CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

SHEET 74 $\frac{N}{7}$ (West Half)

LEGEND

PROTEROZOIC

ATHABASCA SERIES (5-7)

7 — *Arkose*

6 — *Conglomerate*

5 — *Sandstone*

ARCHÆAN OR PROTEROZOIC

TAZIN GROUP (1, 2)

2 — *Quartz-feldspar gneiss*
2a, *quartz-feldspar gneiss with bands rich in biotite or chlorite;*
2b, *quartz-feldspar gneiss with bands of feldspathic quartzite*

4 — *Pink granite-gneiss*

3 — *Grey granite-gneiss. Age relative to 4 unknown*

1 — *Quartzite and ferruginous quartzite*

A — *Mylonite, breccia, and crushed rock; mainly of granitic composition. Probably altered equivalent of 2, 3, and 4*

B — *Amphibolite and chloritized amphibolite. Probably of more than one age, but older than 5*

Bedding (horizontal, inclined, vertical, dip unknown)
Bedding (direction of dip known, upper side of bed unknown)
Schistosity, gneissosity (inclined, vertical, dip unknown)
Stratiform foliation (inclined, vertical, dip unknown)
Lineation
Drag-folds (arrow indicates direction of plunge)
Fault (position approximate, position assumed)
Anticlinal axis (position approximate)
Synclinal axis (position approximate)
Glacial striæ
Mine
Principal radioactive mineral occurrences

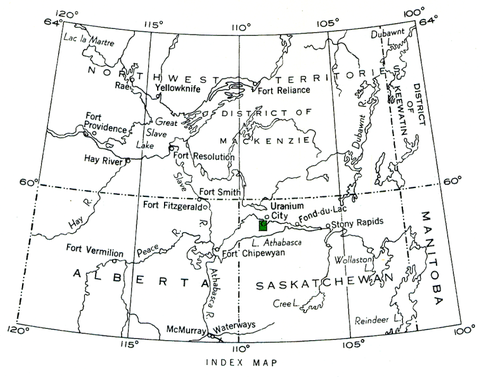
Geology by J. A. Fraser, 1953

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

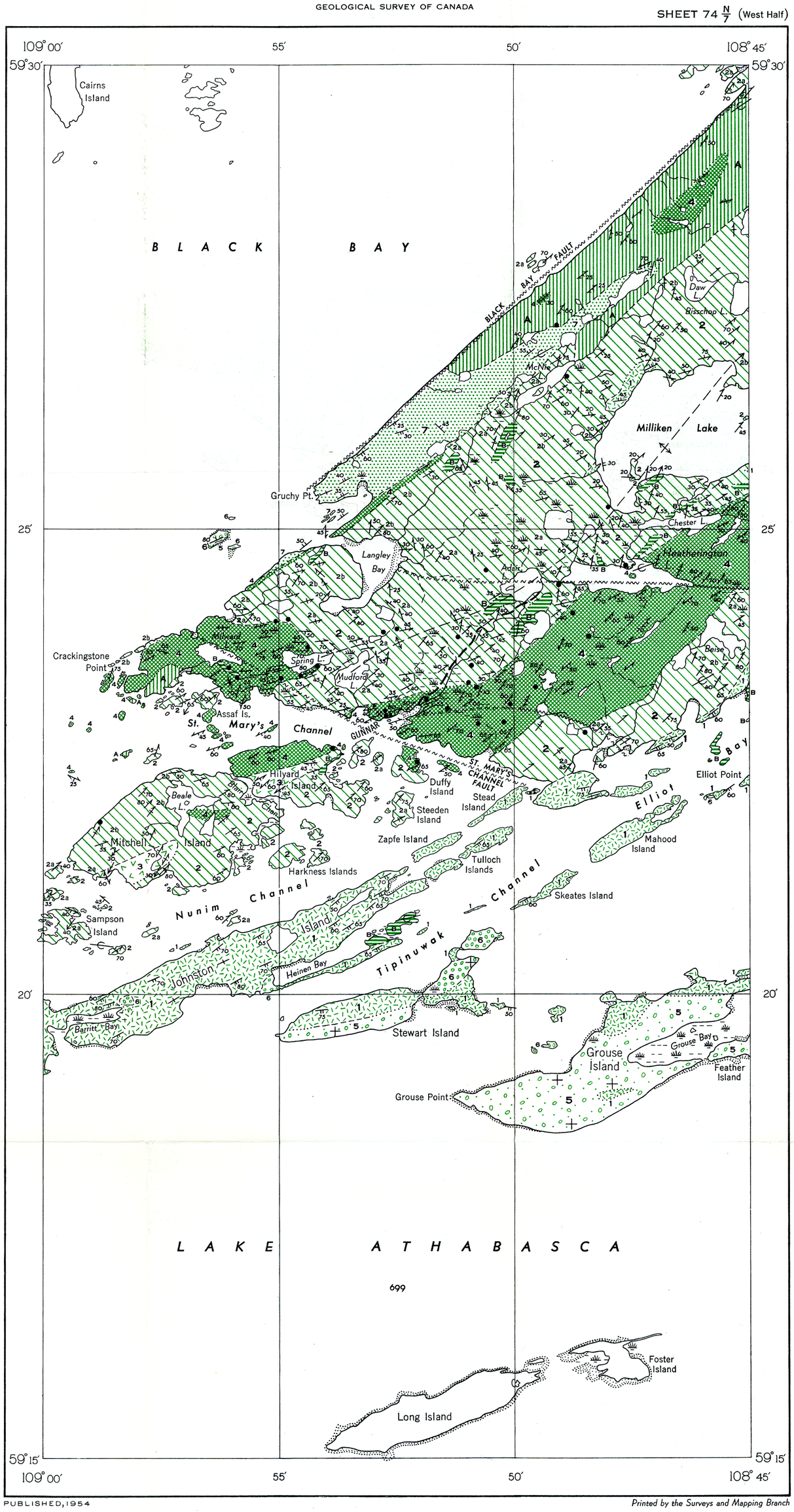
Approximate magnetic declination, 26° 02′ East

Cartography by the Geological Cartography Division, 1954

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



INDEX MAP



PUBLISHED, 1954

Printed by the Surveys and Mapping Branch

PRELIMINARY MAP 54-8

CRACKINGSTONE

(WEST HALF)

SASKATCHEWAN

Scale: One Inch to One Mile = $\frac{1}{63,360}$

Miles

1 ¾ ½ ¼ 0 1 2 3

DESCRIPTIVE NOTES

The characteristic land forms are northeast trending ridges that parallel the strike of bedrock. Relief is greatest along the shore of Black Bay, where steep cliffs rise to over 400 feet above the level of Lake Athabasca; elsewhere the relief is rarely over 100 feet. None of the streams seen is navigable by canoe. Bedrock is exposed on about 50 per cent of the land area except on islands underlain by sandstone of the Athabasca series where exposures are less than 10 per cent.

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, which probably follows the bedding planes. Most layers are less than ¼ inch thick, and range in colour from white to pink to grey or greenish grey. The gneiss (2) grades from feldspathic quartzite into granite-gneiss almost identical in appearance with the pink granite-gneiss (4).

The granite-gneiss (4) consists of about one-third quartz and two-thirds feldspar, with some chlorite. It is coarse grained with crude gneissosity parallel with the contact between the granite-gneiss (4) and the quartz-feldspar gneiss (2). The position of the boundary between the two is difficult to establish within a few hundred feet because of the gradational nature of the contact. The granite-gneiss (4) was also probably formed in situ from a sedimentary rock.

The grey granite-gneiss (3) is a medium-grained, perthite-rich rock, weathering white or light grey. The ferromagnesian mineral content is rarely more than 1 or 2 per cent. It is less gneissic than the pink granite-gneiss (4) and contains biotite rather than chlorite. Where fine grained or mylonitized, grey granite-gneiss resembles the feldspathic quartzite (2b) of the Tazin group, and may in places have been incorrectly mapped as quartzite.

Amphibolite and chloritized amphibolite (B) are more widespread than indicated on the map, for bands and lenses of these rocks too small to show on the map-scale are found in all the Archaean or Proterozoic units except the quartzite (1). In general the bands are about 20 feet wide and hundreds of feet long, and their attitude rarely differs from that of the enclosing rocks. They are probably of diverse origin, but some of them appear to be altered sills or flows.

The mylonites (A) are characteristically fine grained, brown or pink, and chert-like. Mylonites near Crackingstone Point have a porphyroid texture with quartz augen and feldspar metacrysts in a mylonitic matrix. Breccia and mylonite occur locally in units 2, 3, and 4, the mylonite being in irregular masses or 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 Archaean or Proterozoic age. The sandstone (5) is almost pure or contains only a little feldspar. It is white to red, ripple-marked, and crossbedded. The conglomerate (6) consists of angular blocks of the underlying rocks in a brown, silty, or arkosic, matrix. Conglomerate with rounded boulders occurs on the islands west of Langley Bay. The arkose (7) is fine-grained, almost massive, and weathers buff or brown.

The known faults follow prominent scarps, valleys, and shorelines. Where intersected by drill-holes, the position of the fault is recognized by zones of hematite, breccia, and gouge. The three easterly striking faults dip steeply south. Drill intersections in the Martin Lake area prove 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.

Most known radioactive mineral occurences are in the granite-gneisses (3, 4) and in the gneisses (2) of the Tazin group, but a few are in the quartzite (1). Commonly radioactive mineralization is associated with fractures along or cutting across bands of mafic rock. These fractures rarely carry radioactive minerals beyond the amphibolite. Thin veinlets and films of pitchblende appear in many of the showings. The gangue minerals in these may be carbonate, chlorite, quartz, and earthy hematite or specularite. The 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 a mass of rock composed of albite-monzonite within granite-gneiss (4) near its contact with the underlying gneiss (2) of the Tazin group. The albite-monzonite, like the granite-gneiss in which it occurs, is believed to be a recrystallized sedimentary rock. The orebody, lenticular in shape and elongated to the south, plunges south at about 35 degrees and parallels the strike and dip of the foliation in the granite-gneiss. The ore consists of disseminated pitchblende replacing albite in the monzonite and filling open spaces. Local, high-grade shoots consist of veinlets of pitchblende in breccia. In addition to pitchblende, metallic minerals include hematite, and traces of pyrite, chalcopyrite, and galena. Non-metallic, introduced minerals are calcite, dolomite, chlorite, and quartz. Supergene uranium minerals extend 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.

PRELIMINARY MAP 54-8
CRACKINGSTONE
SASKATCHEWAN
SHEET 74 $\frac{N}{7}$ (West Half)