

**GENERAL GEOLOGY**

The belts of greenstone (3), sediments (4) and intrusives (5, 7, and 8) that occupy the greater part of the map-area terminate in the southeast against a complex of gneiss, schist and granite (1 and 2). The boundary between these two unlike terranes is in part sharp and in part apparently transitional. The apparent gradation eastward from Surprise lake of greenstone (3) into garnetiferous hornblende schist (1) and of sediments (4) into garnetiferous biotite schist and gneiss (1) indicates that the gneisses and schists of the southeast corner of the map-area may include highly altered phases of the lavas and sediments; they may also include highly altered phases of the rocks of other series.

The general succession, type of structure, and lithology of the greenstones (3), sediments (4) and various intrusives are in many ways like those of similar rocks in the Rouyn and adjacent districts of western Quebec and therefore the greenstones and associated strata have been grouped as being Keewatin. The Keewatin rocks (3) although probably representing many volcanic types are now typically aggregates of secondary minerals chiefly chlorite, amphibole, epidote, zoisite, sericite, carbonate, albite and quartz. Dark to light green varieties form the largest part of the Keewatin assemblage and commonly have pillow structures. Here and there sediments or well banded tuffs and in places medium to coarse agglomerates are interbedded with the lavas. The Keewatin rocks are as a rule somewhat sheared and in places have been almost completely converted to schistose chloritic rocks. Pillow structures if present may be drawn out to many times their original length and flattened or distorted. The Keewatin rocks north of lac de la Baie have been recrystallized to medium grained, massive, hornblende-rich rocks and are cut by a plexus of dykes ranging from granite to diorite. The Keewatin lavas between Chibougamau and Obatogamau lakes apparently grade eastward into hornblende schists that in places are garnetiferous and resembles rocks of the gneissic and schistose group (1). The massive greenstone on the southeast side of Surprise lake apparently grades eastward into garnetiferous hornblende schists and amphibolites that form a narrow belt (1) along the south side of the lake. In many zones of intense shearing and in some cases where the rocks are unshattered, the Keewatin rocks particularly and those of other groups also are replaced either partly or completely by carbonates and are cut by quartz stringers and veins.

The sedimentary rocks (4) are possibly equivalents of the Timiskaming and Keewatin sediments in the Rouyn-Bell River region of western Quebec. They appear to lie in synclinal structures and to be younger than the greater part of the Keewatin lavas (3). It is possible that they comprise at least two distinct groups: (1) an older group of pyroclastic sediments and breccias that seem conformable with and even to some extent interstratified with Keewatin lavas; and (2) a younger group resting unconformably on older rocks. The sediments on Caopatina lake are in part conglomerates with well rounded boulders. They apparently grade eastward into garnetiferous, biotite and hornblende gneisses and schists (1) formerly termed the Nemenish series. Although not traced, sediments may extend from Caopatina lake westward to beyond the west edge of the map-area.

The basic intrusives (5), except for some small bodies, form a rather regular succession of sills separated from one another by narrow bands of sediments and lavas. They consist, with a few reversals or repetitions, of interbedded serpentine (peridotite) and pyroxenite at the base overlain in ascending order by (1) pyroxenite and gabbro, (2) amphibolite, amphibolite gabbro, and quartz gabbro, and (3) quartz diorite. A typical feature is the general increase of feldspar upwards and of ferromagnesian minerals downward not only in the sills taken as a group but in individual members also. The basic intrusives in the belt that stretches across the northern part of the map-area are folded into a tightly closed syncline that is clearly displayed between Barlow and Gwillim lakes by a regular repetition of the sills symmetrically about the synclinal axes. In other parts of the syncline the tendency of the sills to die out northward is shown by a greater development of the sills in the south than in the north limb. A similar succession of sills to those in the synclinal belt occurs along the south side of the Opémisca granite mass and forms part of the south limb of the anticline that lies immediately south of the synclinal belt. This southern belt of sills is cut off eastward by a fault, probably a southwest continuation of the Gwillim lake fault, and their extension east of the fault is imperfectly known.

The anorthosite (7) at Lake Chibougamau is typically a white, chalky rock mottled green and is for the most part altered to aggregates of zoisite, quartz, mica, carbonate, chlorite, amphibole and albite feldspar. Fresh phases consist of labradorite. Altered gabbroic rocks grouped with the anorthosite occur particularly along the northern border of the Lake Chibougamau anorthosite mass. The anorthosite southeast of Lake Chibougamau is for the most part much altered and shrunken and is intermingled with altered gabbroic rocks in the high ridges lying along the southeast side of the body. These gabbroic rocks except in the case of some fresh types that are probably much younger, are like the gabbros on the north side of the anorthosite body.

Biotite granite is the most widespread type of the granitic group (8) and is comparatively fresh although altered and intensely sheared in places, particularly along the northwest side of the region underlain by gneisses, schists and granite (1 and 2). Hornblende-rich types prevail at Opémisca lake. The marginal phases of the larger granitic bodies tend in places to be dioritic. Diorite and granodiorite are fairly widely developed phases of the Scott-Chibougamau lakes granite mass particularly on the southern parts of Scott and Simon lakes where they are dark and altered.

The Chibougamau strata (10) may be equivalents of the Cobalt series. They dip at low angles except where faulted and rest with marked unconformity on the rocks with which they are in contact. They are probably younger than most if not all of the granitic rocks (8).

The gabbro and diabase (11) are in places remarkably fresh but in other places contain secondary minerals in place of pyroxene and other ferromagnesian constituents.

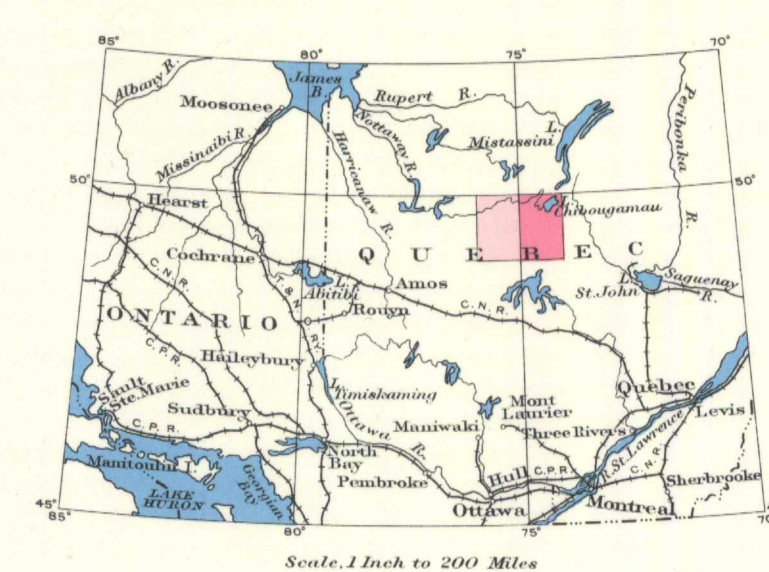
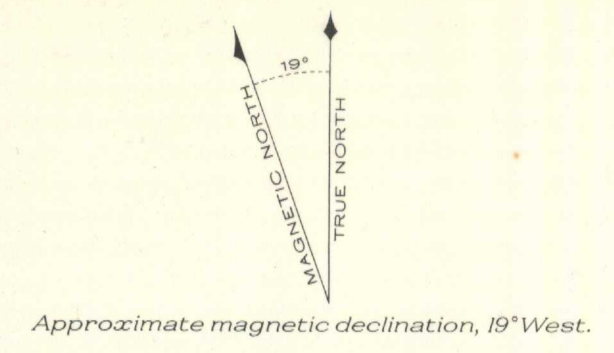
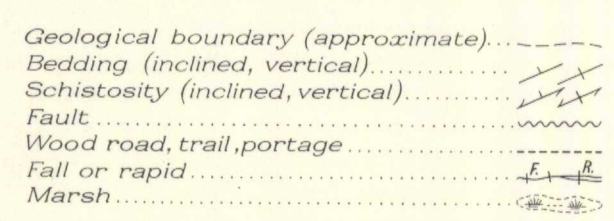
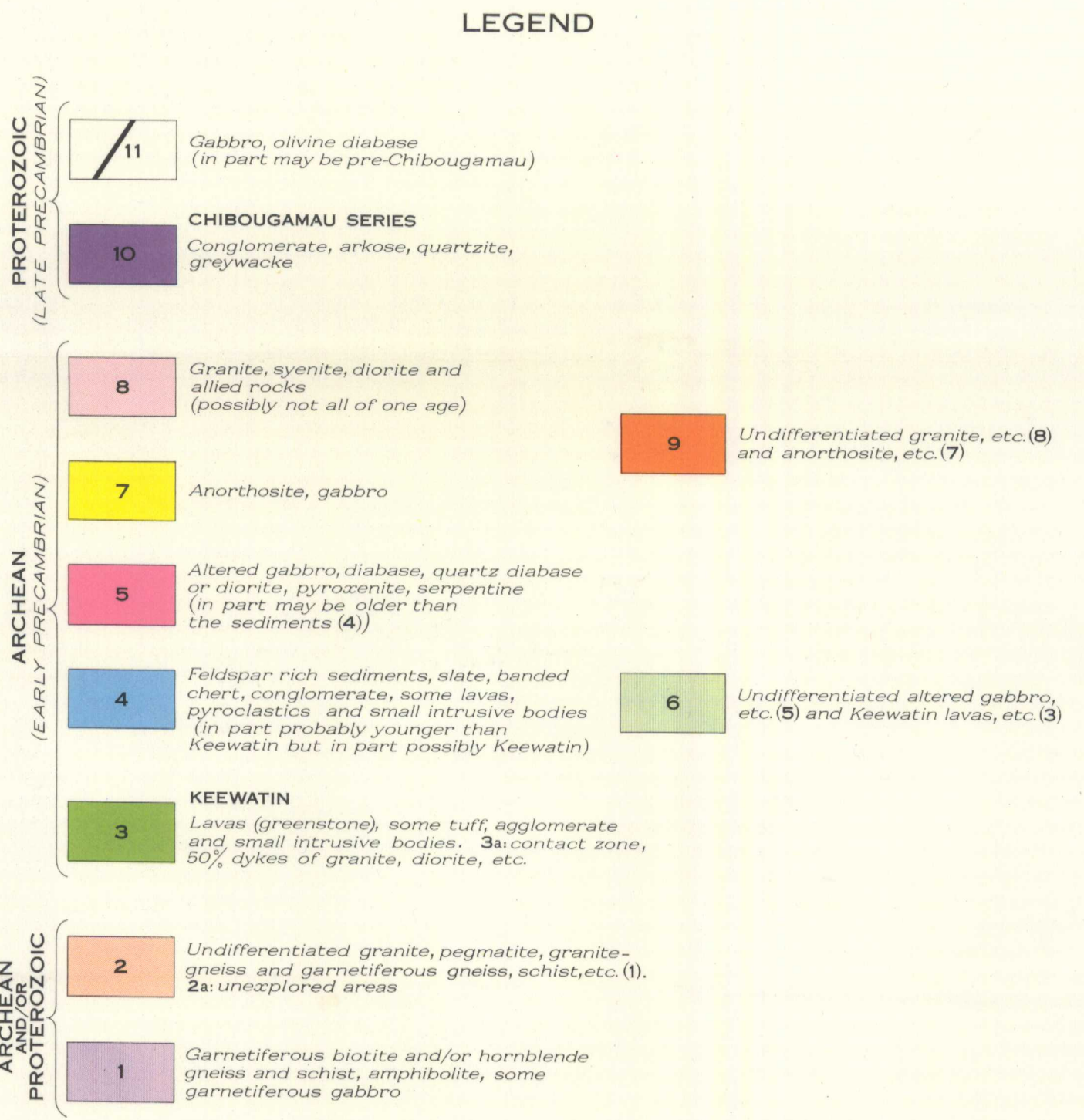
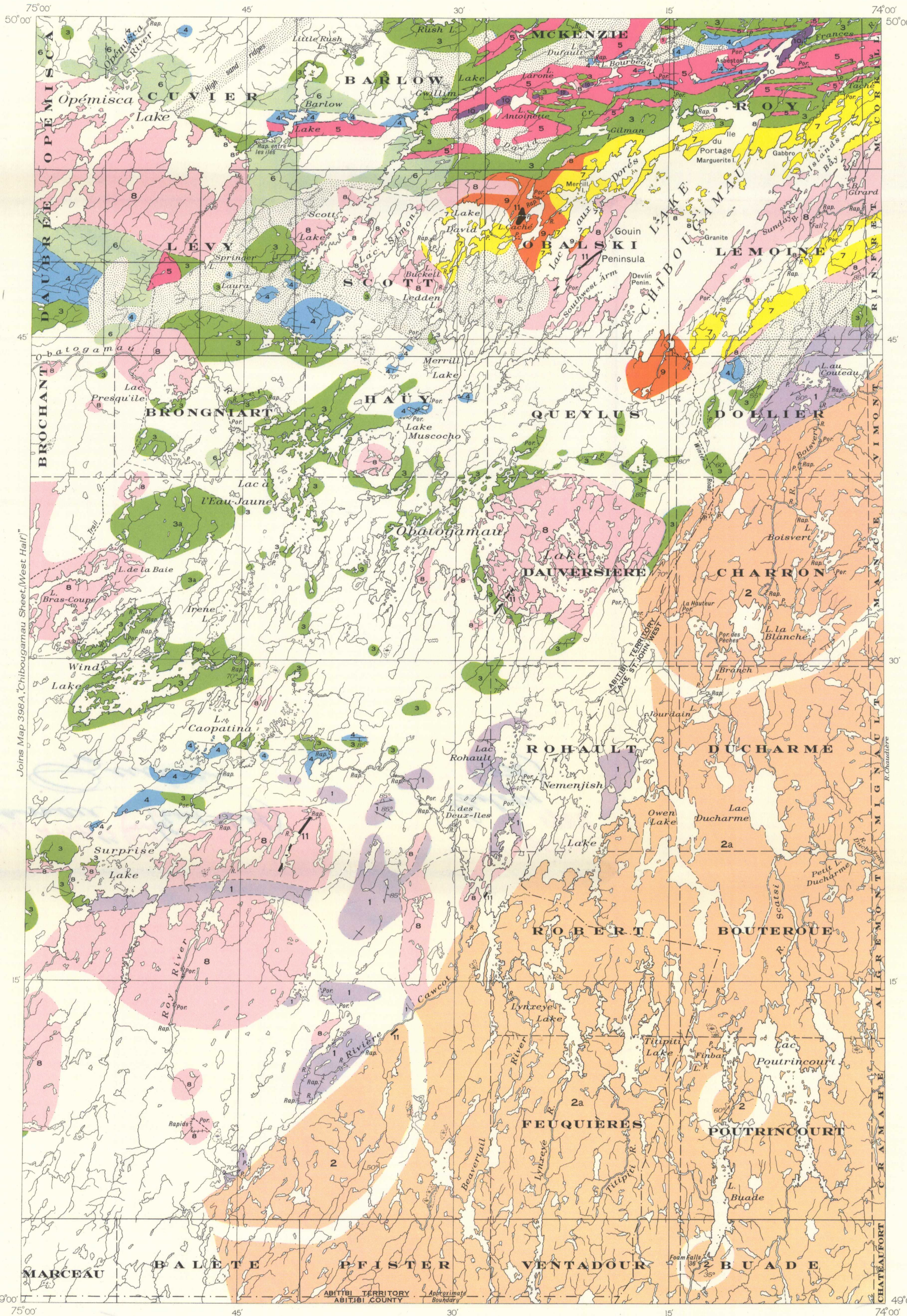
**STRUCTURAL GEOLOGY**

The major folding of the Keewatin (3) and sedimentary rocks (4) strikes east-southeasterly to easterly. The belts of sediments are considered to be synclinal as indicated by the attitudes of tops of the Keewatin lava flows. The volcanic and sedimentary rocks everywhere dip steeply or vertically and their strikes, in general, parallel the trend of the belts in which they occur. Cleavage where developed near granitic intrusives is typically parallel to the granitic contact.

A northeasterly structural trend exhibited by certain larger faults that are later than the Chibougamau strata (10), by diabase dykes (11), and by the ill-defined northwest front of the region of gneisses and granite (1 and 2) is, in places, superimposed upon and is later than the easterly structural trend exhibited by the volcanic and sedimentary rocks (3 and 4). Northeasterly trending faulting is most conspicuously shown by offsets of rock masses and linear depressions northeast of Chibougamau lake, and occurs along and southwest of Gwillim lake. Zones of shearing, in places of intense crushing, even in granitic rocks, and probably the northeasterly trending faulting occur between lake Chibougamau and the area of gneiss, schist, etc. (1 and 2) in the southeast part of the map-area.

**ECONOMIC GEOLOGY**

The known mineral deposits with the exception of a few prospects lie in the districts immediately north and west of lake Chibougamau. The most important are copper and gold, siliceous, sulphide deposits and gold-quartz deposits. The former occur along shear zones in anorthosite, and associated rocks (7) near the northern half lac aux Dorés and in the gabbro-pyroxenite mass (5) four miles north of Presqu'île lake. The gold-quartz deposits occur in dioritic rocks (5) on the south side of Bourbeau lake, in greenstone (3) northwest of Gwillim lake and elsewhere, and in the granite diorite complex of David and Simon lakes. Descriptions of the various deposits are given in Memoir 185, Summary Report 1930, part D, pages 22-48, and in the annual report of the Quebec Bureau of Mines for 1934, pages 133-145.



MAP 397A  
**CHIBOUGAMAU SHEET**  
 (EAST HALF)  
 ABITIBI TERRITORY  
 QUEBEC

Scale: 25/40 or 1 Inch to 4 Miles  
 Miles  
 Kilometres

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