GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

SHEET 74 N/7 (West Half)

LEGEND

PROTEROZOIC

6 — ATHABASCA SERIES (4-6): *Arkose*

5 — *Conglomerate*

4 — *Sandstone*

ARCHÆAN OR PROTEROZOIC

2 — TAZIN GROUP (1,2): *Quartz-feldspar gneiss*
2a, *quartz-feldspar gneiss with bands rich in biotite or chlorite;*
2b, *quartz-feldspar gneiss with bands of feldspathic quartzite*

3 — *Granite-gneiss*

1 — *Quartzite and ferruginous quartzite*

A — *Mylonite, breccia, and crushed rock; mainly of granitic composition. Probably altered equivalent of 2 and 3*

B — *Amphibolite and chloritized amphibolite. Probably of more than one age, but older than 4*

Bedding (horizontal, inclined, vertical, dip unknown)
Bedding (dip known, top of bed unknown)
Schistosity, gneissosity (inclined, vertical, dip unknown)
Stratiform foliation (inclined, vertical, dip unknown)
Lineation
Minor folds (arrow indicates direction of plunge)
Fault (approximate, assumed)
Anticline (approximate)
Syncline (approximate)
Glacial striæ
Mine
Principal radioactive mineral occurrences

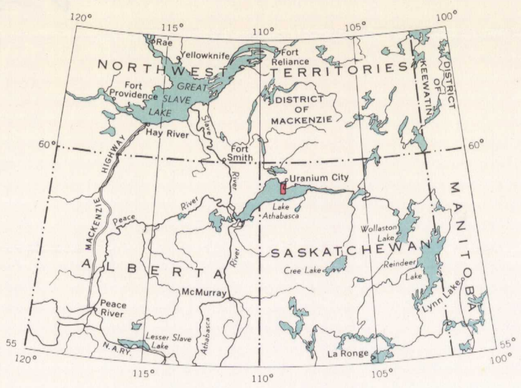
Geology by J.A. Fraser, 1953

Building
Sand or gravel
Marsh
Height in feet above mean sea-level 699

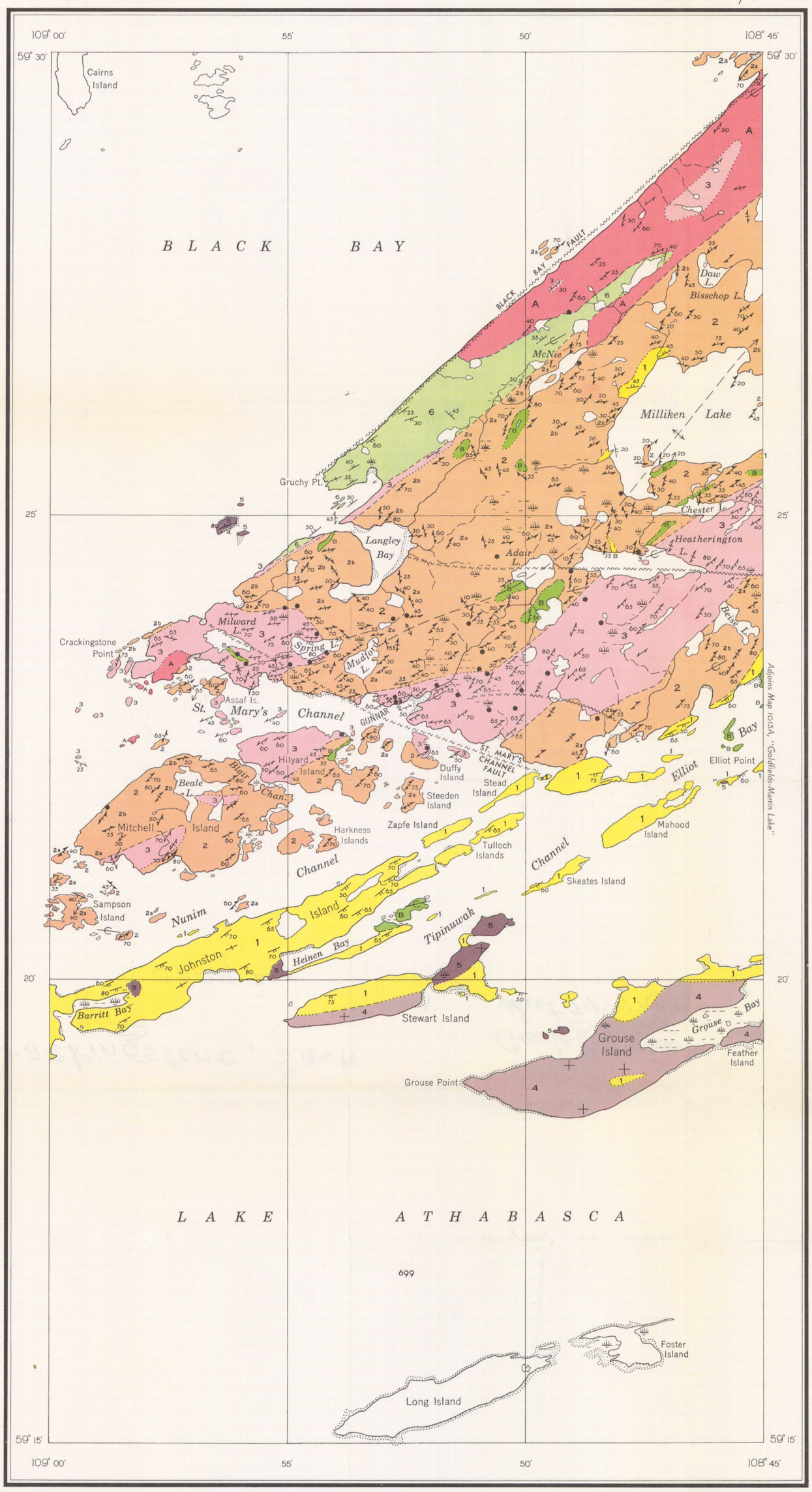
Cartography by the Geological Survey of Canada, 1960

Air photographs covering this map-area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario

Approximate magnetic declination, 25° 20' East



INDEX MAP



DESCRIPTIVE NOTES

The topography is characterized by ridges that trend northeast parallel to the general strike of bedrock. Relief is greatest along the shore of Black Bay, where steep cliffs rise more than 400 feet above the level of Lake Athabasca. None of the streams are navigable by canoe. About 50 per cent of the bedrock is exposed except on Grouse Island where less than 10 per cent is exposed.

The gneisses of the Tazin group are derived from sedimentary rocks. The quartz-feldspar gneiss (2) is fine grained to medium grained with well-defined foliation that probably follows original bedding planes. Most layers are less than one-quarter inch thick. Colours range from white to pink to grey or greenish grey. The gneiss (2) grades from feldspathic quartzite into gneiss almost identical in appearance with granite-gneiss (3).

The granite-gneiss (3) is mainly pink and coarse grained. It consists of one-third quartz, two-thirds feldspar, and minor chlorite. A crude gneissosity is parallel to the contact between the granite-gneiss (3) and the quartz-feldspar gneiss (2). The origin of the granite-gneiss (3) is obscure but derivation from a sedimentary rock seems most likely. Grey granite-gneiss (3) is rich in perthite, contains biotite rather than chlorite, and has a very poorly-defined gneissosity. It is best exposed on the south side of Mitchell Island but occurs in many places with pink granite-gneiss (3) and is probably a phase of it.

Amphibolite and chloritised amphibolite (B) are more widespread than indicated on the map, for bands and lenses of these rocks, averaging about 20 feet in width and a few hundred feet in length, are common in the granite-gneiss (3) and in the quartz-feldspar gneisses (2) of the Tazin group. The attitude of these mafic bands rarely differs from that of the enclosing rocks. The bands are probably of diverse origin; some of them appear to be altered sills or flows.

The mylonites (A) are characteristically brown or pink, fine grained to very fine grained, and chert-like. Mylonitic rocks near Crackingstone Point have a porphyroid texture with quartz augen and feldspar metacrysts. Breccia and mylonite occur locally in units 2 and 3 as irregular masses and dyke-like bodies only a few inches wide. Along the southeast shore of Black Bay mylonite and crushed rock are so widespread that the original nature of the rock is largely obscured.

Rocks of the Athabasca series locally overlie those of Archæan or Proterozoic age. The sandstone (4) is either almost all quartz or contains a little feldspar. It is white to red, ripple-marked and crossbedded. The conglomerate (5) consists of angular blocks of the underlying rocks in a brown, silty, arkosic matrix. Conglomerate with rounded boulders is found on the islands west of Langley Bay. The arkose (6) is fine grained, almost massive, and weathers buff or brown.

The four faults shown on the map follow prominent scarps, valleys, and shorelines. Other marked topographic lineaments in the map-area may also represent faults. In drill intersections the faults are recognized by zones of hematitization, breccia, and gouge. The three easterly striking faults dip steeply south. Drilling in the Martin Lake area has shown that the Black Bay fault dips about 65 degrees southeast. The age of the faults is not known, but at least some of the movement along the Black Bay fault has taken place since the deposition of the Athabasca series.

Many radioactive mineral occurrences are known in the granite-gneiss (3) and in the gneisses (2) of the Tazin group; a few are in quartzite (1). Commonly, radioactive mineralization is associated with fractures in bands of mafic rock (B). These fractures rarely carry radioactive minerals beyond the mafic body. Thin veinlets and films of pitchblende appear in many of the showings. The gangue minerals may be carbonate, chlorite, quartz, and earthy hematite or specularite. Walls adjacent to pitchblende-bearing veins are almost invariably reddened by hematite.

The uranium deposit of Gunnar Mines Limited occurs in an area of low relief largely covered by muskeg. The orebody is in a mass of albite-monzonite lying in the granite-gneiss (3) near the contact with the underlying quartz-feldspar gneiss (2). The albite-monzonite, like the granite-gneiss (3) in which it occurs, is believed to have been derived from a sedimentary rock. The orebody, lenticular in shape and elongated to the south, plunges south at about 35 degrees parallel with the foliation of the granite-gneiss (3). The ore consists of disseminated pitchblende replacing albite and filling open spaces in the monzonite. Local, high-grade shoots consist of veinlets of pitchblende in breccia. Other metallic minerals present are hematite, and traces of pyrite, chalcopyrite, and galena. Non-metallic, introduced minerals include calcite, dolomite, chlorite, and quartz. Supergene uranium minerals are found to a depth of at least 400 feet and carry up to 40 per cent of the uranium in the ore. The commonest hydrothermal alteration related to the ore is replacement of quartz by carbonate in granite-gneiss near the orebody.

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MAP 1095A

GEOLOGY

CRACKINGSTONE

SASKATCHEWAN

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

Miles 1 ½ 0 1 2 3