MARGINAL NOTES

Mapping of the Bath area involved the re-examination of part of an area previously mapped by B.A. Liberty for the Geological Survey of Canada (Liberty 1971). The Yorkshire Island map-area was included in an earlier report on the Paleozoic geology of the Belleville-Wellington area (Liberty 1961). Paleozoic bedrock outcrop is abundant throughout the entire map-area, especially along the Lake Ontario shoreline.

The main physiographic features in the map-area include Long and Cressy Points, two peninsulas extending eastward from Prince Edward Peninsula, in the western portion of the map-area. Amherst Island is located in the north central part of the area and Simcoe Island is located 0.5 km northwest of Wolfe Island in the eastern part of the area. The Napanee River flows southwest across the northwest corner of the area, and Little Cataraqui Creek flows almost due south through the western limits of the city of Kingston. Hay Bay is at the head of a long inlet off the Bay of Quinte in the western portion of the map-area.

The Bath-Yorkshire Island area comprises part of the Napanee Plain (Chapman and Putnam 1973) wherein only a thin veneer of unconsolidated sediment covers the limestone bedrock and glacial sediments are present only in some of the deeper stream valleys.

STRATIGRAPHY

Simcoe Group

Gull River Formation (Middle Ordovician)

The Gull River Formation is the oldest Paleozoic rock unit in the area and is the lowermost rock unit in the Simcoe Group. Outcrops of the Gull River Formation are present in the northwestern part of the map-area around the Napanee River, and in the northeast part of the map-area, extending eastward along the Lake Ontario shoreline from Millhaven to the Cataraqui River. The formation also forms a 6 m cliff on the extreme northern edge of Simcoe Island.

To the north, in the Tichborne-Sydenham map-area the Gull River Formation can be subdivided into three members (Carson 1981c). In the present map-area, only the middle and upper members outcrop. The middle member consists of up to 20 m of pale green and buff siltstone, pale grey, green and buff, finely crystalline dolomitic siltstone, and medium to dark brown lithographic limestone. The unit is generally thin to medium bedded and locally recessive. The upper member of the Gull River Formation is composed of medium to dark brown lithographic limestone that weathers grey and is massive in character. The upper member is approximately 30 m thick. Fossils such as cephalopods, small colonial corals and gastropods are common in the Gull River Formation, although the middle member is poorly fossiliferous. Several large spherical stromatoporoids are present in the upper member in a road cut on Highway 33 approximately 20 km west of Kingston (U.T.M. Reference 360250E, 4894256N).

The upper contact of the Gull River Formation with the Bobcaygeon Formation is defined as the point at which lithographic to sublithographic limestone changes to a generally darker, finely crystalline limestone or pale brown, fine-grained calcarenite. Black chert nodules found near this boundary in the Burleigh Falls-Peterborough and Bannockburn-Campbellford map-areas to the west (Carson 1980a, 1980b), and not found in the Tichborne-Sydenham area (Carson 1981c) are abundant in the vicinity of the boundary on Simcoe Island.

Bobcaygeon Formation (Middle Ordovician)

Outcrops of the Bobcaygeon Formation occur in the northwestern part of the map-area, and along the shores of Simcoe Island.

The formation can be subdivided into two units. The lower member is composed of medium to dark brown-grey or grey-brown, finely crystalline to sublithographic limestone that weathers buff or pale grey, interbedded with lesser amounts of pale brown or grey, fine- to medium-grained calcarenite. It occurs in beds up to 20 cm in thickness but averaging between 2 and 7 cm. The upper member consists of medium to dark grey or brown grey, sublithographic to finely crystalline limestone interbedded with coarsely bioclastic limestone and thin seams of grey shale. The limestones are of the upper member commonly bioturbated and generally occur in thinner beds than those of the lower member. The two members are somewhat gradational. In general, the upper member contains bioclastic limestone and is more thinly bedded whereas the lower member has no bioclastic limestone. Calcarenite appears to occur in both members in the present map-area, although to the north in the Tichborne-Sydenham map-area, and to the northwest in the Kaladar-Tweed map-area (Carson 1981c, 1981a), calcarenite is confined to the lower member only. Common fossils in the Bobcaygeon Formation include brachiopods and crinoid fragments while bryozoans, gastropods and large colonial corals are somewhat less abundant.

The upper contact of the Bobcaygeon Formation with the Verulam Formation is gradational from thicker bedded bioclastic and crystalline limestone with shaly stringers and partings, to more thinly bedded, regularly interbedded limestone and shale. The boundary is defined as the base of the first appearance of regularly interbedded limestone and shale in subequal thicknesses.

Verulam Formation (Middle Ordovician)

The Verulam Formation outcrops intermittently along Adolphus Reach and Cressy Point and continuously along the north side of Long Point in the western part of the map-area, as well as throughout Amherst Island.

The formation consists of regularly interbedded pale to dark brown and grey finely crystalline limestone, medium to coarsely bioclastic limestone and grey shale seams in beds of subequal thickness. Along lakeshore exposures, the shaly seams weather out, leaving rubbly outcrops of thin- to medium-bedded crystalline and bioclastic limestone. Common fossils in the formation include fragments of brachiopods and bryozoans. Few whole specimens were found.

The upper contact of the Verulam Formation with the overlying Lindsay Formation is defined as the point at which brownish crystalline limestone and bioclastic limestone are directly overlain by bluish-grey finely crystalline limestone. Locally, this contact may be gradational.

Lindsay Formation (Middle Ordovician)

Outcrops of the Lindsay Formation occur in the central part of the Cressy Point as well as along the entire length of Long Point.

To the west, in the Belleville-Wellington map-area (Carson 1981b), the Lindsay Formation is divisible into two units. In the present map-area, only the lower member is present. It is composed of medium brown-grey and grey-blue, sublithographic to finely crystalline limestone that weathers medium to pale blue-grey and occurs in 2 to 5 cm beds separated by shaly partings. Brachiopods are the most abundant fossils.

STRUCTURAL GEOLOGY

Strata in the present area are essentially flat lying, with an average regional dip of 1.8 to 3.0 m per km (Liberty 1971).

The Napanee River follows the trend of a normal fault, the northwestern side of which has been down-faulted approximately 30 m. The movement on the fault is apparent because the Gull River Formation appears stratigraphically higher on the southeastern side of the river than the Bobcaygeon and Verulam Formations on the northwestern side. A similar situation occurs on a smaller scale along Millhaven Creek in the Bath map-area, and indicates the possible existence of a fault in that area.

ECONOMIC GEOLOGY

At present, only one formation in the study area is being quarried for commercial use, although many abandoned quarries exist in the Gull River and Verulam Formations. Canada Cement Lafarge Limited is quarrying material from the Verulam Formation for use in the manufacture of cement.

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Ministry of Natural Resources
Ontario

Hon. Allan W. Pope, Minister
W.T. Foster, Deputy Minister

ONTARIO GEOLOGICAL SURVEY
MAP P.2497
GEOLOGICAL SERIES - PRELIMINARY MAP

PALEOZOIC GEOLOGY OF THE BATH-YORKSHIRE ISLAND AREA

SOUTHERN ONTARIO

Scale 1:50 000

Mile 1 0 1 Mile
Metres 1000 0 1 Kilometre

NTS References: 31 C/2; 30 N/15
ODM-GSC Aeromagnetic Map: 8403G

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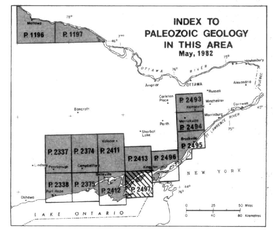

LEGEND

PALEOZOIC
MIDDLE ORDOVICIAN
SIMCOE GROUP

- 6 — 6a Lindsay Formation (lower member): crystalline limestone with shaly partings
- 5 — 5 Verulam Formation: interbedded limestone and shale
- 4 — 4b Bobcaygeon Formation (upper member): crystalline and bioclastic limestone
  4a Bobcaygeon Formation (lower member): crystalline limestone and calcarenite
- 3 — 3c Gull River Formation (upper member): lithographic and sublithographic limestone
  3b Gull River Formation (middle member): buff and green siltstone, dolomitic siltstone, and brown, lithographic limestone

SYMBOLS

- × Bedrock outcrop
- Geological boundary, observed
- Geological boundary, position approximate
- Geological boundary, position interpreted
- Fault, observed
- Fault, position approximate
- Fault, position interpreted
- Quarry

SOURCES OF INFORMATION

Topography from Map 31 C/2 (Bath) and Map 30 N/5 (Yorkshire Island) of the National Topographic Series.

CREDITS

Geology by D.M. Carson and assistants, 1981.

Every possible effort has been made to ensure the accuracy of the information presented on this map; however, the Ontario Ministry of Natural Resources does not assume any liability for errors that may occur. Users may wish to verify critical information; sources include both the references listed here, and information on file at the Resident or Regional Geologist's office and the Mining Recorder's office nearest the map-area.

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Carson, D.M.
1982: Paleozoic Geology of the Bath-Yorkshire Island Area, Southern Ontario; Ontario Geological Survey, Map P.2497, Geological Series - Preliminary Map, Scale 1:50 000, Geology 1981.