CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

PRELIMINARY SERIES

PART OF SHEET 74 $\frac{N}{9}$ (West Half)

URANIUM CITY

SHEET 5

SASKATCHEWAN

DESCRIPTIVE NOTES

The area is located 9 miles due east of Uranium City. The southeastern quarter of the area is best reached by plane. A good road near the north end of Fookes Lake and the west end of Foot Bay on Donaldson Lake gives water access to the rest of the area. The area is rugged with relief between 300 and 400 feet and up to 500 feet east of Donaldson Lake. Rock exposures are fairly good except in the northeast corner of the area where they are partly obscured by a coating of lichen and moss and by a thick growth of trees. Drainage is to the southwest towards Beaverlodge Lake and is disorganized.

The relative position of the rocks in the legend has been inferred from structural features observed in the northern half of the area. No top determinations were made as most of the rocks are gneisses and granitic rocks. Quartz, feldspars, and chlorite, hornblende or biotite, in varying amounts, are the main mineral constituents.

The quartz-feldspar gneisses (1) are medium to coarse grained, dominantly reddish, and exhibit a gneissic structure or a pronounced colour banding. Reddish bands alternate with black and dark green bands. East of Donaldson Lake, these gneisses are composed of about 60 per cent feldspars, 20 per cent quartz, and 20 per cent mafic minerals. The feldspars are microcline and oligoclase and occur in the proportions of 3 to 5. These gneisses probably represent a thinly bedded sequence of shale, sandstone, and limy material, because relicts of such rocks have been found within areas of the gneisses. Locally, dykes and sills of a red granite, low in mafic minerals and coarse enough in places to be pegmatitic, cut these gneisses.

The quartz-feldspar gneisses and quartzitic rocks (2) have a characteristically white, buff and light grey weathered surface. There are two main types. One type (2b) is found mainly northwest of the St. Louis fault and particularly northwest of Donaldson Lake. It is coarse grained, granite-like, and generally massive, and is composed of about 60 per cent feldspar, with as much microcline as oligoclase, 30 per cent quartz, and about 10 per cent mafic minerals, commonly biotite. It is not rare to find unaltered remnants of quartzite beds throughout the rocks of this type. Rusty patches, due to the weathering of biotite, are also common features on the weathered surfaces. The other type is quartzite-like. Where they appear to be definitely a quartzite (2a) they have a high quartz content, in part a glassy appearance and a low feldspar content. They may be bedded but they are more commonly massive and dense. However, where the feldspar content is high due to granitization or feldspathization and where a gneissic or banded structure is present, the rocks are a quartz-feldspar gneiss (2), but they still have a quartzitic appearance and a somewhat higher quartz content than other such rocks.

Amphibolite and hornblende schist (3a-3k) are typically dark green to brownish green and black. Rocks of this group are widely distributed throughout the area and although they vary much in appearance, they were probably at one time rocks with about the same composition. Most of these rocks were probably sediments, such as limy shale. Where they are now hornblende schist (3a) they are fine to medium grained and finely foliated. Locally they may show a banding that appears to be relict bedding. In the area northwest of the eastern shore of Donaldson Lake, these rocks are gently folded to flat-lying and form the tops of many of the hills; east of Fookes and Fulton Lakes, they are mainly chloritic schists (3d) that are interbedded with rather unaltered quartzite. They are more schistose and lighter green than the hornblende schist. Their chloritic composition and their association suggest a low stage of metamorphism rather than an alteration of amphibolite. Other rocks from this group appear to be closely related to the chlorite-epidote rocks (4), for rocks of both groups (3g and 4) are similar both in composition and on weathered surface, and in part they outcrop along the strike of the altered chlorite-epidote rocks (4a). Along the eastern boundary of the area between Flack Lake and Yahyah Lake, there is a wide belt where rocks (3h) such as quartzite, granitized (feldspathized) quartzite, gneissic granite, red massive granite, amphibolite, and chlorite and/or biotite schist all occur interbedded as narrow layers or beds. This mixture was placed with the rocks of the amphibolite group because the amphibolite and the chlorite and/or biotite schist layers appear to be the most common and diagnostic ones.

The chlorite-epidote rock (4) occurs only in the area southwest of Collier Lake, north and south of the St. Louis fault as a lenticular mass that appears to finger out easterly and to dip steeply to the south. It is interbedded with unaltered quartzite. The rock is fine to medium grained, yellowish green to dark green, and massive to schistose. It is locally bedded. Seams and irregular patches of epidote and chlorite are common.

Metasomatic granite (5) occurs mainly south from Schmoo Lake where it is the most common rock. Its contacts with other rocks are generally gradational and their position is somewhat subjective as they were determined in the field mainly by the appearance of the weathered surface. The granite is generally massive and granitoid, but locally, as around Yahyah Lake, it is finely gneissic (5a). The gneissic structure is due to either segregation and orientation or concentration and elongation of some of the minerals. Its weathered surface is red to orange-red and the grain medium to coarse; but fine-grained granites were also noted. The granite is composed of about 25 per cent white milky quartz, 70 per cent red and buff feldspars, and 5 per cent mafic minerals, generally chlorite. In places it has white calcite as a uniformly distributed mineral and becomes a quartz-feldspar-calcite-bearing rock (5f). This carbonate-bearing granite is very common north of Yahyah Lake and also east and south of Foot Bay on Donaldson Lake. Many other small areas of carbonate-bearing granite are common, but were not mapped separately. Weathered surfaces of this carbonate granite are pitted and generally deeper red. The hybrid granite (5b) is so-called because it has white feldspar metacrysts, a high mafic mineral content, and many lens-shaped dark inclusions that give it the appearance of an agmatite. These inclusions are generally a foot to 2 feet in length, rich in hornblende, and in many cases could be referred to as inclusions of hornblende schist. This hybrid granite has about 15 per cent mafic minerals and 55 per cent feldspars. A few dykes and sills of pegmatite were noted cutting the gneissic granite. They have muscovite in addition to the common minerals of the red granite, and are believed to be related to the process that is responsible for the granitization in this area.

Gabbro and diabasic gabbro dykes and sills (6) were mapped north of the St. Louis fault, north of Foot Bay on Donaldson Lake and in the northeast corner of the area. The dykes and sills vary in width from about 120 feet to a few inches and many of those shown on the map are less than 5 feet wide. The gabbro is a massive, fine- to medium-grained rock, dark green to black. It is composed of about 46 per cent plagioclase, from 34 to 48 per cent pyroxene, which is in part altered to amphibole and chlorite, and from 4 to 10 per cent opaque minerals. The group of dykes immediately north of Foot Bay has in addition to the above minerals about 10 per cent interstitial felsic minerals.

Foliation is common in the rocks of the area and it was measured in as many places as possible. As it is held to be relict bedded structure, much of the structural interpretation of the area is based on those measurements. Bedding planes were also noted locally; they are most common in the southwest corner of the area where some of the rocks still show apparent primary features. Bedding is generally parallel with the foliation. A lineation represented by crenulations on the foliation was also measured at a few places; it plunges around 40 degrees to the southwest.

The formations have a general easterly to northeasterly trend and all have been compressed into folds that vary in intensity and size with the location in the area and the types of rocks. North of the St. Louis fault an anticlinal axis was traced from the northern boundary of the area south to Foot Bay. Its southern extension appears to pass north of the National Exploration mine camp, which is located slightly west of the map-area, suggesting a sharp westerly bend in the fold or an offset to the west along a fault following Foot Bay. The eastern limb of this fold shows much intricate folding. Several minor fold axes on the west limb of the major anticline are shown on the big island in Donaldson Lake. They have a similar northeasterly trend but have not been recognized in the undering granitized quartzite farther north. The distribution of these folds probably indicates that intimately interbedded hornblende schist and quartzitic rock have been more closely folded than quartzitic rocks alone. In the area between the St. Louis fault and the Fish Lake fault, the formations trend northeasterly and dip south, and no apparent fold axes were located. South of the Fish Lake fault, the formations show much intricate folding. The axes of these minor folds trend about north but the formations have a general easterly trend.

The St. Louis fault was traced from Verna Lake on the west to Raggs Lake on the east, and the formations on both sides of the fault are sharply truncated. The Fish Lake fault is also a major fault. Its location is assumed from truncation of formations on both sides of it and from a topographical low. Its strike is about parallel with the strike of the St. Louis fault. Other faults of similar strike are believed to be present north of the St. Louis fault, but their exact position could not be determined definitely in the field. One of them probably occurs at the east end of Foot Bay and passes south of Schmoo Lake. Another one probably follows the eastern shore of Donaldson Lake north of the Ad Astra Camp; this could be the continuation of the Tom fault.

Uranium is the only metal of economic interest in the area and so far it has not been found in mineable deposits. It occurs as pitchblende filling fractures mainly in granitized rocks (1, 2, 3) and granite (5). The fractures appear to be mainly joints that strike most commonly easterly to southeasterly, at an angle to the trend of the formations, and have a steep southerly dip. The pitchblende along these fractures is in part botryoidal and generally is found associated with white calcite. Both minerals form lenticular narrow veins only a few inches wide, and a few feet in length.

A fair amount of exploration work has been done throughout the area. It consisted of geological mapping, testing with a Geiger counter, stripping, and rock trenching, with some diamond drilling, particularly along the St. Louis fault.

LEGEND

PROTEROZOIC

6 Gabbro, diabasic gabbro; 6a, altered

ARCHAEAN(?)

TAZIN GROUP (1-5)

5 Metasomatic granite, generally red and massive, locally gneissic, includes a few pegmatite dykes and sills; 5a, gneissic; 5b, hybrid granite, agmatite-like; 5c, with remnants of quartzitic rocks (2 and 2a); 5d, with remnants of quartz-feldspar gneisses (1); 5e, derived from 2b; 5f, carbonate-rich, in part limestone-like; 5g, brecciated; 5h, includes small amphibolite masses; 5k, includes pegmatite dykes and sills

4 Chlorite-epidote rock, probably derived from tuffaceous-argillaceous material; 4a, altered to amphibolite and hornblende schist and in places includes much granitic material

3 Amphibolite, granitized amphibolite; minor hornblende schist; a few quartzite beds and some granitic material; 3a, hornblende schist; 3b, hornblende schist with a few quartzite beds and some granitic material; 3c, hornblende schist with some granitic material; 3d, in part a chloritic aggregate or chlorite schist and includes some quartzitic rocks; 3e, in irregular patches with much granitic material; 3f, in part chloritic and biotitic; 3g, in part argillite-like; 3h, a bedded and banded mixture of rocks 1, 2, 3, and some granitic material; 3k, carbonate-rich, limestone-like

2 Quartz-feldspar gneisses and quartzitic rocks, contain up to 15% mafic minerals, gneissic to banded, locally massive, generally white; 2a, quartzite and quartzite-like rocks, in part feldspathized; 2b, coarse, white, granite-like; 2c, quartzitic rocks with minor areas of red granite; 2d, brecciated; 2e, schistose, in part granitized chlorite-sericite schist; 2f, ferruginous, hematite-bearing; 2g, carbonate-rich, limestone-like; 2h, includes a few pegmatite dykes and sills; 2k, glassy quartzitic; 2m, includes some hornblende schist

1 Quartz-feldspar gneisses, generally banded and red, contains from 15 to 50% mafic minerals, probably derived from original rocks of 2, 3, and 4; 1a, areas where the content of mafic minerals appears to be rather high, in part amphibolitic; 1b, in part quartzite-like; 1c, in part granite-like; 1d, brecciated; 1e, schistose; 1f, contorted; 1g, carbonate-rich, limestone-like; 1h, includes a few pegmatite dykes and sills

Drift-covered area
Area of gravel and sand
Area of rock outcrop
Geological boundary (defined, assumed)
Bedding, tops unknown (inclined, dip unknown)
Schistosity (inclined)
Foliation (inclined, vertical, dip unknown)
Lineation (plunge known)
Fault (defined, assumed)
Anticline
Syncline (defined, approximate)
Drag-fold
Glacial striae
Rock trench and stripped area
Mineral occurrence x, Py

MINERAL SYMBOLS

Fluorite	F	Pitchblende	U
Garnet	G	Pyrite	Py
Hematite	He	Serpentine	Serp
Magnetite	Ma		

Geology by L. P. Tremblay, 1954, 1955

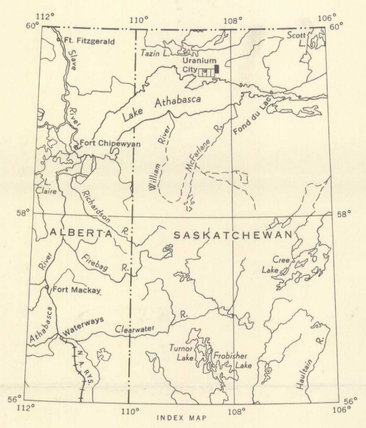
Trail
Building
Wharf
Stream (position approximate)
Fall and rapid
Marsh
Foreshore flats
Contours (interval 50 feet)
Height in feet above mean sea-level 1125

Approximate magnetic declination, 25° 35' East

Cartography by the Geological Cartography Unit, 1957

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

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.



Adjoins Preliminary Map 53-26, "Uranium City" Sheet 4

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MAP 18-1956
URANIUM CITY
SHEET 5
SASKATCHEWAN

Scale: One Inch to 800 Feet = $\frac{1}{9,600}$

Feet: 800 0 800 1600 2400

5-1-10
A, Geol

Uranium City, Sask
Map 18-1956 (Prelim)

MAP 18-1956
URANIUM CITY
SHEET 5
SASKATCHEWAN