GEOLOGICAL MAPPING - DEER LAKE-WHITE BAY CARBONIFEROUS BASIN

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Introduction

The Deer Lake-White Bay Carboniferous basin mapping project was commenced late in the 1975 field season. The aim of this project is to extend the 1:50,000 mapping of areas underlain by Carboniferous strata to the Deer Lake-White Bay area. During the field season an elongated area that runs parallel to the course of the Deer Lake-Humber River system was mapped (Fig. 1).

General Geology

Introduction

The map area can be divided into two contrasting geological terraines: a northeast-southwest trending basin underlain by Carboniferous rocks and the surrounding areas of pre-Carboniferous rocks. The pre-Carboniferous rocks consist of the Fleur-de-Lys Group of presumed Cambrian-Precambrian age, and Ordovician carbonates of the St. George and Table Head Groups. The Carboniferous rocks are divided into two major units: the Anguille Group, Lower Mississippian in age, and the Upper Mississippian Windsor Group.

Pre-Carboniferous

Rocks assigned to the Fleur-de-Lys Group (Unit 1) crop out along the southern shore of Deer Lake southwest of the village of South Brook, along the northwest slope of the rolling ridge southeast of Deer Lake between Little Harbour and Pynn's Brook, and along the western flank of Birchy Ridge. They comprise a series of well-deformed mica schists and phyllites. In the upper reaches of North Brook a considerable thickness of quartzite, mica schist, phyllite and argillite is exposed. This sequence was assigned a Cambrian age by Baird (1960). It is here tentatively included with the Fleur-de-Lys Group. The contact between the Fleur-de-Lys Group and the overlying Ordovician St. George-Table Head carbonates is not exposed, but is assumed to be either an unconformity or a fault.

The Ordovician St. George-Table Head carbonates (Unit 2) comprise black dolomitic limestone, dark grey limestone, buff-coloured dolomite and light bluish grey dolomite. They crop out along a rugged ridge northwest of Nicolsville. Two streams, North Brook and Rocky Brook, cut across this ridge revealing excellent exposures. South of this ridge no outcrop of St. George-Table Head carbonates was recorded. Numerous cobbles of the carbonates, however, are recognized from conglomerates belonging to the Upper Mississippian North Brook Formation exposed along the south-

LEGEND

MISSISSIPPIAN

WINDSOR GROUP (4-6)

6 HUMBER FALLS FORMATION: red, arkosic sandstone, partly calcareous, with green reduction spots; red and grey conglomerate; dark greenish grey shale with lime concretions.

5 ROCKY BROOK FORMATION: red and green siltstone; minor dirty green sandstone; fossiliferous oil shale; stromatolite beds; black shale.

4 NORTH BROOK FORMATION: coarse limestone conglomerate; hematitic conglomerate; red and green pebbly sandstone; minor stromatolitic beds; grey quartzitic sandstone.

ANGUILLE GROUP

3 ANGUILLE GROUP UNDIVIDED: pebbly quartzite; arkosic sandstone; minor conglomerate; black slaty shale; red sandstone and siltstone.

ORDOVICIAN

2 ST. GEORGE-TABLE HEAD CARBONATES: black dolomitic limestone; buff siliceous dolomite; bluish-grey limestone.

CAMBRIAN - PRECAMBRIAN(?)

1 FLEUR-DE-LYS GROUP: mica schist; chlorite schist; phyllite; argillite; includes some quartzite of possible Cambrian age.

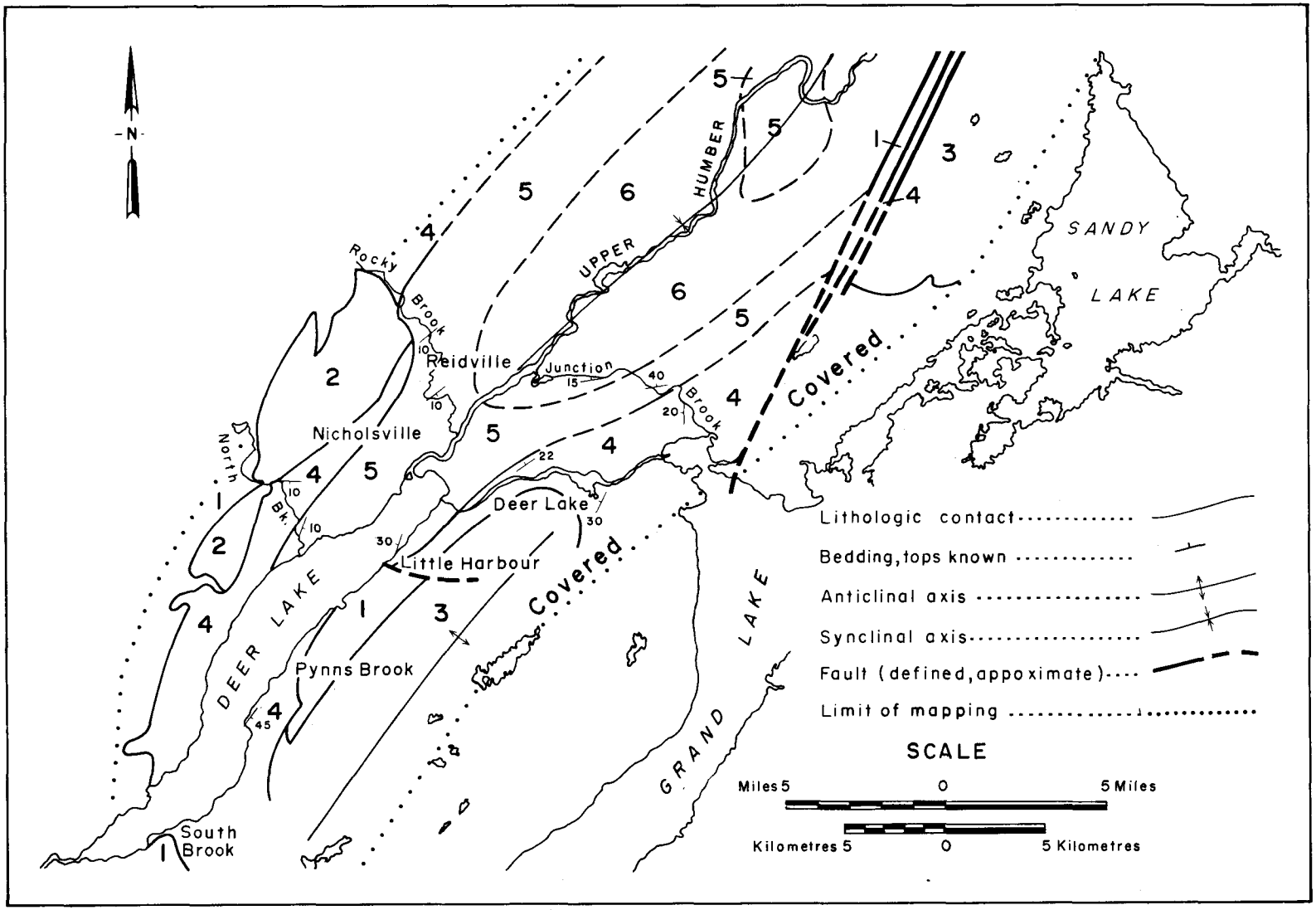

Fig. 1 - Geological Map of the Deer Lake Area

eastern shore of Deer Lake. The carbonates are overlapped by coarse carbonate conglomerates of the North Brook Formation in the upper reaches of North Brook and by red and green siltstones of the Rocky Brook Formation in Rocky Brook near the Gros Morne National Park Highway.

Anguille Group

Lower Mississippian Anguille Group rocks (Unit 3) are the oldest Carboniferous unit in the map area. Rocks included in this unit are grey pebbly quartzite, buff-coloured arkosic sandstone, light brownish-buff conglomerate, black slaty shales with plant fragments, and red sandstones and siltstones. They are folded into two northeast-southwest trending anticlinal ridges, Birchy Ridge and the rolling ridge between Grand Lake and Deer Lake. The group is unconformably overlain by conglomerates of the North Brook Formation.

Windsor Group

The North Brook Formation was named by Werner (1955) in an unpublished private report but was not assigned any formational name by Baird in his 1959 map. It represents the lowest formation in the Windsor Group in the map area. Rocks of this formation are polymictic conglomerates, containing clasts of a wide variety of lithologies, and red, cross-bedded sandstones. In the upper reaches of North Brook, the type locality, the lower section of this formation comprises limestone conglomerate changing upward to a hematitic conglomerate. The limestone conglomerate is made up of widely scattered cobbles of Ordovician carbonates with very little matrix, while the open space between the limestone clasts is filled with coarse sparry calcite. In the hematitic conglomerate Ordovician limestone clasts decrease in abundance while the number of igneous and metamorphic clasts increases. The matrix is a dirty sand with a conspicuous hematite stain. In Lanes Brook, a small stream emptying into Deer Lake at Little Harbour, the lower part of the North Brook Formation is a conglomerate composed of flat pebbles of schists and phyllites derived from the underlying Fleur-de-Lys Group. Minor Ordovician carbonate and quartzite pebbles are present. The matrix is a dirty micaceous sand apparently derived from Fleur-de-Lys schists. A thin bed of stromatolitic limestone, approximately 40 cm. thick, is intercalated with this flat pebble conglomerate. The upper part of the North Brook Formation comprises massive beds of red, cross-bedded, occasionally pebbly, calcareous sandstone. A few beds of red limestone are also present. This sequence of rocks is exposed in North Brook and Junction Brook. The North Brook Formation is conformably overlain by the Rocky Brook Formation.

The Rocky Brook Formation (Unit 5) consists mainly of siltstones and shales with minor sandstone and stromatolitic limestone beds. Alternations of maroon and green siltstones occur throughout the entire thickness of the formation. Black oil shales occur in the middle of the formation. Some of these beds are highly fossiliferous. Small, rhombic scales, and

occasionally incomplete remains, of a ganoid fish are very abundant. Three species of ostracods, Carbonita sp.; Leaia leidyi and L. elongata, are recognized from the oil shales. A bed of buff coloured limestone with well-developed stromatolites, 45 cm. in thickness, is intercalated in the oil shales. A thin, densely packed biomicrite horizon from 1.5 cm. to 10 cm. thick occurs within the limestone and contains the ostracod Carbonita. Some of the fossiliferous oil shale beds also contain numerous coprolites, up to 5 cm. long, which are entirely made up of undigested rhombic scales of ganoid fish. The Rocky Brook Formation is in gradational contact with the overlying Humber Falls Formation.

The Humber Falls Formation (Unit 6) is the youngest Mississippian rock unit in the map area. It consists of red and green arkosic sandstone with minor pebbly beds; red, cross-bedded sandstone and siltstone with green reduction spots ranging from 1.5 cm. to 5 cm. in diameter; red and greenish grey conglomerates; and dark greenish grey shales with lime concretions. Rocks of this formation are well exposed in Junction Brook and in many rapids in the Humber River.

Structural Geology

The Fleur-de-Lys Group in this area consists of polydeformed metamorphic rocks. The overlying St. George-Table Head carbonates are relatively undeformed and much less metamorphosed, suggesting that the contact between the two is either an unconformity or a fault.

Carboniferous rocks in the map area are folded into two major NE-SW trending open folds: an open syncline that runs parallel to the course of Deer Lake-Humber River, and an anticline immediately southeast of it that runs along the entire length of Birchy Ridge and the rolling ridge between Deer Lake and Grand Lake. The fold structures are cut by a sequence of major faults that run sub-parallel to the axes of the folds.

Economic Geology

Oil shale occurs extensively in the Rocky Brook Formation in the map area and was explored in the past for oil and gas potential (Fleming, 1970). No mineralization of any significance was found in the present mapping work. Two minor occurrences, however, were discovered: in Junction Brook where rocks of the North Brook Formation are locally coated with steel-back manganese crusts, and in Rocky Brook where marcasite forms minor encrustations in stromatolite beds.

References

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