; characterized by a gently sloping surface interrupted primarily by Hewitt Phase drumlins which rise above the outwash plain surface.

Q_{lo-h} - HACKENSACK OUTWASH PLAIN: Interlobate sand and gravel interbedded with flowtill deposits; moderately to gently sloping surface is interrupted by abundant lakes and drained depressions; hillslopes are much more abundant and original depositional surfaces are much more sparse than in other outwash plains.

Q_{ll} - LAKE PLAIN: Fine-grained lacustrine sediments, mostly sand and silt; land surface is flat to gently sloping, in places surrounded by irregular topography of lower elevation.

Q_{le} - ESKER: Fluvial sediment, ranging in size from sand to boulders, bedding structures common; occurs as a sinuous ridge, 10-20 m above surrounding sediments.

HEWITT TILL. Dark brown unsorted glacial sediment, containing varying amounts of crystalline, carbonate and Fe-rich clasts.

Q_{hg} - WADENA DRUMLIN FIELD: Compact, unsorted lodgement till, characterized by a land surface of round- to linear-shaped hills with a maximum relief of 20 m, surrounded and capped by fluvial and eolian sediments.

MAP SYMBOLS

- Contact, solid where known to within 200 m, dashed where approximate
- Outwash plain zone boundary
- Core study area
- Interlobate contact (approximate)
- Meltwater channel
- D D' Cross-section line

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