MINISTÈRE
DE L'ÉNERGIE
ET DES RESSOURCES

DIRECTION GÉNÉRALE DE
L'EXPLORATION GÉOLOGIQUE
ET MINÉRALE

CASEY-WEST AREA

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1972

DP-101
GM-27918

NTS-31 c/16

OPEN-FILE MANUSCRIPT

Gouvernement du Québec

DEPARTMENT OF NATURAL RESOURCES

Mines Branch

Geological Exploration Service

Geology of the CASEY-WEST AREA

~~LAVIOLETTE~~ CHAMPLAIN COUNTY

Preliminary Report

by

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Québec

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INTRODUCTION

The Casey- West map-area is located in the northern half of the ~~Laviolette~~ CHAMPLAIN county, about 150 miles north of Montreal, and was mapped during the summer of 1970.

The 200 square miles map-area is bounded by longitudes 74° 15' and 74° 30' and latitudes 47° 45' and 48° 00', corresponding to the Casey- West map-sheet (31 O/16 W.) of the National Topographic System. It includes parts of Drouin, Dandurand, Letondal, Lamy and Suzor townships.

This area and the map-sheet to the west of it were mapped by C. Faessler (1937). The area is also included in the report and map by H.R. Wynne-Edwards (1966).

Access to the area is provided by the Canadian National Railways line joining Montreal and Quebec City with the Abitibi area. The railway line divides the map-area into north and south halves. Stopping points in the area are the McCarthy and Siscoe stations on Letondal lake and Menjobogues (Wapoos) at the north end of Dandurand lake.

A rough road leads from the Siscoe Station 7 miles northwards to the site of the original Siscoe Gold Mines'mica deposit. This road branches off eastwards to a newer mica deposit, that of the Laviolette Mining and Metallurgical Corporation.

The northern part of the area can be reached by floatplane based at Parent, 15 miles west of the area.

Access to the southern half of the map-area is provided by old logging roads, one of which leads via La Tuque, Sanmaur and Casey to the southeastern tip of Dandurand lake, at the western side of the map-sheet. This road also branches off at the south end of Letondal lake and thus provides access to the south and southeastern parts of the area. All roads in this area are only practicable in four-wheel-drive vehicles.

The northern half of the map-area is, for the most part, well exposed. Overburden is thin, usually less than three feet in thickness. The good exposure is, at least in part, due to a forest fire which devastated a large part of the area in 1923.

A severe windstorm crossed the northernmost third of the area in 1970 and laid flat large patches of bush. This windfall was encountered on several traverses and is almost impassable.

The southern half of the area, although fairly heavily wooded, offers fairly good exposure due to the more pronounced topographical relief.

The highest elevation in the area is 2000 feet; average variation in relief is about 350 feet.

All lakes in the western third of the area drain into Dandurand lake, the other two thirds of the area are drained eastwards, primarily by the Pitchoui and Ruban rivers, and are part of the St. Maurice watershed.

GENERAL GEOLOGY

The map-area lies in the Grenville Province. All consolidated rocks are Precambrian in age.

The largest rock units are those represented by the leucocratic charnockitic gneisses and intermediate charnockitic gneisses. These are followed, in decreasing order of abundance, by the paragneises, limestones and metagabbros. Included in the above units are rock types which occur in units too small to be represented separately on the accompanying geological map.

The effect of migmatisation is evident in many parts of the area. The resulting forms vary from flow and fragmentation structures, in some cases accompanied by the partial digestion of the mafic component, to pinch and swell and nebulitic structures as seen in some of the darker varieties of charnockitic gneisses.

Unconsolidated sediments are represented by fluvioglacial sand and gravel and fluviatile sands. Glacial clay was found at one locality.

Table of formations

Era	Period	Origin	Unconsolidated sediments or rock type
Cenozoic	Quaternary	Fluviatile	Sand
		Fluvioglacial	Unsorted sand, gravel and boulders
		Glacial	Till, moraine and clay
Precambrian		Intrusive	Pegmatite and pink granites
			Gabbro and metagabbro
		Unknown	Suzorite
			Leucocratic charnockitic gneiss
			Intermediate charnockitic gneiss
			Andesine- hornblende gneiss
	Grenville	Sedimentary	Crystalline limestones
			Paragneisses

DESCRIPTION OF ROCK TYPES

Crystalline limestone (map unit 1.a)

Crystalline limestone occurs in long narrow lenses up to 300 feet in width. These follow the trace of a large fold located in the northwestern quarter of the map-area. The crystalline limestone is usually grayish white to salmon pink and often impure. Lump-shaped concentrations of calc-silicate minerals are often present. The rock contains about 60% calcite, the rest being made up of varying amounts of diopside, phlogopite, apatite and feldspar. Disseminated graphite and pyrite are often present. Some of the limestone lenses show copper mineralisation; these will be treated later.

Paragneiss (map unit 1.b)

Paragneisses are sparsely represented in the area. They occur in lenses, lenticules or narrow bands. Three types of paragneiss have been distinguished in the field.

The first type is a biotite-rich variety with finely disseminated garnet. The rock is unevenly foliated, the foliation being defined by the segregation of the biotite. The wavy texture is produced by the pinching out of lenses of feldspar.

The second type, a garnetiferous quarzo-feldspathic rock, occurs in lenses or bands of less than 20 feet in width. It is white weathering and has a massive appearance. It is composed of about equal amounts of quartz, plagioclase and potash-feldspar, arranged in thin lenses and lenticules. Garnet occurs in small clusters. Very small amounts of biotite, hornblende and pyroxene are usually present, along with traces of zircon and pyrite.

The third type is a well layered, poorly foliated, fine-grained feldspar quartz rock with finely disseminated biotite, graphite, garnet, ± sillimanite, pyrite and traces of zircon. It is characterised by its rusty weathered surface.

Intermediate charnockitic gneiss (map unit 2.)

A dark variety of the charnockitic rocks has been assigned a separate unit where this rock type predominates.

The intermediate charnockitic gneisses are characterised by their olive-green colour when fresh, and rusty-brown colour when weathered. The rock may be grayish when the hornblende and biotite content are high. The gneisses are medium to coarse grained and have an even grained, sacharoidal texture. They are

usually distinctly foliated, foliation being determined by the discontinuous segregation of hornblende and, to a lesser extent, of biotite. Potash-feldspar is the dominant mineral in this rock type. The perthite and quartz content are lower, and plagioclase higher, than in the leucocratic charnockitic gneisses. The distinguishing field feature of these rocks is their mafic content. This is usually greater than 10% and consists of green hornblende, lesser, but usually equal, amounts of clino- and orthopyroxenes and in some cases biotite.

Andesine- hornblende gneisses occur throughout the area in the form of long bands or lenses measuring from less than 1 inch to more than 500 ft. in width. These rocks are commonly interlayered in the intermediate charnockitic gneisses and have been included in that unit. The rock, dark gray when fresh, usually has a surficial "salt and pepper" texture when weathered. It is composed primarily of plagioclase feldspar (andesine) and green hornblende. Smaller amounts of potash-feldspar and garnet may also occur.

Leucocratic charnockitic gneiss (map unit 3)

These rocks, greenish to light gray when fresh, weather rapidly to a buff colour. They are medium to coarse grained and,

in places, pegmatitic. They usually have a granitic texture. Where sufficient mafics are present, a faint, streaky foliation may be developed.

The rocks are made up of potash-feldspar, (in part perthitic), plagioclase (An 30), and lesser amounts of quartz. The mafic component is usually lower than 10%, consisting primarily of ortho- and clinopyroxene and a little biotite. Garnet, and to a lesser extent greenish- brown hornblende, may be present.

Olivine gabbro and metagabbro (map unit 4)

Two occurences of gabbroic rocks were noted. The first forms a large ellipsoidal shaped body just west of the Laviolette mica deposit. The rock grades, from west to east, from an olivine bearing gabbro to a metagabbro and finally amphibolite, the latter being in immediate contact with the western edge of the mica deposit.

A second occurrence of strongly metamorphosed gabbro, a band with a width of about 30 feet, was located at 1000 feet from the junction of the road departing from the southernmost tip of Tie lake, just outside of the area.

These rocks are dark gray with a thin rusty weathered surface and are characterised by their spotty appearance due to small clusters of ferromagnesian minerals. The rock is fine grained and has a panidiomorphic-granular texture. The olivine, when present, is usually surrounded by a rim of orthopyroxene and garnet, the rest being made up of hornblende, clinopyroxene, plagioclase and traces of apatite, spinel and zircon.

Suzorite, a phlogopite-diopside gneiss whose type locality is in this area, is described later under the economic geology heading.

Several small granitic intrusions were seen in this area. The granite is fine and even grained and has a rust-orange colour. The mafic content is low. The rock occurs in the form of dykes, with sharp and usually steep contacts. Inclusions of intermediate charnockitic gneiss were seen at one location.

Pegmatite veins of up to 1.5 feet in width are common throughout the area. The composition is similar to that of the surrounding gneisses.

QUATERNARY

A light fluvioglacial cover of sand and gravel and some boulders is evident in most of the area. Fluviatile sands are concentrated along the channels of Pitchoui river and the area between Boucher lake and Dandurand lake.

Concentrations of sand and gravel useful for road building are often encountered in the south half of the area, but are rare in the north half.

Glacial clay was found on the south shore of Letondal lake.

STRUCTURAL GEOLOGY

The dominant structural trends of the gneisses in this area vary from northeast in the southern part of the area, to north in the northern part. The dips recorded averaged about 30° to the east.

Linear measurements were obtained from the orientation of minerals, warped surfaces and minor folds. The fold axes of these minor folds have a low, southward directed plunge.

A major folded structure occupies most of the north-western part of the area.

Although a continuous marker horizon is lacking, lenses of paragneiss and limestone tend to follow the outline of the fold in its western part.

The fold axis of the northern hinge plunges steeply southwards; the limbs of the fold are eastward dipping. The fold axis of the southwestern hinge plunges steeply northwards; the limbs again are eastward dipping. The eastern limb of the last-mentioned segment can then be followed northeastwards to Guenette lake where it is again folded back southeastward towards Kamitsgamak lake. The fold axis in this segment plunges about 25° to the north.

Two faults are indicated on the map and are very pronounced on the aerial photographs. Displacement of lithology or effects of brecciation or mylonitisation were, however, not found in the field.

ECONOMIC GEOLOGY

Chalcopyrite

The occurrence of chalcopyrite in some of the crystalline limestones and neighboring paragneisses has, for a number of years, attracted the interest of prospectors. The peak of

prospecting activity seems to have been attained in the nineteen-thirties. Most of the known occurences were trenched at that time. In 1969, Pinnacle Mines Ltd. and Fidelity Mining Investments Ltd. carried out a detailed geophysical survey of most of the area between Bussières lake and a little south of Faessler lake. C. Faessler (1937) visited most of these workings in 1936 and has given a good description of the location and nature of these occurrences. It should be noted that the Cloutier lake and creek referred to by Faessler in his report of 1937 are located 2000 feet west of Truchon lake. Recent topographic maps designate the Lapointe lake and creek of Faessler (1937) as Cloutier lake and creek.

The location of the mineralised areas are as follows:

	North	East
Faessler lake:	530220	54460
Baxter lake:	530320	54440
Cloutier creek:	530650	54350
Alex lake:	531040	54360
Bergeron lake:	531252	54145

The above-mentioned coordinates are given on the topographic map 31 O/16 W of the National Topographic Series.

Typical mineralisation found in the crystalline limestone consists of pyrite, chalcopyrite, pyrrhotite, molybdenite and graphite. The surrounding paragneisses are usually, although to a lesser extent, also mineralised with chalcopyrite.

Faessler (1937) noted concentration of mineralisation in the vicinity of pegmatite veins often found cutting limestone and paragneiss lenses. It is probable that the mineralisation present was synsedimentary, but with the injection of the pegmatites, sulphides were mobilised and concentrated about the pegmatite veins. Copper mineralisation in the surrounding paragneisses was probably deposited there at the time of pegmatitization.

Suzorite

The name suzorite was given to a phlogopite-diopside-rich rock found in this area by Faessler (1939).

The original deposit was later developed by the Siscoe Gold Mines Ltd. and is accessible by a road leading 7.5 miles northwards from the Siscoe railway siding.

The rock is a coarse-grained, compact, phlogopite-rich gneiss of bronze colour.

The original deposit had the shape of a curved lens, oriented roughly east-west. It was about 1200 feet in length and 200 feet wide and had a maximum depth of about 300 feet. Subsequent mining operations resulted in the removal of the eastern half of this lens so that most of the ore is now concentrated in a steep, roughly north-south-oriented ridge.

Suzorite outcrops contain numerous veins and veinlets of orange-coloured pegmatite, some of these measuring several feet in width. Phlogopite occurs in flakes averaging about 7 mm in diameter. The flakes appear to be randomly oriented; nevertheless, a preferred alignment can be discerned in larger sections of the outcrop. The average dip of the foliation in outcrops corresponds with the structural data obtained in the surrounding gneisses. The deposit itself dips steeply towards the north.

The rock contains about 50% phlogopite and, in decreasing order of abundance, feldspar, apatite, pyroxene, sphene and actinolite,and small amounts of calcite, ilmenite and pyrite. Small needles of sillimanite and diopside are nearly always present in the potash-feldspar.

A newer deposit, that of the Laviolette Mining and Metallurgical Corporation, is located 1 mile to the east of the aforementioned deposit and is accessible by the same road.

This occurence, although similar to that of the Siscoe deposit, differs in several important aspects. The size of the deposit is much greater; it is oval shaped and measures 2500 feet along a north-south main axis and a maximum of about 1000 feet along its short axis. Most of the southern half of the outcrop has been stripped clear of overburden.

A few pegmatite veins, averaging 2 to 3 inches in width, cross the outcrop diagonally. Small shear fractures up to 8 inches in length are oriented perpendicular to the main axis of the outcrop. These are also filled with pegmatite. Total pegmatite content in the outcrop is, however, less than 2%.

The mineral assemblage in the Laviolette deposit is simpler than that of the Siscoe deposit. Phlogopite makes up over 80% of the rock, the rest consisting of clino- and orthopyroxene and smaller amounts of feldspar and apatite.

Portable diamond-drill work was done on the main portion of the outcrop; few of these holes reached a depth of over

90 feet. Contact with neighboring rock types was, apparently, not obtained in these drill holes. Structural data obtained from the surrounding rocks would, however, seem to indicate that a depth of over 600 feet can be expected.

Other mica-rich rocks have been observed in the area. All of these occurrences are smaller and of lower quality than both of the above-mentioned occurrences.

The first of these, just north of the northwestern shore of Guenette lake, shows some promise and has been claimed by the Laviolette Mining Corporation.

Two biotite showings were located on des Isles lake. The first is at the northern tip of the only island on the main part of the lake. The second is on the south shore of the lake, 400 feet south of the island outcrop.

A phlogopite-diopside gneiss containing patches of pyroxene- hornblende gneiss was reported just south of the southeast corner of the map-sheet, on the north side of the southern arm of Tie lake.

Another outcrop of phlogopite-diopside gneiss, containing about 35% phlogopite, is exposed for about 200 feet in a railroad cut 1000 feet east of Wapoos station. The outcrop could be of greater width, as a ledge of the same rock was found just north of the railroad track, about opposite the camps at Wapoos.

A ledge of coarse-grained biotite gneiss was found at N. 529428 and E. 55155 of the National Topographic System grid. The rock here is strongly pegmatitised.

All of the above-mentioned outcrops would be worthy of further investigation, should the demand for mica warrant it.

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