CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS
GEOLOGICAL SURVEY OF CANADA

LEGEND

PROTEROZOIC

- 9 — Basic dykes
- ATHABASCA SERIES (6-8)
- 8 — Basalt flows
- 7 — Arkose, sandstone, and feldspathic siltstone
- 6 — Conglomerate; a, with angular fragments; o, with rounded fragments

ARCHÆAN OR PROTEROZOIC

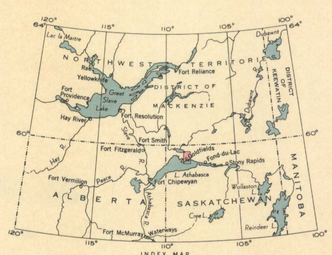
- 5 — Granite-gneiss, commonly containing lenses or bands of amphibolite or biotite or chlorite; 5a, granite; G, garnetiferous gneiss; Sil., sillimanite gneiss; x, fine-grained rocks, mainly mylonite and flaser-gneiss; may contain some sedimentary material, or hydrothermal quartz, albite, chlorite, or hematite
- 5b — Granite-gneiss, with inclusions of quartzite
- 5c — Granite-gneiss, with bands of diopside, believed derived from alteration of dolomite
- TAZIN GROUP (1-4)
- 4 — Mafic rocks: A, amphibolite; B, biotite schist or gneiss; G, garnetiferous gneiss; C, chloritic rocks; E, epidote-bearing; Cor, cordierite-bearing; Sil., sillimanite-bearing; And., andalusite-bearing; Q, chlorite-epidote rocks grading to more siliceous types; S, of sedimentary origin; V, of volcanic origin; I, of intrusive origin. (S), (V), and (I) indicate uncertainty as to origin
- 4a — Mafic rocks, with added granitic material
- 3a — Quartzite, with added granitic material
- 3 — Quartzite; F, ferruginous quartzite and quartzite breccia
- 3b — Quartzite, with minor amounts of dolomitic material
- 2 — Conglomerate
- 1 — Dolomite and dolomitic quartzite

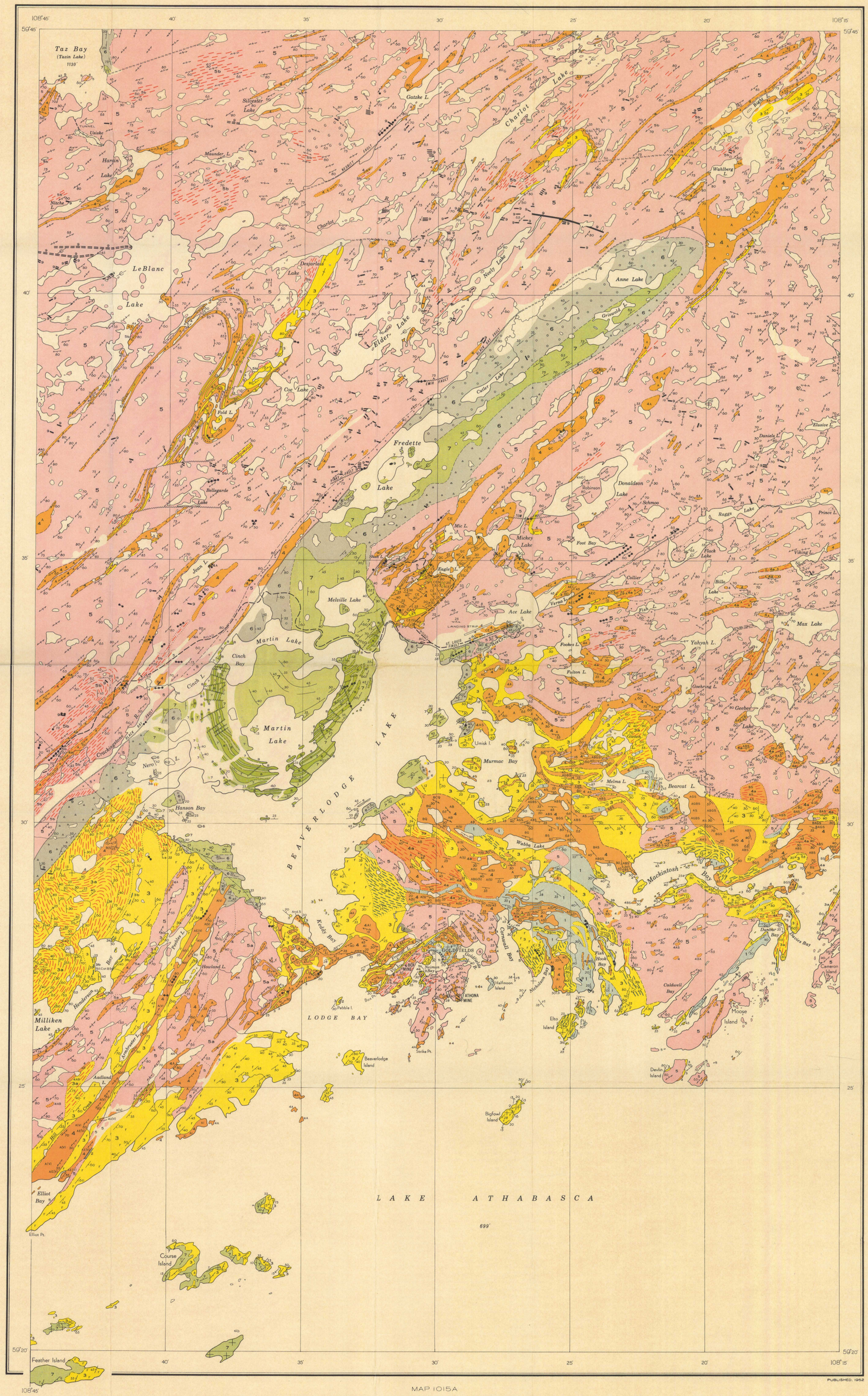
Bedding (horizontal, inclined, vertical)
Foliation, schistosity (horizontal, inclined, vertical)
Lineation
Fault (arrow indicates direction of dip)
Glacial striæ
Shaft
Adit
Principal radioactive mineral occurrences

Geology by A.M. Christie, 1947, 1948

Cartography by the Geological Mapping Division, 1952

Approximate magnetic declination, 24°30' East





DESCRIPTIVE NOTES

The topography of the map-area is similar to that of other parts of the Canadian Shield. In detail the country is rough, the highest hills rising more than 700 feet above the nearest lakes. The numerous lakes are joined by small streams, none of which, except Crackingstone River below Beaverlodge Lake, is navigable by canoe. About 15 per cent of the area underlain by the Athabasca series is exposed bedrock, whereas in those areas underlain by older rocks more than 50 per cent of the bedrock is exposed, or is mantled only by lichen or thin moss.

The Tazin group (1-4) is composed mainly of sedimentary rocks, with some volcanic material. The sedimentary strata are quartzites, dolomitic quartzites, dolomites, conglomerates, other impure sediments, and their metamorphic equivalents. Many contacts between these rock types are gradational. The volcanic rocks are mainly basic, and are intercalated with the sedimentary series. Both sedimentary and volcanic rocks are cut by basic sills and dykes, which are here included in the Tazin group. The term 'mafic rocks' used in the legend includes all the basic or dark-coloured rocks of this group, such as amphibolites, biotite schists, chlorite-epidote rocks, and chlorite schists, whether they be of extrusive, intrusive, or sedimentary origin. Because of the difficulty experienced in everywhere distinguishing the mode of origin of these rocks, they have been mapped as a unit and are subdivided by overprint lettering according to their mineralogical composition and origin as indicated in the legend. Thus AI indicates an amphibolite of igneous origin, BGS a garnetiferous biotite schist or gneiss of sedimentary origin, and AEV an amphibolite, with abundant epidote, of volcanic origin. Where the letters S, V, and I are shown in parentheses, as A(V), the origin indicated is uncertain. Certain of the dark-coloured, fine-grained, chloritic rocks near the Eagle shaft and near the Black Bay fault are crushed rocks, mylonites or breccias, with only minor amounts of chlorite.

The rocks of the Tazin group are in part intruded, or replaced, by granitic material to form a complex of granite, granite-gneiss, and granitoid gneisses (5). The gneisses, although composed mainly of granitic material (feldspar and quartz), contain numerous relict masses of older rocks, ranging in size from the complexly folded formations southeast of LeBlanc Lake, which outcrop continuously for more than 4 miles, to lenses a few inches long. These relict masses represent most of the Tazin rock types of the area, with amphibolite particularly widespread and abundant, quartzite abundant, and altered dolomitic rocks other than amphibolite, less common. Coarse pegmatite dykes, with sharp walls, occur only in the area south of the St. Louis fault and east of Beaverlodge Lake. Lamprophyre dykes were recognized in the same area, but not elsewhere.

Near the Black Bay fault, the St. Louis fault, and elsewhere, lie bands of fine-grained, cherty looking, massive or banded rocks, which are mainly the crushed rocks known as mylonites or flaser-gneisses. These rocks may greatly resemble certain fine-grained, massive or banded, sedimentary beds, and it was not found possible to distinguish everywhere between them in the field. The composition and appearance of the crushed zones have in many places been modified by the addition of albite or oligoclase, quartz, hematite, chlorite, and carbonate, of hydrothermal origin.

The Athabasca series (6-8) of conglomerate, arkose, and sandstone, with intercalated volcanic material, rests unconformably on the older rocks, and contains boulders or fragments of all the older rocks of the area. The fragments may be enclosed in a sandy matrix or may be cemented by carbonate, chlorite, or ferruginous material. The arkose and sandstone consist largely of reddish beds of sand grain, but include some fine-grained, red, siltstone beds. Crossbedding and ripple-marks are common in the arkose and sandstone, and mud-cracks are common in the siltstone beds. The volcanic rocks are basalts and andesites, in places spilitic in composition, and commonly amygdaloidal.

Most of the late basic dykes (9) are from 1 foot to 20 feet wide, are usually straight, dip nearly vertically, and can rarely be traced more than 100 feet. Only a small percentage of these dykes has been mapped. In composition they vary from gabbro to syenodiorite. One large, coarse-grained gabbro dyke north of Neely Lake averages 150 feet in width and has been traced for 1½ miles.

Two major faults are recognized in the area, the St. Louis fault, which strikes north 60 degrees east from Beaverlodge Lake to Raggs Lake and dips 50 degrees to the southeast, and the Black Bay fault, which strikes north 35 degrees east from Black Bay of Lake Athabasca through Cinch and Fredette Lakes and dips 65 degrees to the southeast. At least some of the movement along these faults has occurred since the deposition of the Athabasca series.

The area contains uranium- and gold-bearing deposits. Thousands of uranium occurrences have been found in the map-area, only a few of the more significant of which are shown on the map. Most of the uranium deposits are related to faults and are of the pitchblende vein-type, associated with one or more of quartz, carbonate, hematite, and chlorite. Pyrite, chalcopyrite, and galena are common metallic minerals in the pitchblende veins; others, less common, are bornite, sphalerite, copper selenides, clausthalite, niccolite, arsenopyrite, cobalt-nickel arsenides, native copper, native silver, and native gold. The uranium hydrocarbon thucholite occurs at the Nicholson property and the Box mine, and platinum and related elements have been identified in association with uranium at the Nicholson workings. A new iron vanadate mineral has been found at Fish Hook Bay and at the uranium occurrence in quartzite south of the west end of Beaverlodge Lake. Scheelite is reported associated with pitchblende at the uranium occurrence just west of Fish Lake. Yellow, orange, and green alteration products of pitchblende are common.

Uraninite has been identified from various parts of the area, but in much less amount than pitchblende. It occurs with quartz, chlorite, hematite, and molybdenite near the Nesbitt fault, and at numerous localities has been suspected of being the source of the radioactivity of relatively massive granite. Monazite also occurs in granitoid rocks of the map-area.

The two most prominent gold properties, now inactive, are the Box and Athona mines near Goldfields. On both properties the gold occurs in numerous, narrow, tourmaline-bearing quartz veins and stringers cutting sill-like bodies of granite. The quartz veinlets contain small amounts of pyrite, galena, and sphalerite.

PUBLISHED, 1952

MAP 1015A

GOLDFIELDS - MARTIN LAKE

SASKATCHEWAN

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

Miles 1 ¾ ½ ¼ 0 1 2 3

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1015A

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