CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS
GEOLOGICAL SURVEY OF CANADA

GEOLOGICAL SERIES

CANADA, SHEET 31 N/14

LEGEND

PROTEROZOIC

10 — Lamprophyre

POST-TIMISKAMING

9 — Diabasic gabbro

8 — Muscovite-hornblende granite

7 — Biotite-hornblende syenite

6 — Muscovite pegmatite; 6a, muscovite granite; 6b, biotite-muscovite granite; 6c, quartz porphyry; 6d, tourmaline-bearing aplite

5 — Peridotite

ARCHEAN

KEEWATIN AND TIMISKAMING

4 — Biotite schist with minor greywacke; 4a, biotite schist with pegmatite; 4b, staurolite-biotite schist; 4c, tremolite-biotite schist; 4d, tourmaline-sericite schist; 4e, mylonite, with minor flinty crushed rock

3 — Andesite altered to amphibolite

KEEWATIN

2 — Banded tuffs, partly amphibolitized

1 — Andesite; some tuffs; 1a, same as 1 but partly amphibolitized; 1b, hornblende schist; 1c, sheared acidic rock, may be partly amphibolitized

PRECAMBRIAN

A — Biotite-garnet paragneiss, with minor pegmatite; Aa, hornblende-garnet gneiss; Ab, hornblende gneiss, with pegmatite; Ac, hornblende schist

Sand and gravel
Rock outcrop, area of outcrop
Bedding (inclined, vertical, overturned, dip unknown)
Bedding (upper side of bed faces as indicated, direction of dip unknown)
Schistosity (inclined, vertical, dip unknown)
Foliation (inclined, vertical, dip unknown)
Fault or shear zone
Glacial striae

NOTE: Outcrop areas in the west half of the map-area were in part sketched from air photographs.

Provincial highway — NO. 58
Road and buildings
Bush road or trail
Portage
Wharf
Telephone line
Telephone line along county boundary
Triangulation station
County boundary
Township boundary
Range and lot number — V 40
Stream (position approximate)
Rapid
Marsh
Drowned land
Reef or small island
Height in feet above mean sea-level — 1050'

Geology by M. Tiphane and K.R. Dawson, 1947.

Base-map compiled by the Topographical Survey, 1942, from air photographs taken by the Royal Canadian Air Force, in August and September, 1939, and from information supplied by the Department of Lands and Forests, Quebec. Cartography by the Geological Mapping Division, 1949.

Approximate magnetic declination, 14°45' West.

PUBLISHED, 1950.

MAP 998A

VILLEBON

QUEBEC

Scale: One Inch to One Mile = 1/63,360

Miles

DESCRIPTIVE NOTES

The map-area has a maximum relief of about 300 feet in the parts underlain by the Precambrian paragneisses. Most of it is covered by Pleistocene clays and till, with here and there prominent ridges composed of sand and gravel. Recent deposits are limited to marshes and stream alluvium.

The group of ancient volcanic rocks (1) resembles those customarily referred to as Keewatin. It forms an assemblage of dark green, fine- to coarse-grained, andesitic lavas, which show pillow structures in many places.

Most of these rocks are amphibolitized (1a) and, in general, a little darker than the normal volcanic rock. The amphibole crystals vary in size, but commonly form short prisms in the massive rocks; they may be as much as 1 inch long in the peripheral parts of the pillows.

In the area immediately west of the main highway, the Keewatin volcanic rocks (1) are separated from biotite schist (4) by a narrow band of basic pyroclastic rocks (2). The contact of these rocks with the lavas is probably gradational, but their contact with the biotite schist is obscured by drift.

East of the south arm of Lac Villebon, the acidic rocks (1c) are similar to aplites in colour and sugary texture, but most of them preserve a flow structure and cannot be considered as dykes.

Altered andesites (3) occur in three widely separated localities: on islands in Lac Granet, to the west of Lac Camille-Roy, and south of Lac Louvicourt. The association of pegmatite with the exposures on the islands suggests that the flow is an inclusion or pendant, and both of the occurrences to the north appear as flows interbedded with the biotite schist (4). Field observations and microscopic studies indicate that these rocks are lavas in which the original minerals have been entirely altered to a pale green amphibole and carbonate, with accessory pyrite and a few residual grains of quartz and feldspar.

The rocks mapped as biotite schists (4) are probably of sedimentary origin, though neither crossbedding nor conglomeratic bands were observed. Eastward, towards Lake Matchi-Manitou, they are intruded by pegmatite (4a). The rock is normally grey, with regularly spaced, dark, thin bands of biotite parallel with the schistosity. Under the microscope the quartz is seen to be accessory, and nowhere represents more than 15 per cent of the rock, the other pale-coloured minerals being orthoclase and plagioclase. West of the Mont Laurier highway and near Lake Matchi-Manitou the schists show a greater degree of diversification. Staurolite is common enough in some localities to justify the subdivision staurolite-biotite schist (4b). Garnet is widely distributed through the schists, and may or may not accompany the staurolite. Near the batholith other varieties have been observed, including tremolite-biotite schist (4c) and tourmaline-sericite schist (4d).

On the shores of Mink Narrows are outcrops of mylonitic rocks (4e). These are mostly dark brown, except for white linear patches of felsitic material that stand out on the weathered surface. In thin section, the felsitic material proves to be highly fractured grains of feldspar in a dense matrix probably composed of crushed quartz and feldspar. This texture and the brittle, highly fractured nature of the rock lead to the conclusion that it is a mylonite. Towards the west it grades into well-bedded biotite schist (4), and towards the east into highly contorted, garnetiferous paragneiss (A). Both in the adjoining schist and paragneiss, and here and there in the mylonite itself, can be seen narrow dykelets of a brown, flinty, crushed rock. In addition, the mylonitic rocks include several highly sheared pegmatite dykes. On the whole it appears that Mink Narrows lies in a large fault zone along which the paragneisses have been thrust in a northwesterly direction over the biotite schist and pegmatite to the west.

The contact between the biotite schists (4) and volcanic rocks (1) is not sharply defined, but is apparently gradational across a zone of indeterminate, but not great, width, within which the schists, on the one side, carry some amphibole, and the amphibolitic rocks, on the other, contain biotite.

Two bodies of rocks, one south of Cooper Lake and the other in Fréville township west of Highway 58, have been mapped as peridotite (5). The rocks are similar to those described by G. W. H. Norman in the La Motte map-area to the northwest.

The area underlain by muscovite pegmatite (6), muscovite granite (6a), and biotite-muscovite granite (6b) includes about three-quarters of Granet township. The relief in this area is higher than in areas underlain by biotite schist (4), and most of the hills are outcrops of pegmatite. Pegmatite is the predominant rock of the map-unit; both it and the muscovite granite contain plagioclase feldspar (generally andesine), microcline, quartz, and either the normal type or the plumose variety of muscovite as the major constituents. Sericite, biotite, garnet, and zircon have a wide distribution as accessory minerals; tourmaline and beryl occur locally. In the marginal zone of the batholith the size of the biotite schist inclusions increases, and such minerals as plumose muscovite and biotite become more prevalent. This local increase in the biotite has resulted in the formation of the biotitic phase of the granite (6b).

In the area immediately to the west of Lac Marrias a small stock of quartz porphyry (6c) is exposed, surrounded by the biotite schist. The rock is composed mainly of quartz and feldspar, with a small percentage of mafic minerals. The marginal zone is composed of a tourmaline-bearing aplite (6d).

East of Highway 58, the most abundant intrusive rock is a biotite-hornblende syenite (7), which occupies about 15 square miles. Microscopic study reveals that the biotite is secondary after the hornblende, but that this 'replacement' has not affected the whole intrusive body to the same degree. In places the biotite constitutes about 90 per cent of the mafic minerals, whereas at other places it forms only about 50 per cent of the same minerals. Quartz is an accessory mineral.

A body of muscovite-hornblende granite (8), of uncertain area, lies west of the Precambrian gneisses (A). The rock is not unlike the biotite-hornblende syenite (7) that outcrops in Villebon township, the main difference being the quartz content. The rock is also more highly sheared than that of the corresponding syenite.

Two dykes of gabbro (9) were observed in Villebon township, and a third dyke is exposed for several thousand feet in the northwest corner of Marrias township. They strike northeasterly, and outcrop as a series of low knobs. The dyke east of Cooper Lake is not exposed, but has been revealed by diamond drill-holes on the Bonville and Villbona properties.

A dyke of lamprophyre (10) cuts across Precambrian paragneiss in the southeast corner of the map-area. It is a fine-grained rock carrying disseminated biotite flakes.

Much of the eastern half of the map-area is underlain by rocks classified as Precambrian paragneiss (A), which forms part of the Grenville subprovince of the Canadian Shield. The most abundant rock type is a biotite-garnet paragneiss in which the banding is generally well shown by the biotite. The garnet varies in quantity and in crystal size from place to place; it is normally a deep red, but may be slightly purplish.

The hornblende-garnet gneiss (Aa) is considered to be of volcanic origin, but the evidence is not conclusive. Other areas of hornblende gneiss (Ab) contain abundant pegmatites in which no mineral of importance has yet been found. Two exposures of hornblende schists (Ac) were seen. The rock is probably of volcanic origin and may be related to the Keewatin group (1). Where exposed it is conformable with the adjacent rocks.

The assumed fault between the Precambrian paragneisses (A) to the south, and lavas (1), banded tuffs (2), and biotitic schists (4) to the north is indicated by a discordance in structure, as between the trends of bedding and schistosity in the biotite schists, tuffs, and lavas and the trend of the foliation in the gneisses. Furthermore, the banded tuffs north of the fault have not been found on the south side. The exposures of mylonite along Mink Narrows lend support to the view that there is a fault as mapped. The greater part of the fault zone, however, is drift covered, so that evidence of movement is obtainable in only a few places.

The only prospecting done in the map-area is west of the Precambrian gneisses (A). The work has consisted of trenching and geophysical surveys, and diamond drilling has been done on the Bonville, Villbona, Quebec Yellowknife, Quintal Quebec, Twin Fault, Westville, and Marcourt Nickel properties. Geophysical surveys have been made on other properties of the area, but without any further exploration.

Visible gold is reported to have been found in at least two places on the Villbona property, in carbonatized and pyritized amphibolitic volcanic rocks. A little nickel is contained in the carbonatized shear zone associated with the lava band south of Lac Louvicourt.