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CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

PAPER 53-9

PRELIMINARY MAP

ALLISTON

SIMCOE, YORK, AND DUFFERIN COUNTIES

ONTARIO

(Descriptive Notes)

By

B. A. Liberty

OTTAWA
1953

Price, 25 cents

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DESCRIPTIVE NOTES FOR ALLISTON MAP, ONTARIO

Stratigraphy

The map of the bedrock topography of the Lake Simcoe area, by Deane[1], has been used, with some modifications, as a base for the present interpretation. The areal configuration of the map-units is dependent on a remarkable bedrock topography, which is the result of the preglacial and glacial drainage pattern in the Georgian Bay-Lake Simcoe-Lake Ontario area. The bedrock 'island' north of Bradford, shown by Deane[1], does not appear on the present map, as its lithological identity places it entirely within the Cobourg formation.

Only three outcrops, all of the Dundas and Meaford formations, are known in the entire map-area. The Queenston formation is traced into the area from outcrop control in the adjacent Dundalk and Bolton map-areas. Strata of Collingwood and Gloucester ages appear only in the 'face' of the eastward bearing segment of the Niagara escarpment, which, farther east, swings southwards into a re-entrant caused by the preglacial Laurentian River Valley. With the exception of a small area of Sherman Fall beds in the northeast corner, the remainder of the area is underlain by Dundas and Meaford formations to the south, and Cobourg strata to the north, of the belt of Collingwood and Gloucester rocks.

The average total thickness of the Trenton and underlying Black River strata in this region is slightly more than 600 feet. However, the three wells in Gwillimbury West township report thicknesses as great as 680 feet. For purposes of sample description, the A. Breedon No. 1 well, in lot 21, con. III, Adjala tp., Simcoe co., is the most important.

Within the map-area, lower Sherman Fall beds have a logged thickness of 265 feet. They are predominantly brownish grey, fine-grained, argillaceous limestone, which commonly has a green cast, with interbeds of greyish brown and greenish grey crystalline limestone. In minor amounts are thin sections of green shale, some dense, hard, argillaceous limestone strata, and an occasional fragmental (clastic) limestone bed. The basal 50 feet or so consists of greyish brown to greenish grey, fine-grained, argillaceous limestone. The whole unit is fossiliferous, the lowermost 50 feet especially so.

The upper Sherman Fall beds may be described as comprising 20 feet of grey to brown, fine, medium, and

coarsely crystalline fossiliferous limestone. They are underlain and overlain by argillaceous limestone.

The Cobourg formation has a logged thickness of 180 feet. It is predominantly brown and greyish brown, dense limestone, but includes considerable fine-grained argillaceous limestone. In addition it may contain thin beds of coarsely crystalline limestone, and some fragmental limestone strata occur near the base. The formation is generally quite fossiliferous.

Within the map-area, the Collingwood and Gloucester strata are about 95 feet thick. They consist essentially of dark brownish grey, calcareous shale and dark brown, dense, shaly limestone. The shale may be finely micaceous or slightly silty. Both shale and limestone have a brown streak, and are fossiliferous.

The Dundas and Meaford formations, as recorded by Caley[2], are difficult to separate lithologically either in exposed areas or in the subsurface, and as only three outcrops of them were found in the Alliston area they have been mapped together.

No reliable information on the subsurface thickness of these formations is available within the map-area. Near Collingwood, their combined thickness is about 360 feet. The Adjala wells -- Breedon No. 1, Breedon No. 2, and Skeele No. 1 -- penetrated 295 to 300 feet of Dundas and Meaford strata, but this does not represent a complete section of these formations, which have a possible maximum thickness of 380 feet in the southwest corner of the map-area.

In outcrop, the Dundas and Meaford formations are essentially grey, bluish grey, and greenish grey shales in thin, even beds, with thin interbeds of impure limestone increasing in number and thickness toward the top of the upper, or Meaford, formation. The uppermost strata are dominantly of limestone, in beds several inches thick. In the subsurface, the combined unit may be described as consisting of medium grey, dark grey, to greenish grey, hard, finely micaceous shale, some of which is calcareous, slightly silty, and pyritic. In places, these formations contain abundant fossils; ostracods and shell fragments are reported.

The thickness attained by the Queenston formation within the map-area cannot be estimated, as no well has penetrated it. Typically, the formation consists of thinly bedded, brick-red to, locally, mottled green, argillaceous, and silty shale, and in general is remarkably uniform in character. On exposure it breaks down rapidly to form a fine red clay soil.

Glacial Geology

The map-area is covered by a mantle of glacial drift, which varies in thickness from 50 feet to as much as 430 feet. A full account of this superficial material is given by Deane[1], whose map of the bedrock topography of the Lake Simcoe district portrays the remarkable preglacial drainage pattern. The present topography bears little relation to that of the underlying bedrock in the Alliston map-area.

Structural Geology

In the Lake Simcoe district, the dip of the Ordovician strata is thought to be very nearly that of the regional slope of the Precambrian surface, which strikes west-northwest and dips south-southwest at a rate of about 18 feet a mile. A more local estimate on the top of the Trenton, based on elevations from the Breedon No. 1 well, the Williams No. 1 well, and the Tottenham well in lot 5, con. III, Tecumseh tp., indicates a west-northwest strike and a south-southwest dip of 24 feet a mile.

Economic Geology

Within the map-area, several wells have been drilled into bedrock for purposes of exploring its petroleum possibilities. The most important, the A. Breedon No. 1 well, was diamond drilled in 1949, and oil shows were found at depths of 854, 876-887, 905, 952, 960-965, and 968 feet. Two additional offset wells were drilled by cable-tool rig, but encountered no important showings. All were subsequently abandoned. Thus far, these oil shows represent the most promising results in the Lake Simcoe district[3].

Gravel pits are readily available for road material, but none is of noteworthy importance.

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[1]Deane, R. E.: Pleistocene Geology, Lake Simcoe District, Ontario; Geol. Surv., Canada, Mem. 256, 1950.

[2]Caley, J. F.: Palaeozoic Geology, Toronto-Hamilton Area, Ontario; Geol. Surv., Canada, Mem. 224, 1940.

[3]Gray, J. E., and Roliff, W. A.: Developments in Canada in 1949; Am. Assoc. Pet. Geol., June 1950, p. 1235.