ORDOVICIAN

17 OTTAWA FORMATION: grey limestone

ROCKCLIFFE FORMATION: olive-green shale with sandstone lenses

MARCH AND OXFORD FORMATIONS: blue, very fine crystalline dolomite

PRELIMINARY SERIES

NEPEAN FORMATION: yellow and grey, fine to coarse sandstone

Unconformity

Massive, coarse-grained white granite and white pegmatite; mainly associated with marble and may include minor white granodiorite equivalent to 10

12 Massive, coarse-grained, pink granite and pink pegmatite

11 Mainly massive, coarse-grained syenite and syenodiorite

10 Foliated and massive, pink granodiorite

9 Massive, medium- to coarse-grained hornblende diorite, which may grade into gabbro

8 Hornblende migmatite: mainly intercalated amphibolite and

Meta-gabbro; 7a, dense, massive to schistose, fine-grained, dark amphibolite, possibly equivalent to meta-gabbro

6 Layered, medium-grained amphibolite

5 Garnet amphibolite; garnet gneiss and migmatite

Medium- to coarse-grained, light grey marble; 4a, tremolite marble alternating with well-layered, fine-grained, grey marble

3 Quartzo-feldspathic (-biotite) gneiss, distinguishable by rusty weathering and content of pyrite and graphite

Biotite migmatite, consisting of intermixed biotite gneiss and granite

1 Quartzite: pink to white, includes minor granite

NOTE: Units 1 to 8 are interbanded

Geological boundary (defined, assumed)
Foliation (horizontal, inclined, vertical, dip unknown)
Lineation (inclined, may be combined with foliation symbols)
Mylonite laminations (inclined)
Minor fold (arrow indicates plunge)
Fault (assumed, from lineaments)
Glacial striae (direction of ice movement unknown)
Esker
Sand and gravel
Gravel pit (active, abandoned)
Quarry, pit
Mineral occurrence

MINERA

rrhotite po
nd and gravel gs
one (building) B. st
one (decorative) D. st

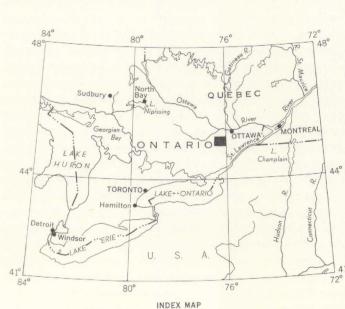
Precambrian geology by E. W. Reinhardt, 1963
Palaeozoic geology by A. E. Wilson, 1946, compiled by B. A. Liberty, 1963

Geological cartography by the Geological Survey of Canada, 1964

Main highway · · · · · · · · · · · · · · · · · · ·	Route (
Other roads	
Trail	
Railway	+-+
Township boundary	
Electric power line; on steel towers	
Buildings	
School	
Post Office	
Church	
Cemetery	
Swamp or marsh	
Intermittent stream	
Inundated land	====
Contours (interval 25 feet)	500 —
Height in feet above mean sea-level	

Base-map compiled and drawn by the Army Survey Establishment, R. C. E., 1951 with revisions by the Geological Survey of Canada, 1964

Approximate magnetic declination, 12°46' West, decreasing 0.6' annually





76°30′ Adjoins Map 1089A,"Perth" PUBLISHED, 1964
COPIES OF THIS MAP MAY BE OBTAINED FROM THE PRINTED BY THE SURVEYS AND MAPPING BRANCH MAP 7-1964

DESCRIPTIVE NOTES

31 F/1

Maximum relief in the area is about 500 feet, but local relief rarely exceeds 250 feet. Topography reflects bedrock lithology and structure and is divisible into the following types: (1) areas of low relief underlain by flat-lying Palaeozoic strata; (2) low-lying areas of moderate relief underlain by Precambrian marble; and (3) areas of greater relief characterized by rounded hills or linear ridges and underlain respectively by massive or layered Precambrian rocks. The greatest concentration of outcrop is in the northwestern quarter of the map-area.

Pink to white faintly-layered quartzite (1) is confined to lenses within biotite migmatite (2) and its lack of continuity along strike is due to the emplacement of granite. The biotite migmatite (2) consists of predominant medium-grained biotite granite and less conspicuous layered biotite-quartz-feldspar gneiss. This gneiss has undergone varying degrees of assimilation and granitization, the most advanced stages of which are represented by biotite schlieren. Well-layered, rusty quartzo-feldspathic gneiss (3) contains variable amounts of biotite and always occurs in contact with marble.

in places. Local occurrences of accessory coarse-grained tremolite are prominent mainly between Lanark and Watsons Corners. Other accessory minerals are phlogopite, graphite, scapolite, and diopside.

Rocks that are essentially amphibolites have been separated into map-units 5, 6,

Marble (4 & 4a) varies in grain size and sharpness of layering, and is contorted

Rocks that are essentially amphibolites have been separated into map-units 5, 6, and 7. All have over 50 per cent hornblende, and scapolite may be present wherever the plagioclase is altered.

Unit 5 is distinguished by garnet in amounts up to 20 per cent and in addition to

amphibolite includes a garnet-biotite-quartz-feldspar gneiss. This gneiss is commonly associated with, but not always distinguishable from the garnet amphibole or its migmatitic equivalent. Units 5 and 6 are metasedimentary if their characteristic layering can be considered to represent original bedding.

Unit 7, a hornblende-rich meta-gabbro, displays a relict subophitic texture,

Unit 7, a hornblende-rich meta-gabbro, displays a relict subophitic texture, indicating that it is a metamorphosed diabase. Fine-grained amphibolite (7a) is probably of igneous origin because in a few places it exhibits textures similar to those of the metagabbro and also because it lacks any extensive compositional banding. Unit 6 differs from unit 7a by having compositional banding, less hornblende, and less disseminated pyrite.

Intrusive hornblende diorite and gabbro (9), which may be garnetiferous in places, varies considerably in both grain size and composition over a few feet. Its relations with granodiorite (10) are uncertain.

The large intrusion of granodiorite (10)¹ that lies north of Clayton has a strong marginal foliation, which is parallel to the layering in enclosing marble and amphibolite. This parallelism of foliations indicates that the pluton is syntectonic.

Granite and pegmatite (12), which contain minor amounts of biotite as the chief

mafic mineral, cut magnetite-bearing syenite and syenodiorite (11) as well as diorite (9). The white colour of the granites and pegmatites of unit 13 is probably caused by the reducing effect of marble on ferric iron. Many small bodies of white pegmatite occurring in marble are not mappable.

The Precambrian rocks of the map-area are part of a northeast-trending belt, which appears to be an extension of the Clare River syncline 2,3,4 to the southwest. Except for the northwestern quarter of the area the dip is steeply southeast. Lineations are few and consist mainly of mineral streaks on the foliation planes of gneissic syenite and layered amphibolite in the central part of the area. The complicated structure north of Clayton appears to be mainly anticlinal and is flanked to the south by an eastward-plunging syncline that dies out southeast of Taylor Lake.

Lineaments, which mainly follow swamp-filled depressions, possibly represent faults. The two northwest-trending lineaments north of Clayton mark zones of closely-spaced joints, and no definite displacements could be observed along these or any other lineaments in the area.

A major angular unconformity separates the steeply-dipping Precambrian rocks from the overlying horizontal Palaeozoic strata.

The Palaeozoic Nepean Formation (14), consisting of fine- to coarse-grained sandstone with minor medium to coarse conglomerates, varies in colour from cream to yellow to grey. Graded bedding, ripple-marks, limited mud-cracks, Liesegang rings, and pyrite have been observed. Thickness varies from 30 to 60 feet, the upper 30 feet of which is an orthoquartzite. Lower strata have a carbonate matrix and a consistently fine-grained texture. The formation is considered to be Lower Ordovician (Beekmantown) in age by Wilson⁵.

Unit 15 includes strata of the March and Oxford Formations, as the contact between them is difficult to define in the field. This unit is mainly carbonate; the basal few feet are sandy. It is thick-bedded, blue, very fine crystalline dolomite, weathering rusty and containing geodes of pink and white calcite crystals. Where seen, the lowest 30 feet consists of grey sandstone, sandy dolomite, and blue, very fine crystalline dolomite, weathering brown (March Formation). The Oxford Formation contains spheroidal masses of cryptozoons. Thickness in the map-area is not known; it is 240 feet at Ottawa. It is Lower Ordovician (Bekenantown) in age.

Unit 16, the Rockcliffe Formation, consists of friable, olive-green, iridescent shale with enclosed lenses of sandstone. The lenses vary up to 20 feet in thickness and cover several square miles. The sandstone is fine grained and grey (rarely deep red); green shale and dolomite may be present. Fucoid-like structures, ripple-marks, and green mud-galls have been observed. The unit thins westward to Ashton where it wedges out; it is about 150 feet thick at Ottawa. It is Middle Ordovician (Chazyan) in age.

Unit 17, the Ottawa Formation, is dominantly a grey limestone. The lowest member, about 30 feet in thickness, comprises limestone and dolomite with some shale and sandstone. A second member (over 100 feet thick) comprises grey, dove grey, lithographic limestone, with minor dolomite, in thick and thin beds. The third member (25 feet) consists of softer, more thinly bedded limestone, which contains various amounts of grey, fine-grained, argillaceous limestone, calcarenite, and calcisiltite. It is very fossiliferous. The section described represents only the lowest 150 feet or so of the Ottawa Formation (650 feet) and as such is Middle Ordovician (Black River - low Trenton) in age.

These Palaeozoic formations have been described in more detail by Wilson⁵ and in their Ontario-Quebec context by Caley and Liberty⁶.

Attractive white and blue decorative marbles are being quarried near Tatlock and it is possible that more are present farther north near Raycroft. Pink marbles suitable for architectural aggregates occur in contact with granodiorite northwest of Clayton. Graphitic marble from 3 miles west of Carleton Place is used in a lime plant in the town and many small, abandoned lime kilns used by the early settlers are present in areas where marble outcrops. Much of the sandstone and marble in the area is of building stone quality. The area has a good supply of sand and gravel; notable occurrences are 2 miles northeast of Lanark, 2 miles southwest of Almonte, and near the village of Hopetown.

¹McGlynn, J. C.: Petrology and correlation of the acidic intrusives of Darling township, Lanark county, Ontario; Queen's University, Kingston, unpubl. M. Sc. Thesis, pp. 19-27 (1949).

"Ambrose, J. W., and Burns, C.A.: Structures in the Clare River syncline: a demonstration of granitization; Roy. Soc. Can., Spec. Publ. No. 1, pp. 42-52 (1956).

"Wilson, M. E.: The Clare River syncline: Trans. Roy. Soc. Can., ser. 3, sec. IV.

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Wilson, M. E.: Madoc, Hastings, Lennox and Addington counties, Ontario; Geol. Surv. Can., Map 559A (1940).

⁵Wilson, A. E.: Geology of the Ottawa – St. Lawrence Lowland, Ontario and Quebec; Geol. Surv. Can., Mem. 241 (1946). ⁶Caley, J. F., and Liberty, B. A.: The St. Lawrence and Hudson Bay Lowlands and

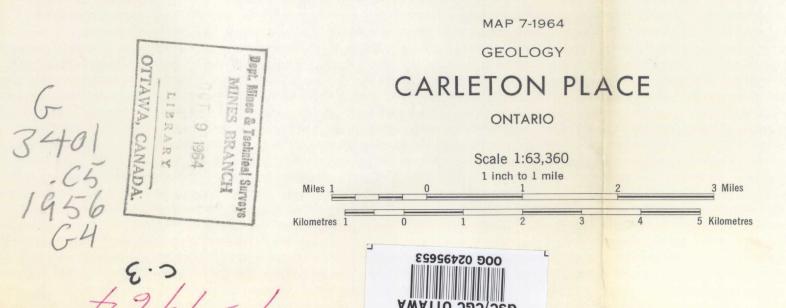
ley, J. F., and Liberty, B. A.: The St. Lawrence and Hudson Bay Lowlands and Palaeozoic Outliers; in Geology and Economic Minerals of Canada, Ch. IV; Geol. Surv. Can., Econ. Geol. Ser. No. 1, 4th ed. (1957).

MAP 7-1964

CARLETON PLACE

ONTARIO

31 F/1



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