

GEOLOGICAL SURVEY

75°00'



LEGEND

- NOTE:— Stippled areas are heavily drift-covered and in them the underlying bedrock is not known. Coloured areas are largely drift-covered, the locations of known areas of outcrop are indicated by crosses (x), small outcrop (o).
- ORDOVICIAN**
- 11 RICHMOND
QUEENSTON FORMATION: red shale
RUSSELL FORMATION: interbedded grey shale and dolomite
 - 10 LORRAINE
CARLSBAD FORMATION: grey shale, sandy shale, some dolomitic layers
 - 9 GLOUCESTER
BILLINGS FORMATION: black shale with a little brown shale
 - 8 COLLINGWOOD
EASTVIEW FORMATION: dark grey, almost black limestone
 - 7 TRENTON AND BLACK RIVER
OTTAWA FORMATION: limestone with some shaly partings, in lower part considerable interbedded shale, some dolomite and, in basal part, some sandstone, 7a, Pamela, 7b, Lowville, 7c, Leray, 7d, Rockland, 7e, Hull, 7f, Sherman Fall, 7g, Cobourg
 - 6 CHAZY
ST. MARTIN FORMATION: shale, sandstone, impure limestone, dolomite
 - 5 ROCKCLIFFE FORMATION: shale with lenses of sandstone
 - 4 BEEKMANTOWN
OXFORD FORMATION: dolomite and limestone
 - 3 MARCH FORMATION: interbedded sandstone and sandy dolomite
- ORDOVICIAN OR CAMBRIAN**
- 2 NEPEAN FORMATION: sandstone
- PRECAMBRIAN**
- 1 Altered dolomite
- Heavily drift-covered area
Geological boundary (defined, approximate)
Bedding (inclined)
Fault (defined, assumed)
- Provincial highway (with number)
Road well travelled
Road not well travelled
Road along county boundary
Road along township boundary
Bush road or trail
Post Office
Interprovincial boundary
County boundary
Township boundary
Intermittent stream
Marsh
Contours (interval 50 feet)
Height in feet above Mean sea-level 200'

DESCRIPTIVE NOTES

The single PRECAMBRIAN (1) outcrop in the area occurs at Rockland village. It is a small horst-like exposure of metamorphosed dolomite. The Precambrian complex of the Canadian Shield lies just to the north and within the area its irregularly eroded surface everywhere forms the floor upon which the Palaeozoic strata lie in an almost horizontal position except in the proximity to some of the larger faults.

The NEPEAN formation (2) is the oldest of the Palaeozoic strata. Its only outcrops are in Rockland village but so far as known it everywhere underlies the next younger formation. The Nepean is a thin to thick-bedded, coarse-grained, cream-colored sandstone, weathering grey with irregular brown stains. Where quartz forms the cementing material the rock is hard with thin bands of pure quartz. Near the top the cement is calcareous or of iron oxide and the rock disintegrates after long exposure. Since the formation was deposited on an irregular surface it varies widely in thickness; the maximum known thickness in the area is 280 feet. The Nepean has been correlated with the Potsdam of New York and it was assumed to be of late Cambrian age. There is no discernible break between the Nepean and the overlying March formation and, therefore, it is possible the Nepean sandstone is of Ordovician age.

The MARCH formation (3) has an estimated thickness of 25 to 30 feet. It is composed of thick beds of grey sandstone with a calcareous cement, alternating with thick beds of sandy blue-grey dolomite, both weathering a rusty brown. The contact with the Nepean is placed at the lowest dolomite layer, but it is often difficult to locate because outcrops of the formation in many places are of the resistant sandstone layers which are very similar to the Nepean sandstone. It has been mapped separately because its characteristic features are persistent and it is a water-bearing horizon. The upper part of the March grades into the overlying Oxford and for this reason the formation is considered to be of Beekmantown age.

The OXFORD formation (4) holds a few thin beds but for the most part consists of thick, rusty weathering beds of dove-grey limestone, magnesian limestone and blue-grey dense dolomite, becoming dark and somewhat argillaceous in the upper part of the formation. In the dolomitic layers irregular cavities 1/2 to 2 inches in diameter frequently are filled with large pink or white calcite crystals. The Oxford is approximately 325 feet thick at Carlsbad Springs the thickness increases comparatively rapidly towards the east. The formation contains fossils that indicate its Beekmantown age.

The ROCKCLIFFE formation (5) is separated from the Oxford by a disconformity indicating an erosional interval. The deposition of the Rockcliffe and the Oxford. The Rockcliffe consists of thick beds of grey-green shales containing lenses of fine, grey sandstone. The lenses vary greatly in thickness and extent. The lowest sandstone layer is coarse, and is almost a fine conglomerate where it lies upon the Oxford dolomite. The Rockcliffe has a thickness of 140 to 150 feet in the vicinity of Ottawa. Indications farther east suggest that it becomes thinner in that direction. *Camarotoechia plena*, and *C. orientalis* occur sparingly indicating deposition in late Chazy time. The Lower and Middle Chazy beds of the Lake Champlain area were probably laid down during the erosional interval represented by the disconformity at the base of the Rockcliffe. The formation is composed of grey shale containing limestone bands, and occasional thick, siliceous and dolomitic beds near the top. Locally thin beds of coarse sandstone occur. The formation has a thickness of 20 feet in one western section and increases in thickness to the east. The whole is replete with *Camarotoechia plena* indicating a late Chazy age.

The OTTAWA formation (7) succeeds the St. Martin with a slight disconformity which probably does not represent a very long period of time. The formation consists of the base of brown, or locally black shale, grey-brown sandstone and thin bands of limestone. The basal beds closely resemble the underlying St. Martin but the contact between the two can usually be recognized by the abrupt cessation of *Camarotoechia plena* so abundant in the St. Martin. The shaly and sandy lower beds give place upwards to grey shales interbedded with grey limestone, dolomite and occasional bands of sandstone. This assemblage in turn grades upward into a group of thick beds of pure, crystalline limestone. About 240 to 250 feet above the base the thick-bedded pure limestones are succeeded by shale with interbedded thin beds of impure limestone. These are followed by heavier, purer limestone, though occasional shaly partings persist. The formation attains a thickness of approximately 700 feet. Its abundant fossil content indicates uninterrupted deposition from early Black River to the end of Trenton time. The pure crystalline limestones were deposited during late Black River and Trenton time.

The BILLINGS formation (9) succeeds the Eastview with no break. The lower 15 feet consists of brown shale like those forming the partings of the upper beds of the Eastview. Within this lower 15 feet the fauna changes from Collingwood to Gloucester. These brown shales grade upwards into dark almost black, fissile shales having an estimated thickness of about 200 feet.

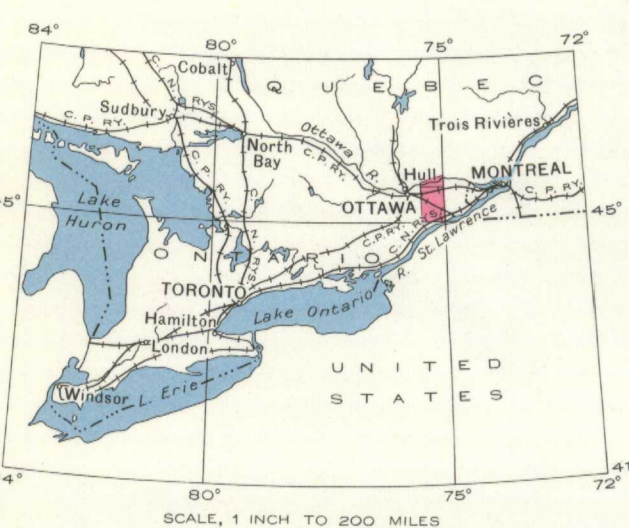
The CARLSBAD formation (10) succeeds the Billings with no discernible break. The formation is made up of grey shale and sandy, rusty-weathering shale with interbedded dolomitic layers at some horizons near the top. It attains a thickness of nearly 600 feet.

The RUSSELL formation (11) succeeds the Carlsbad with, apparently, no break. It consists of grey shale and interbedded heavy rusty-weathering dolomite and may be of Meaford age. Upwards the Russell shales and dolomites give place to red shales of Queenston age. The QUEENSTON formation (11) consists of red shales, in a few cases mottled with green. Only a few outcrops occur, and its exact thickness is not known. The Russell and Queenston formations are mapped together because exposures of the Russell beds are poor and definite information is lacking. The combined thickness of the two formations is approximately 100 feet.

A heavy mantle of drift consisting of glacial till, marine clay and sands, and recent alluvium conceals much of the Palaeozoic rocks.

Geology by Alice E. Wilson, 1935, 1936, and 1937.

Base-map prepared by the Topographical Survey, 1938, from Federal Government maps published in 1933 and 1936. Cartography by the Drafting and Reproducing Division, 1940.



MAP 587A
CASSELMAN
RUSSELL, DUNDAS, STORMONT, PRESCOTT,
CARLETON, AND PAPINEAU COUNTIES
ONTARIO AND QUEBEC
Scale, 1/250,000 or 1 inch to 2 Miles
Approximate magnetic declination, 13°45' West.

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