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ISSUED 1938

GEOLOGICAL SURVEY

SHEET 31 G (West Half)

LEGEND

NOTE:–Outcrops or areas of outcrop of a formation are shown by deep colour; inferred extensions of a formation beneath drift are shown by a lighter tint of the same colour. Small outcrops shown thus: ×

CENOZOIC

MODERN

7 — PLEISTOCENE AND RECENT
Recent alluvium and glacial deposits

ORDOVICIAN

6 — BLACK RIVER AND TRENTON
OTTAWA FORMATION: limestone, some dolomite layers in lower part, considerable interbedded shale with some sandstone in basal part; **6a**: *Pamelia,* **6b**: *Lowville,* **6c**: *Leray,* **6d**: *Rockland,* **6e**: *Hull,* **6f**: *Sherman Fall,* **6g**: *Cobourg*

PALAEOZOIC

5 — CHAZY
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 — *Unsubdivided*

NOTE:–An exposure of Oxford strata 5½ miles south of the map-area, may indicate that this area of alluvium and glacial deposits is underlain by the Oxford formation. If so, a fault separates the Oxford from the Ottawa formation to the west.

Geological boundary (defined, approximate)
Subdivisions of Ottawa limestone
Bedding (inclined)
Fault (defined, assumed)
Mine or prospect ×
Quarry

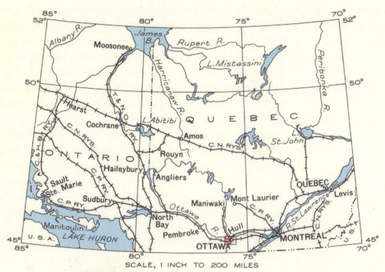
Road (well travelled)
Road (not well travelled)
Trail
Railway
Electric railway
Bridge
Provincial boundary
Township boundary
Township boundary (along road)
Sand pit
Contours (interval 50 feet) 250

Base-map compiled by the Topographical Survey from information supplied by Federal Government Departments.

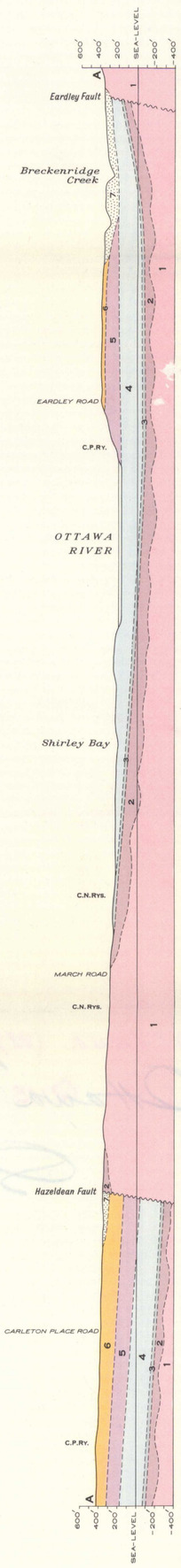
Geology by A. E. Wilson, 1935.

14° MAG. NORTH — TRUE NORTH

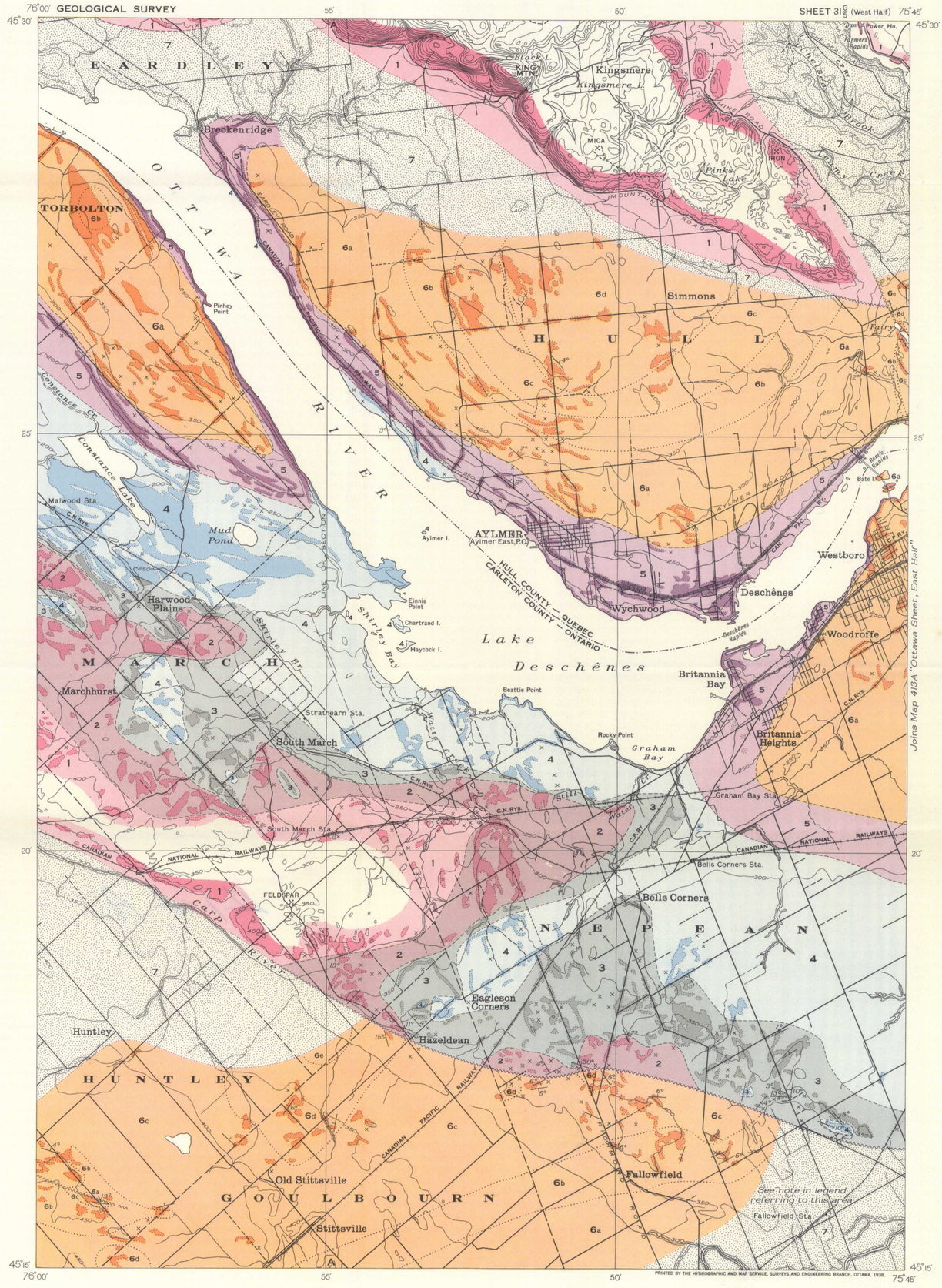
Approximate magnetic declination, 14° West.



SCALE, 1 INCH TO 200 MILES



Section along line A–A
Horizontal scale, 1 inch to 1 Mile
Vertical scale, 1 inch to 880 Feet



PRINTED BY THE HYDROGRAPHIC AND MAP SERVICE, SURVEYS AND ENGINEERING BRANCH, OTTAWA, 1938.

MAP 414 A

OTTAWA SHEET

(WEST HALF)

CARLETON AND HULL COUNTIES

ONTARIO AND QUEBEC

Scale, 1/63360 or 1 Inch to 1 Mile

Miles 1 0 1 2 3

Kilometres 1 0 1 2 3 4 5

GENERAL GEOLOGY

The undifferentiated PRECAMBRIAN rocks (1) consist of various types of altered sedimentary rocks, crystalline limestones, gneisses and quartzites, of the Grenville series intruded and deformed by bodies of granite, syenite and other igneous types. The irregularly eroded surface of this basal complex forms the floor upon which the Palaeozoic strata lie in an almost horizontal position except where in immediate proximity to some of the larger faults.

The NEPEAN formation (2) is the oldest member of the Palaeozoic strata. As far as known it everywhere underlies the next younger formation. The Nepean is a thin to thick-bedded, coarse-grained, cream-coloured, silica sandstone, weathering grey with irregular brown stains. Where silica forms the cementing material it is hard with thin bands of pure quartzite. Near the top where the cement is calcareous or of iron oxide it disintegrates after long exposure. Since the formation was deposited on an irregular surface it has a wide range in thickness, the maximum known thickness being 280 feet. The Nepean has been formerly correlated with the Potsdam of New York, and it was assumed to be of Upper Cambrian age. It appears to be unfossiliferous in the Ottawa area, and its age is not definitely known. There is no discernible break between the Nepean and the March formation above it. So that it is possible the Nepean sandstone was laid down in an advancing Ordovician sea.

The MARCH (3) is a thin formation of Lower Ordovician age lying conformably upon the Nepean. It is composed of thick beds of interstratified grey sandstones with a calcareous cement and sandy blue-grey dolomites, both weathering a rusty brown. Transitional between the Nepean below and the Oxford above, it has been here defined as a formation because its characteristic features are persistent throughout the region. It is a water bearing horizon. The contact with the Nepean is placed at the first dolomitic layer, but it is difficult to locate in many places because the resistant sandstone layers are often widely exposed and are very like those of the upper Nepean. The upper layers grade into the Oxford. It has an estimated thickness of 25 to 30 feet.

The OXFORD formation (4) lies conformably upon the March. Having a few thin beds it is for the most part made up of heavy, rusty-weathering beds of dove-grey limestone, magnesian limestone and blue-grey dense dolomites, becoming dark coloured and somewhat argillaceous towards the top. In the dolomitic layers irregular cavities ½ to 2 inches in diameter frequently are filled with large pink or white calcite crystals. The Oxford has an average thickness of 225 to 230 feet, which increases comparatively rapidly towards the east. The formation contains *Ophileta* and *Raphistomina* and other fossils which indicate its Beekmantown age.

The ROCKCLIFFE formation (5) is separated from the Oxford by a disconformity indicating an erosional period between 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 basal sandstone layer only is coarse, almost a fine conglomerate in places where it lies upon the Oxford dolomite. The lenses vary greatly in thickness and extent. The Rockcliffe has a thickness of 140 to 150 feet. *Camarotoechia plena* and *C. orientalis* are found sparingly in some sandstone beds, recording deposition in late Chazy time. The Lower and Middle Chazy beds of the Lake Champlain area were probably laid during the erosional interval represented by the disconformity at the base of the Rockcliffe.

The OTTAWA formation (6) succeeds the Rockcliffe or the St. Martin to the east with a slight disconformity which probably does not represent a very long period of time. The formation consists at the base of a few feet of brown shales, grey-brown sandstones and thin bands of limestone. Because of the sandy and shaly nature of the base of the Ottawa it closely resembles the two formations beneath it. Where it is in contact with the Rockcliffe it is particularly difficult to distinguish. These beds give place to grey shales interbedded with grey limestones, dolomites and occasional bands of cream-coloured comparatively pure sandstone all of which is gradually succeeded by thick beds of pure crystalline limestones. About 240 to 250 feet above the base there is an abrupt change from the thick-bedded pure limestones to interbedded shale and thin beds of impure limestone. This, however, is again followed by heavier, purer limestone, though occasional shaly partings persist. The formation attains a thickness of approximately 700 feet. Its abundant fossil content shows a condition of uninterrupted deposition from the beginning of Black River to the end of Trenton time. The end of the Black River period and beginning of the Trenton came during the deposition of the pure crystalline limestones, while the shallowing of the sea represented by the shaly beds 240 to 250 feet above the base came well within the Trenton period.

A heavy mantle of PLEISTOCENE and RECENT (7) deposits overlies the Precambrian and Palaeozoic. The overmantle consists of glacial till, marine clay and sands and recent alluvium deposits. It conceals much of the Palaeozoic rocks but has been mapped only where it is known to have a considerable depth over large areas.

STRUCTURAL GEOLOGY

Several comparatively large faults cross the sheet. The outcrops show that the Gloucester and Hazeldean faults follow a broad arc. The displacement is greater at the centre of the arc, and gradually diminishes towards the ends. A deep overmantle somewhat to the west of the Precambrian ridge suggests that the Eardley fault lies southwest of the exposed ridge, and probably has the curve characteristic of the region.

The Gloucester fault forms the western margin of a large, down-dropped block, upon which the cities of Ottawa and Hull have been built. The eastern margin of this block is bounded by the more complicated echellon system of faults crossing and recrossing the Montreal road. The maximum displacement seems to move progressively eastward from fault to fault, from Rockcliffe Park to a faulted region in the vicinity of Robillard's quarry, thence to the north of Orleans. This fault system has approximately the same magnitude as the Eardley fault and may be a continuation of it, possibly having been offset horizontally by the later Gloucester fault.

In the northwest section of the map-area there is a hidden fault or an area of torsion. The rocks of the low plateau of South Hull township have a dip towards the southeast but the same strata west of the river in March and Torbolton townships dip northwest into the river.

414A