

PLEISTOCENE GEOLOGY

Variation in Content of Some Drumlins and Tills  
in Southwestern Nova Scotia

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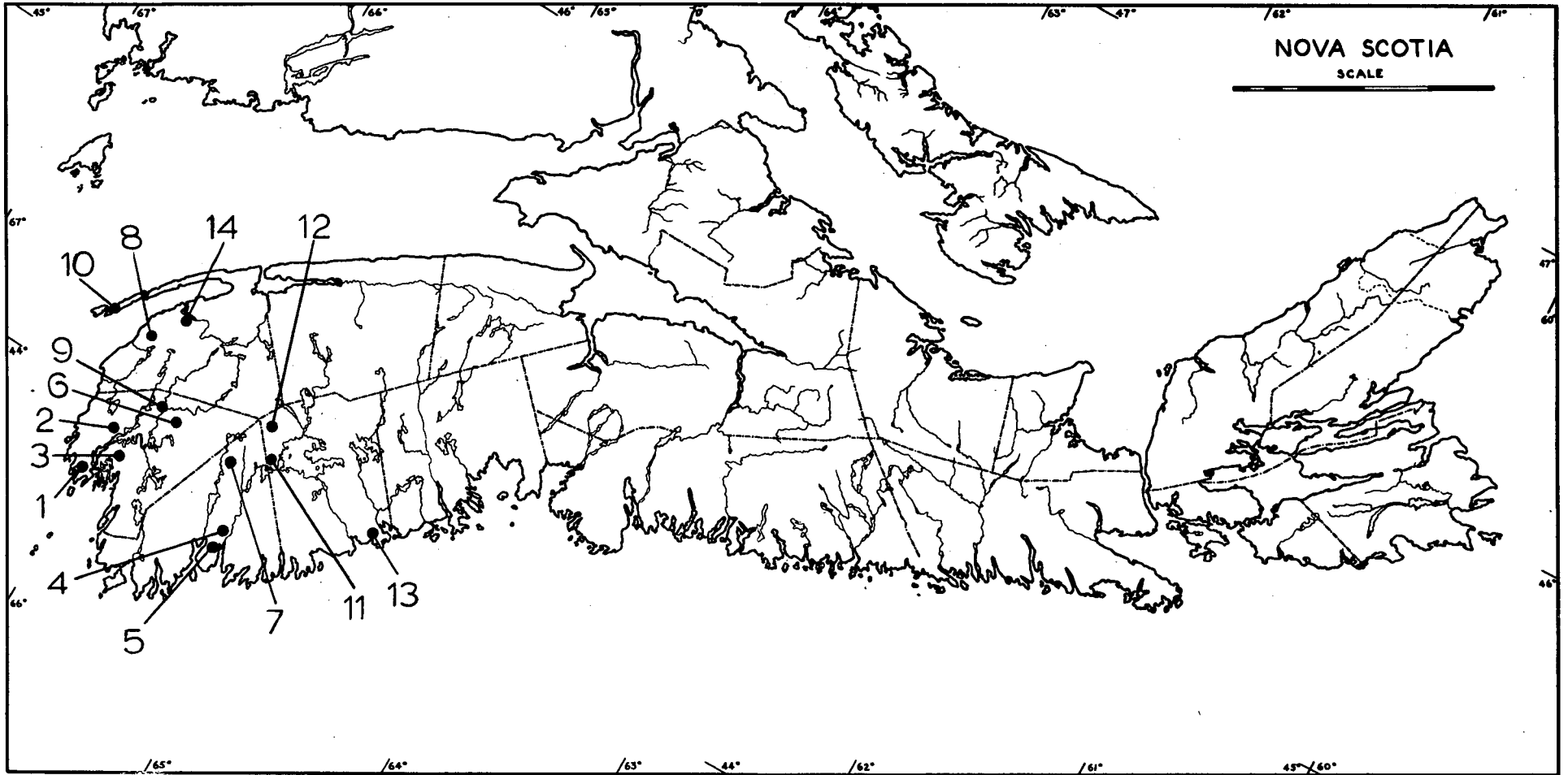
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There is a considerable difference in the composition of the drumlins and tills in the southwestern part of Nova Scotia. Many of these deposits show variation in both the size of the particles and rock fragments and the materials which constitute the drift, but many others show little variation in the content of the debris. Much of the variation in the drift may be traced directly to the bed-rock of the area or that to the northward.

The work and references cited are exclusively from the Nova Scotia Research Foundation project notes on the Pleistocene Geology of Nova Scotia, and no reference is made to previous work and reports which are well known.

White/Grey Rock Flour Type

In drumlins southwest of Carleton, Yarmouth County, much rock flour, together with the rock fragments which generally do not exceed the size of cobbles, is found in the drumlins. A few boulders may be found but most of the rock fragments are under 2 inches in longest dimension. No clay is to be found in these deposits, the fines being rock flour. In other parts of both Shelburne and Queens Counties the same type of drift may be found in many of the drumlins and in much of the till. Many of the rock fragments have a coating of the ground-up rock debris or rock flour, and this appears to have been in some way deposited by a varying amount of water action. The assumption being that there was some small amount of free water in the lower part of the ice as it was in the process of depositing this drift either as drumlin forms or as till. There is not any appreciable evidence of sorting or stratification in any of these drumlins or tills. Most of the rock which appears in this drift is either granite with lesser amounts of quartzites, which are generally of a low grade, or quartzite with lesser amounts of other rocks, mainly granite and metasediments. Although the drift forms a well-packed deposit, it readily breaks up into its various components on being disturbed. The faces of the borrow pits are usually vertical, indicating a high degree of packing in the drumlin or till. The cohesiveness of the material appears to be the result of compaction by the superincumbent ice load. The rock flour is usually very white thus giving a very distinctive grey or whitish-grey colour to the drift. There is no appreciable amount of weathering of minerals either near the surface or at depth in the drumlins or till.



### Other Types

Other drumlins and till contain materials which are sensibly different in size, type, and arrangement. Some have a high clay content, with other particles and rocks ranging in size from the rock flour or fine silt-sized particles to quite large boulders, some of which may be as much as 2, 3, or 6 feet across. The colour of this type of drift is in variance with that of the "rock flour" type, in that it is reddish, brownish-red, or reddish-brown in colour, varying from locality to locality. There was a high degree of compaction in this type of drumlin and till. It is generally extremely hard and strongly resists the shovel and pick. The clays act as good cementing substances and, together with the strong compaction, form a very tightly arranged fabric. Most of the drumlins formed of this material exhibit a hackly or cheese-like fracture which is apparently the result of a combination of vertical and horizontal forces exerted by the overriding ice sheet. The rock content of this type of drift is often quite variable. It may contain granites, mica schists, quartzites, basalts, felsite, hornblende gneiss, slate, and other variations of the Meguma Group metasediments.

### Multiple Drift

There are many instances of the occurrence of two distinct drift types in the same spot, with the two being quite different from one another, while other occurrences show that the drift is somewhat similar in both the deposits. Some of these may be separated by a relatively thin layer of glaciofluvial sediments. More than two ages of drift may be found, one such instance was the subject of a paper read by the writer to the VALLEY CHAPTER of the NOVA SCOTIA INSTITUTE OF SCIENCE in 1961.

### References

The following are some of the deposits referred to in this discussion and shown on the location map: (the bracketed number refers to the Field Note.)

- 1) (1367) North of Dunn Lake. Yellowish-brown sandy till over a hard-packed grey, sand and rock flour till with subangular (S/A) rocks.
- 2) (68G) West of South Deerfield. Drumlin, consists of a clayey type of drift with mica schist, quartzite, grey granite, hornblende schist, felsite, pink granite, and gneiss as the main rock content.
- 3) (1359) East of Duck Lake. Tan-brown rocky, sandy till with many boulders of quartzite. This overlies an older grey sandy till.
- 4) (4895) Jordan Falls. Rocky, sandy, rock flour type of till.
- 5) (4805) Near the mouth of the East Sable River. Till, hard-packed, white/grey sand and rock flour, with fragments and larger pieces of quartzites and other metasediments of the Meguma Group.
- 6) (1299) West of East Quinan. Sand and rock flour type drumlins.

The top 8'± is not as hard-packed as that below this depth. The top part is sand and rock flour with rocks generally less than 8 in. in size, and usually in the pebble range of size. This till is separated from the lower till by a layer of sand and rock flour approximately 1 ft. thick. The lower till is a very sandy one, very hard-packed, and dissimilar to the top one.

- 7) (1500) About 200 yds. north of the "Bonnycastle Dale" cemetery. Sand till with quartzite, schists and granite fragments, schist and quartzite boulders, and a small number of small granite rock fragments.
- 8) (S14) South of Saulnierville Station. Clay and slate till, containing large blocks and pieces of slate. Tills in this area also contain quartzites, schists, granites, slate, and basalt of varying sizes, and generally subangular in form.
- 9) (321) North Kemptville. Drumlin, consists of a sandy clay matrix, generally S/A rocks, such as slate, quartzite, pink and grey granites, felsite, basalt, and mica schist.
- 10) (060) Southeast of Freeport. Sand till with S/A to rounded basalt, quartzite, pink granite, and red sandstone of the Annapolis formation.
- 11) (8805) South of Eighth Lake. Sandy, slaty, mottled brown and grey tightly-packed, "smeared" till with gravelly parts as well as grey lenses/bands of fine sand or silt. Parts of this till are very rocky. The top 12 ± ft. consists of a tan-brown sandy till, less rocky and less tightly-packed than the lowest till, and with smaller rocks. This overlies an intermediate till (?) deposit which is about 8 in. thick, is fine-grained, and much less rocky than either the upper one, but has been packed much harder.
- 12) (8763) North of First Beaver Lake. Small drumlin. Drift is white, sandy, rock flour, with granite residue and granite rocks measuring up to 10 ft. with a trace of quartzite in the drift as well.
- 13) (8480) Southeast of Medway. Fine drift, sandy, grey, fragmental, with boulders up to 2 ft. but mainly under 1 ft., as well as some larger blocks up to 6 ft. The rocks and rock material are largely quartzites of the Meguma Group.
- 14) Evidence of Three Pleistocene Till Sheets at Weymouth Mills, Nova Scotia.