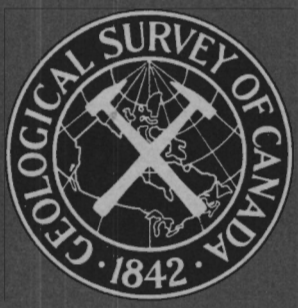

GEOLOGICAL SURVEY OF CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PAPER 62-24

LEAF RIVER MAP-AREA, NEW QUEBEC

Parts of 24 SW, 24 NW, 34 SE, and 34 NE

(Report and Map 36-1962)

I. M. Stevenson

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OF CANADA

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LEAF RIVER MAP-AREA, NEW QUEBEC

By

I.M. Stevenson

D E P A R T M E N T O F

M I N E S A N D T E C H N I C A L S U R V E Y S

C A N A D A

LEAF RIVER MAP-AREA, NEW QUEBEC

The geological reconnaissance mapping of Leaf River map-area by helicopter commenced in June 1961. This area is a northward extension of the area mapped by the Geological Survey in 1957-58-59 (Eade, 1957, 1958, 1959)[1]. The centre of the area mapped in 1961 is approximately 150 miles west of Fort Chimo and 325 miles northwest of Schefferville. There are no settlements, and access is best by float-equipped aircraft from Schefferville or Fort Chimo. In general, the major rivers are navigable by canoe, particularly the lower reaches where rapids are less common. Although lakes are numerous over the entire region, many are too shallow for float-equipped aircraft. North of lat. 57°00' and west of long. 71°00' it is difficult to find suitable camp sites sheltered from the prevailing northwest winds.

Approximately two thirds of the area is barren-land terrain with typical tundra-type vegetation, consisting mainly of caribou-moss, lichen, and scrub-willow. Although the transition from coniferous forest to barren-land vegetation is gradual, the so-called 'tree-line' runs due east from Lake Minto to Larch River, and then swings northeast to Leaf Bay. The topographic relief is mainly moderate to subdued, consisting of a monotonous succession of low rolling hills rising two or three hundred feet above flat, boulder-covered plains. In general, the highest hills are in those areas underlain by the more erosion-resistant, pyroxene-bearing rocks of unit 3. The entire area has been extensively glaciated, and the heavily-drift-covered eastern part has a relatively rugged relief where the larger rivers have incised deep channels through the drift.

Except for those areas containing iron-formation, much of the region has not been explored geologically. The chief published geological maps are those of Low (1889, 1898), compiled from data gathered on reconnaissance canoe trips along Clearwater, Larch, and Nastapoka Rivers. More detailed work has recently been carried out along the eastern margin of the map-area by the Quebec Department of Mines (Bérard, 1957, 1958, 1959) and private companies.

Most of the map-area is underlain by a mixed assemblage of schists and gneisses (1) derived primarily from sedimentary material, interlayered profusely with pink-to-white granite and

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[1] Names and dates in parentheses refer to publications listed in the References.

pegmatitic granite. At one place this unit may be a well-banded black and white paragneiss of undoubted sedimentary origin, whereas a short distance away it may be a slightly foliated, coarse-grained pink granite containing only small amounts of biotite and/or hornblende. The pegmatitic phases of the granite are generally rich in biotite and muscovite. Also included in unit 1 are rust-weathering, grey, quartz-biotite-plagioclase schist that grades into grey gneiss and pink granite.

The gneisses and schists of rock unit 2 are mainly well-foliated, metamorphosed volcanic and sedimentary rocks, commonly garnetiferous, in which relict structures are visible in places. The unit is characterized by the general scarcity of pink massive granite, although it may be present in small areas. Amphibolitic inclusions, probably derived from ancient basic sills, flows, and dykes, are common in unit 2.

Rock unit 3, consisting of yellowish green granite, quartz diorite, granodiorite, and granite-gneiss, forms a distinctive unit in the map-area. The greasy, resinous, olive-green lustre of these rocks is due to the peculiar colour of the feldspars, and normally the rock weathers a rusty brown to a depth rarely exceeding $\frac{1}{2}$ inch. Dark grey and blue quartz, as well as pink garnets, are common constituents. Hypersthene and/or clinopyroxene are generally present. This rock type is similar in appearance and composition to that described by Duffell (1956) from Mount Wright area, some 350 miles to the south.

Unit 4 is composed of an assemblage of granite, granodiorite, quartz monzonite, syenodiorite, etc., that is in general massive but may locally be foliated. Horizontal sheeting is a common feature, particularly in the more massive areas. Most of the contacts between the rocks of this unit and the surrounding gneisses, where examined, were found to be gradational, but a few small bodies of granite were found intruding the granite-gneiss. They were of insignificant size, however, and have been included in unit 4. Many of these rocks are porphyritic, the individual phenocrysts of feldspar in most cases assuming a random orientation. The colour of these rocks varies from pink to grey, depending on the feldspar content and percentage of mafic minerals present. Normal mafic constituents are hornblende and/or biotite, the former being more abundant.

Several small plutons of ultrabasic rocks (5) were seen in the map-area, and many more are undoubtedly present. Their main constituents are altered feldspar, pyroxene, hornblende, and olivine. Because of their erosion-resistant nature, they generally occur as rounded knobs protruding above the surrounding rocks. Several of these ultrabasic intrusions are of gabbroic composition, with well-defined ophitic texture.

Rocks of the Kaniapiskau Group (6) of Proterozoic age outcrop in a north-trending band that is a continuation of the rocks described by Fahrig (1955) in the adjoining area to the southeast. The basal quartzite (6a) can be traced as a narrow band almost continuously along the unconformable Proterozoic-Archaean contact. It is a medium-grained, massive, pink, white, olive-green, or black quartzite, that in a few places is faintly crossbedded. The basal quartzite is conformably overlain by the various members of the iron-formation (6b): siderite-magnetite, manganiferous siderite, siderite-hematite, cherty carbonate, and spotted silica. South of the 59th parallel the quartzite and iron-formations are distinct, but north of this point the structure is more complicated and the two formations are rarely separable. South of Leaf Lake the iron-formation is overlain by a relatively thick sequence of dolomite (6c), conglomerate, greywacke, arkose, sandstone, argillite, shale and slate (6d). North of Leaf Lake the dolomite was not recognized. The rocks of unit 6d show little or no metamorphism except in the northern part of the area where they are locally altered to biotite-chlorite schists and allied rock types (6e). South of Leaf Lake the sedimentary rocks are interbedded with a series of volcanic rocks (6f) consisting mainly of pillowed massive basalt with minor amounts of rhyolite tuff. The relationship between the lavas and the sedimentary rocks is not well defined, but the lavas were apparently extruded contemporaneously with the deposition of the sediments. Intrusive gabbro sills (6g) were injected among both the lava flows and the sedimentary rocks. The sills, mostly separated by slaty rocks, dip gently east and commonly contain inclusions of sedimentary rocks. Several occurrences of mottled gabbro were examined in the region south of Leaf Lake.

Large angular fragments of red to white sandstone (7), plentiful in the extreme southeast corner of the map-area, are indicative of a northward extension of the quartzite area in the adjoining map-area to the south (Eade, 1959). Several large angular quartzite boulders were also found just south of Clearwater Lake.

Gabbro dykes, many of which are diabasic, are present throughout the area. In the northern third of the area they are more prevalent and assume a general northwest trend. Individual dykes may be several hundreds of feet wide and traceable for several miles. Characteristically they are dark green to black, weather a rust-brown on the surface, and contain pyrite. Ophitic texture is generally well developed. The relationship between the gabbro dykes (8) and the gabbro sills associated with the Kaniapiskau Group (6) is not known.

Volcanic rocks (9) of post-middle Ordovician age form a ring of islands in Clearwater Lake. These rocks consist mainly of red and grey dacite breccia, and bedded tuffs. A small island of metagabbro lies in the centre of the ring of islands. Numerous angular boulders of fossiliferous limestone of middle Ordovician age are found in the vicinity of the islands and as inclusions in the lava.

Major, as well as numerous minor folds are everywhere present, but lack of detailed structural data makes the outlining of individual folds impractical. The gneisses and schists of units 1, 2, and 3 have dips generally in excess of 60 degrees, and in various places are severely deformed and locally overturned. A large arcuate structure is clearly discernible in the northeast corner of the map-area. A general northwest trend is apparent over much of the region, except along the eastern edge of the area where the general trend of the Archaean rocks is west. In Clearwater Lake the ring of volcanic islands dips gently toward the centre.

Numerous faults, some with considerable displacement, occur at random over the entire area, but only a few of the more prominent ones have been designated on the map. Major lineaments, visible both on air photographs and on the ground, are mostly joints or joint systems. Vertical and/or horizontal displacement has occurred along a few of the lineaments.

A few rusty-weathering zones are scattered haphazardly throughout the granites and gneisses, with pyrite and occasional chalcopyrite in evidence. Most of the diabase dykes and gabbro bodies are pyritized, and may contain magnetite. A few relict pieces of iron-formation, containing mainly grunerite and magnetite, are found as inclusions in the granitic rocks. The previously mentioned iron-formation of the Kaniapiskau Group (6) is of economic importance, and has been mapped in considerable detail by the Quebec Department of Mines (Bérard, 1957, 1958, 1959).

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