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Preliminary report on Fabre-Mazenod area, Témiscamingue county

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PRELIMINARY REPORT

ON

FABRE-MAZENOD AREA

TÉMISCAMINGUE COUNTY

BY

J.-L. ROBERT

QUEBEC
1962

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INTRODUCTION

The Fabre-Mazenod area was mapped by the writer during the summer of 1961. It comprises 231 square miles, bounded on the north and south by latitudes 47°15' and 47°00', on the west by the Ontario-Quebec boundary (Témiscamingue lake) and on the east by Des Lacs river. It includes Fabre and Mazenod townships and about three-quarters of the townships of Laperrière and Shehyn, all in Témiscamingue county.

Highway 46, between Témiscamingue and Rouyn, crosses the western part of the area in a north-south direction. It passes through the villages of Laniel and Fabre. Fabre, the larger of the two, is 12 miles south of Ville-Marie and about 100 miles south of Rouyn. Laniel is situated at the end of Sandy Portage bay, an arm of Kipawa lake. The Canadian Pacific Railway's branch line, linking Mattawa to the south with Angliers to the north, parallels the main highway through most of its length. Between Laniel and Fabre Station (about 2 miles east of Fabre village), however, the railway arcs slightly to the east to pass through the central part of the area.

Access to the western half of the area is greatly facilitated through use of the main highway and the several secondary roads that lead off from it. A road that branches off from the Belleterre - Ville-Marie road goes as far as Saint-Amand lake, in the extreme northeast corner of the area. The central and eastern portions of the area can be reached either by water, through Kipawa lake and its many bays, or by railway.

The low relief of the area is responsible for the development of many small closely spaced drainage basins along the more prominent valleys. All the waters of the area, however, eventually drain

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* Translated from the French.

into Témiscamingue lake, either directly through streams of various sizes or by means of the Kipawa river. Témiscamingue lake, in turn, is a part of the Ottawa River drainage system.

Ojibway-Barlow lake, which covered the area in post-glacial times, left a mantle of unconsolidated material that is traceable as far south as the boundary between the Grenville and Keewatin geological sub-provinces. In the Keewatin sub-province, these deposits of clay and sand make up a flat to very gently rolling terrain with an average elevation of about 900 feet. This relatively level surface is broken by knolls and rocky hills that project through it, and by stream valleys that have been carved into it. The Grenville sub-province is characterized within the area by strings of lakes and low elongate hills that are oriented along the structural trends of the underlying bedrock. The maximum elevation, 1,225 feet above sea-level, is to be found in the northeast corner of the area. Témiscamingue lake, with an elevation of 540 feet, is the lowest point. The local relief is approximately 200 feet.

Glacial striae and friction cracks indicate that the directions of Pleistocene ice movement varied from southerly to S. 20°W. A north-trending esker, about 11 miles long, lies close to the eastern boundary of the area.

Owing to the similarity of its geological formations to the near-by Cobalt mining district in Ontario, the Keewatin portion of the present map-area received considerable attention from prospectors. Exploration and development work were also carried out at several places in the Huronian rocks. Both Harvie (1911) and Mauffette (1953) studied a part of Fabre township. The mapping reported on by the present writer is a continuation of work done in adjacent areas to the east (Robert, 1961, and Sabourin, 1960) and to the southeast (Lyall, 1959). Henderson (1936) mapped the area to the north.

GENERAL GEOLOGY

All of the consolidated rocks in the area are Precambrian in age and belong to either the Grenville or Keewatin sub-province. Keewatin rocks, consisting of Huronian sandstone, quartzite and conglomerate, outcrop in the northestern corner of the area. They rest unconformably on metavolcanic rocks, gabbro-anorthosite, granodiorite and granite. Diabase, which in places appears to be related to the gabbro-anorthosite, cuts all the above formations. Southeast of the Keewatin rocks, Grenville paragneisses outcrop as irregular bands accompanied by several masses and bands of orthogneiss. The orthogneiss, grey granite and later pink granite are more abundant than the paragneisses. Lenses of a hornblende-bearing rock are associated with the gneissic rocks.

The contact between the two sub-provinces underlies a relatively straight valley and is parallel to the foliation of the gneisses. The gneisses are mylonitized in places for distances of up to 7,000 feet from the contact.

TABLE OF FORMATIONS

		Pleistocene and Recent	Varved clay, till, sand and gravel		
PRECAMBRIAN	PROTEROZOIC	Huronian	Cobalt Series	Diabase and quartz diabase	
				Lorraine formation	Quartzite, brecciated conglomerate (Gowganda?)
				Gowganda formation	Green or salmon-coloured sandstone, conglomerate, siltstone, argillite, metamorphosed conglomerate
				Fabre member	Siltstone
	ARCHEOZOIC ?			Granite, feldspar porphyry Granodiorite Gabbro-anorthosite, meta-lava, meta-tuff, meta-agglomerate, chert Pink biotite or hornblende granite, massive to gneissic; pegmatite Grey granite and granitic gneiss, pegmatite Hornblende-plagioclase rock Hornblende-biotite gneiss, biotite paragneiss Porphyroblastic gneisses and schists, porphyroblastic gneissic granite	

PRECAMBRIAN

Porphyroblastic gneisses and schists; porphyroblastic gneissic granite

Irregular and discontinuous bands of rocks characterized by porphyroblasts of white or pink feldspar are exposed in the southeast half of the area. Quartz porphyroblasts were also noted in places. All possible stages between a schistose and a massive rock, or a true porphyroblastic granite, occur. In a few places, notably south of the Kipawa river and east of Bryson lake, a massive gneiss containing several inclusions of hornblende-biotite paragneiss was mapped. The porphyroblasts in the granite are quite randomly oriented, whereas those in the schistose rocks are generally elongated parallel to the direction of foliation.

The porphyroblastic gneisses and schists are believed to be paragneisses that have been impregnated with grey or pink granitic material. The porphyroblastic granite, on the other hand, is probably related to the grey gneissic granite.

These rocks are made up essentially of feldspar, quartz, biotite and a small amount of hornblende. Cubes of pyrite are commonly disseminated through the schistose varieties.

Biotite-hornblende gneiss; biotite paragneiss

These rocks occur as discontinuous lenses, either in the granite or intercalated with the bands of porphyroblastic gneisses and schists. The biotite paragneiss is distinguished by the granular nature of its constituent minerals and by its banding, which, though generally quite narrow, is continuous over several hundreds of feet.

The individual beds of hornblende-biotite gneiss range in thickness from a fraction of an inch to several feet. The rock is made up of quartz, plagioclase, biotite and variable amounts of hornblende. Epidote is almost always present as an accessory mineral.

All these rocks are, in general, impregnated with granitic material and veinlets of quartz. Several concentrations of pyrite were observed along these veins. In places, the bedding of the gneisses shows distinctive crenulations.

Hornblende-plagioclase rock

This rock outcrops as concordant lenticular bands, up to 7 miles long, in the gneisses. The bands are particularly abundant in the western part of the gneissic zone. The hornblende-plagioclase rock is medium to fine grained, dark green or black and is generally foliated. Hornblende and plagioclase constitute the essential minerals Small garnets were noted in a few distinct facies of the rock.

Grey granite and granitic gneiss; pegmatite

These rocks outcrop mainly in the west-central part of the area. The granite, which is either gneissic or massive where it is in large bodies, is entirely gneissic where it is intercalated as lenses within the paragneiss. It is medium grained and pale grey. The essential minerals include plagioclase and quartz. Biotite is present in all specimens and hornblende was noted in places. Small dykes of granite, which cut both the paragneiss and the hornblende-plagioclase rock, as well as numerous inclusions of these latter rocks within the massive and gneissic granite, attest to the igneous origin of the gneissic granite.

The granitic gneiss has the same mineralogical composition as the gneissic granite, but its origin is uncertain. It outcrops either amongst the granites or as very thin concordant lenses in the paragneiss.

The rare grey pegmatite generally occurs in the form of small dykes.

Pink biotite or hornblende granite, massive to gneissic; pegmatite

Exposures of pink granite are confined mainly to two zones. One is near the boundary between the Grenville and Keewatin sub-provinces; the other, along the northeast diagonal through the area. Elsewhere in the gneissic rocks, the pink granite forms isolated lenses, much smaller than those found within the two principal zones. This granite, which is younger than the other granitic rocks in the area, is generally accompanied by pegmatite.

Either biotite or hornblende makes up the mafic portion of the pink granite. The hornblende-rich variety has a greenish hue and is more massive than the biotite-rich variety. Age relationships could not be definitely established, but the two types of granite are believed to be co-magmatic.

Intermediate meta-lavas, meta-tuff, meta-agglomerate, chert

These rocks outcrop within the keewatin sub-province. Since their preliminary work in the area, Wilson (1910) and Harvie (1911) recognized their similarity to the typical Keewatin rocks. These formations are described in detail in several geological reports, some of which are listed in the accompanying bibliography.

The volcanic rocks include lavas and tuffs that have been metamorphosed into greenstones. They have been strongly folded and now dip almost vertical. Greenstones exposed just to the north of Fabre Station display pillow structures with tops facing south. A few beds of chert are associated with the meta-lavas in an outcrop on Africain brook, lot 1, range VII North.

Gabbro-anorthosite, granodiorite, granite and feldspar porphyry

A complex intrusion, which varies in composition from gabbroic to anorthositic, outcrops on ranges IV and V, and VI South. A variety of granite, here and there cut by masses and dykes of diabase, extends south from this gabbro-anorthosite complex as far as the contact between the two geological sub-provinces. This granite is coarse grained and either greenish or pinkish in colour. To the east, the granite appears to grade into a feldspar porphyry and then into a granodiorite. The sheared granodiorite, which outcrops on lots 32 to 36, range III, lots 1 to 5, range V South, and lot 3, range VII North, contains small "eyelets" of quartz.

HURONIAN

Within the area, the Huronian sedimentary rocks are represented mainly by the Gowganda and Lorraine formations of the Cobalt series. A few thin beds of dark green siltstone are exposed near the mouth of the Lavallée river, on lots 10 and 11, range VII North, as well as along Africain brook, on lot 14, range VI North. These beds of siltstone, which belong to the Fabre member, make up the lower portion of the Huronian stratigraphic sequence in the area.

The basal Gowganda conglomerate usually rests, with slight unconformity, on the siltstone. An exception to this was noted in an outcrop on the east shore of Témiscamingue lake, south of Lavallée bay, where the conglomerate lies directly on the granite. The contact between the two rocks is quite irregular, and angular blocks of granite occur in the lower beds of the conglomerate. The pebbles of the latter rock become quite well rounded a few feet away from the contact. Farther away, the conglomerate, which is about 50 feet thick, grades into the green or salmon-coloured sandstone of the upper Gowganda formation. This sandstone member is at least 300 feet thick. It contains a few thin beds of intercalated siltstone and conglomerate.

The Gowganda sandstone grades into feldspathic quartzites of the Lorraine formation. Two varieties of quartzite were observed, one sea-green and the other pinkish on the weathered surface. The upper beds of the quartzite contain a few lenses of conglomerate in which both pebbles and matrix consist of quartz fragments. The total thickness of the Lorraine in the present map-area is about 350 feet.

A breccia-like conglomerate outcrops north of the villages of Fabre and Fabre Station. Though assigned to the Lorraine formation by Harvie (1911) and Mauffette (1953), it is possible that it belongs to the Gowganda. Both the angular blocks and the matrix of this conglomerate are similar in composition to the underlying granodiorite.

Where in contact with diabase, the sedimentary rocks are considerably metamorphosed and, in places, resemble the rocks that intrude them.

Diabase

Diabase is the youngest consolidated rock in the area. Dykes and sills of this rock, generally trending either northeast or north, are exposed at many places within the Keewatin sub-province. A diabase dyke on lots 8 and 9, ranges V South and V North, Fabre township, is about 8,000 feet long and 400-900 feet thick. Small irregular masses of diabase, all less than 500 feet across, intrude the granite. Here, the rock is fine grained and is similar in appearance to the diabase that is intrusive into the zone of gneisses.

In general, the diabase displays a variable texture and a grain size that ranges from fine to very coarse. The feldspar and quartz content may here and there be sufficient to permit classification of the rock as a quartz diabase. In a few places, a rock-type resembling the diabase grades into gabbroic rocks of the gabbro-anorthosite complex. It thus seems possible that the diabase could be a magmatic derivative of gabbro.

A few diabase dykes up to 50 feet wide and generally trending northeast cut the banded gneisses. The rock is fresh and fine grained.

STRUCTURAL GEOLOGY

Most of the orthogneisses and paragneisses have well developed foliations, generally trending northeast and dipping 45°-85° south. The sedimentary Huronian rocks dip at usually less than 30° either to the north or to the south. Their attitudes reflect the configuration of the surface of the underlying formations. The greenstones trend close to east and are steeply dipping, generally towards the north.

A straight and continuous valley, trending northeast, follows the contact between the Keewatin and Grenville sub-provinces. East of the contact is a mylonitized zone averaging 7,000 feet in thickness. Structural features along this zone indicate that the gneissic rocks of the Grenville sub-province have been thrust over the Keewatin rocks to the west. The sedimentary and intrusive rocks have been extensively altered and sheared near the contact. Their schistosity parallels the contact, and dips range from 20° to 70° towards the east. East of the contact, a lineation ranges in direction from S. 40°E. to S. 60°E. and in plunge from 20° to 40° southeast.

Some structural evidence of minor faulting was noted in the area. Two parallel transverse faults, associated with a longitudinal fault, follow the valleys of Bryson brook and Kipawa river. Several less important displacements, as well as numerous shear surfaces, were also observed.

Jointing is common to most of the rocks in the area, being especially well developed in the granites and orthogneisses. The two main joint systems trend respectively northwest and east-

southeast. Dips are generally steep to vertical, although some horizontal joints were noted.

Most of the joints in the sedimentary Huronian formations dip at quite shallow angles, although the northwest-trending joint system is also present.

ECONOMIC GEOLOGY

A great deal of prospecting has been done in the area, resulting in the discovery of a number of sulphide-bearing exposures. Development work, however, has failed so far to reveal any economic deposits.

Touton Mining and Exploration Co., Limited, was the last company to carry out exploration work. They were active within the area until 1953. Publications of the Quebec Department of Mines (Ingham, Ross, Auger, Mauffette and Gilbert) describe the different zones of mineralization.

Since 1953, individual prospectors and holders of mining rights have continued the exploration of ground formerly held by various mining companies.

Disseminated sulphides, mainly pyrite, occur in the biotite gneisses and schists, and there is some specular hematite in an outcrop of pegmatite on one of the northern islands in Laperrière lake.

Several small deposits of sand and gravel were noted to the southeast of the contact between the two geological sub-provinces.

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