

DEVONIAN (mainly)
MIDDLE DEVONIAN (mainly)
7 METHY FORMATION: dolomite; 7a, basal conglomerate

- 6 Metasomatic, massive to faintly gneissic, granite, grano-diorite, and quartz-diorite; 6a, gneissic; 6b, porphyroblastic; 6c, similar to 5 and 3 in part or with remnants of these rocks; 6d, some quartzite and biotite schist; 6e, some hornblende schist and gneiss, 6f, brecciated and mylonitized
- 5 Medium- to coarse-grained quartz-feldspar-biotite gneiss, regularly to irregularly banded; 5a, massive; 5b, strikingly garnetiferous; 5c, similar to 3 in part; 5d, similar to 6 in part; 5e, some hornblende-feldspar gneiss; 5f, hornblende abundant
- 4 Biotite and/or hornblende-rich quartz-feldspar gneiss; 4a, gneissic quartz gabbro and quartz diorite; 4b, gneissic anorthositic and amphibolite (4a and 4b may be intrusive in part, and locally include much granitic material); 4c, in part faintly schistose; 4d, highly granitized and in part resembling 3, 5, and 6
- 3 Fine- to medium-grained quartz-plagioclase-biotite gneiss, massive; 3a, banded; 3b, similar to 5 and 6 in part; 3c, some hornblende gneiss and schist
- 2 Hornblende-feldspar gneiss, amphibolite; minor greywacke, quartzite, and quartz-feldspar-biotite gneiss
- 1 Slate, greywacke, quartzite, impure quartzite; 1a, some pegmatite

- Outcrop visited x
- Low level observation flights - - - - -
- Geological boundary (approximate) - - - - -
- Bedding, top of bed unknown (inclined, vertical, dip unknown) / / /
- Foliation, banding (inclined, vertical, dip unknown) / / /
- Lamination (inclined, plunge as indicated) / / /
- Drag-fold ~ ~ ~
- Fault (approximate) - - - - -
- Anticline (approximate) / / /
- Syncline (approximate) / / /
- Glacial striae - - - - -
- Recessional moraines [Symbol]
- Fossil locality [Symbol]
- Mineral occurrence (garnet, gt; magnetite, mag; tourmaline, tl) [Symbol]

Geology by L. P. Tremblay, 1960

Cartography by the Geological Survey of Canada, 1961

- Wagon or winter road - - - - -
- Surveyed line - - - - -
- Intermittent lake and stream ~ ~ ~
- Rapids [Symbol]
- Marsh or swamp [Symbol]
- Contours (interval 100 feet) [Symbol]

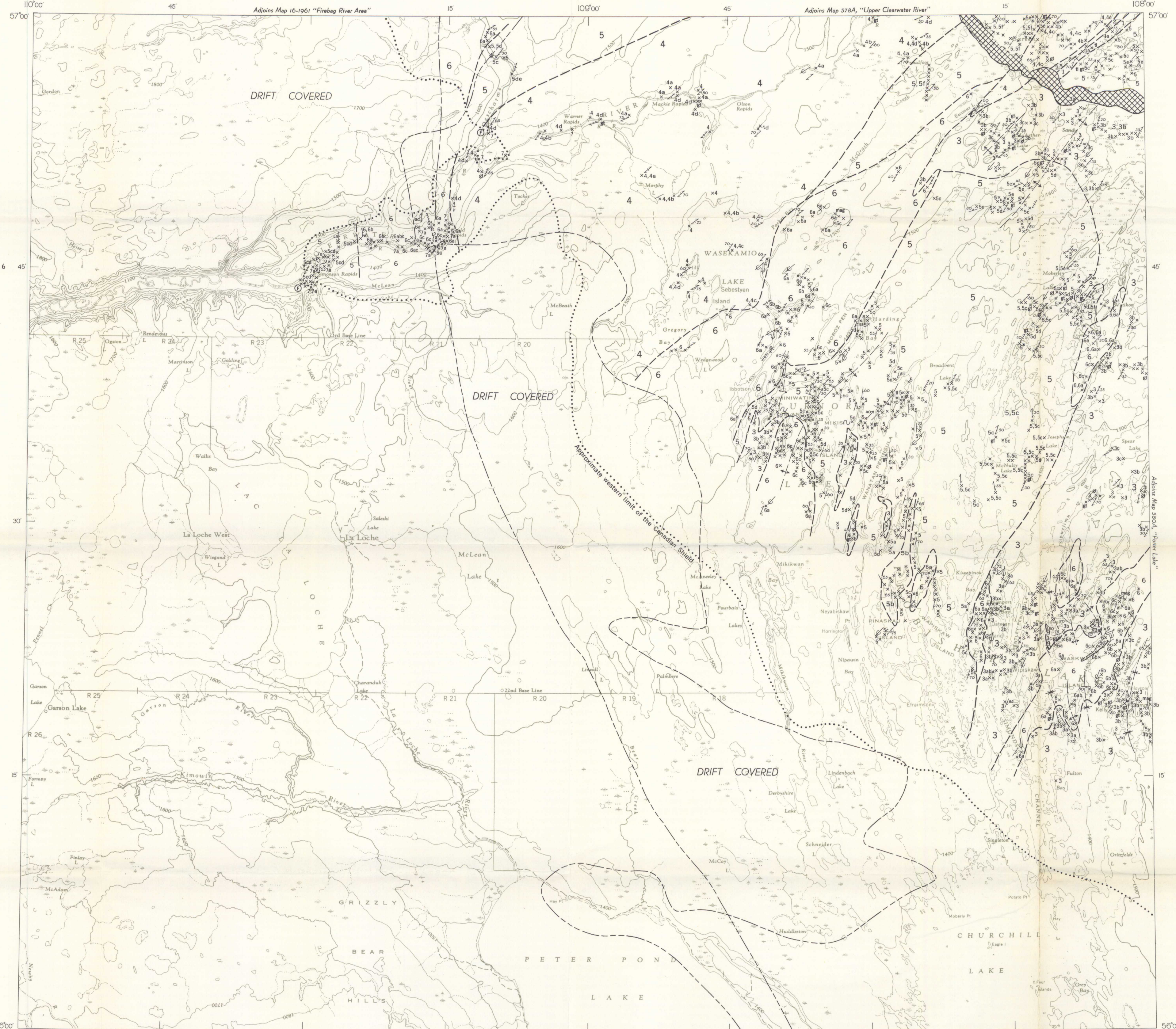
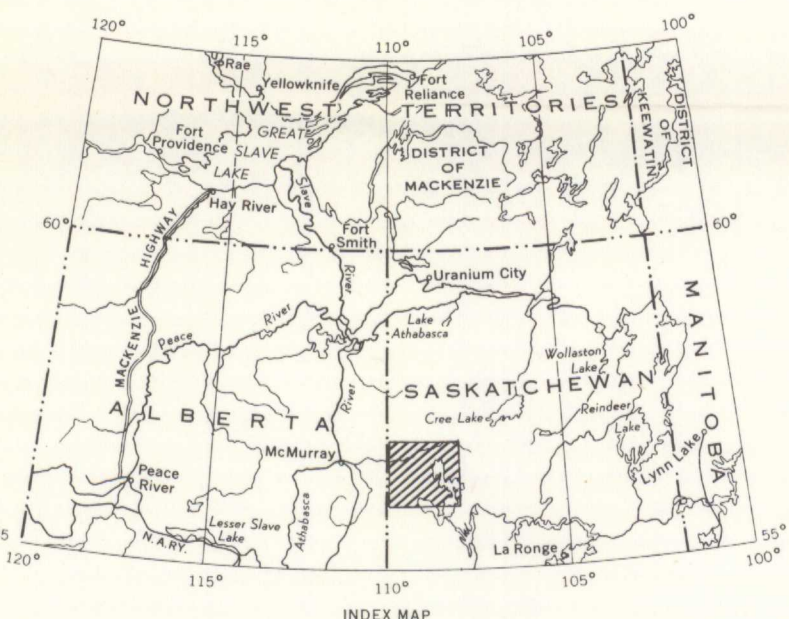
Base-map prepared by the Surveys and Mapping Branch, 1960

Approximate magnetic declination, 23° 35' East

Geographical names subject to revision

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

In response to public demand for earlier publication, Preliminary Series maps are issued in this simplified form and will be clearer to read if all or some of the map-units are hand-coloured



DESCRIPTIVE NOTES

Churchill, Frobisher, Turnor, and Wasekamio Lakes are easily reached by canoe from Buffalo Narrows, a small settlement at the south end of Churchill Lake, about 10 miles south of the map-area. The area to the north and northeast of these lakes is best reached by air-craft chartered either at Buffalo Narrows or McMurray, Alberta, a small town 120 miles west of Frobisher Lake. Landings can be made on small lakes or on suitable parts of Clearwater River.

The area south and west of Frobisher and Turnor Lakes is low and relatively flat. It is drift covered and no outcrops were seen. Swamps are abundant in the southern part; in the north, as the land rises gradually toward the north boundary of the map-area, swampy areas are less numerous and the soil is more sandy. The dry areas are generally gravel mounds that stand only a few feet above the adjoining swamps. North and east of Turnor and Frobisher Lakes, the relief is greater; rocky hills rise 100 feet or so above the adjoining gravelly and swampy areas. These hills may be either closely spaced, as near the eastern edge of the map-area, or widely scattered, as north of Turnor Lake. Locally the swampy areas are so large and deep that they hinder travel between outcrops.

The area was burnt over about 20 years ago and a thick new growth of birch, poplar, and pine now covers most of the area north of Frobisher Lake, where outcrops are fairly abundant. This makes efficient traversing difficult. The few small stands of tall evergreens remaining make good landmarks. A huge recessional moraine, reaching possibly 400 feet in local relief, crosses the area in a roughly easterly direction immediately south of Caren Lake. Between it and Frobisher and Turnor Lakes, there are several clusters of longitudinal sand dunes trending southeast, most indicating strong prevailing winds from the west and northwest. Glacial striae on rock outcrops strike locally in two directions; the presumably older direction is slightly east of south. A third set, much like the others in appearance, but trending northwest, was seen on several outcrops. These striae are believed to be the result of southerly winds and are not shown.

The succession of formations shown in the legend is mainly based on increasing metamorphism; gneisses and their derived granites form more than 95 per cent of the mapped rocks. Rocks of unit 1 range from black to light grey. They are dense to fine grained, and, although they are probably thinly bedded, they generally look massive. The only occurrence large enough to show on the map is that at Caren Lake. However, the occurrence of small masses all through the gneisses (3, 5) suggests that these are the parent rocks from which the gneisses were derived.

Rocks of unit 2 are massive to roughly banded and gneissic. They are dark green to black and generally medium to coarse grained. East of Caren Lake they are conformable with and appear to overlie unit 1. They were also observed within the hornblende- and biotite-rich gneisses (4) north and west of Turnor Lake but as outcrops are too few and widely spaced, they could not be mapped separately from the gabbro (4a) or diorite, and the anorthositic and gabbroic parts of the map-area they occur as small masses. These are not mapped separately but are generally indicated (3c, 5e, 6e). Most of these small masses are in the immediate area of Frobisher Lake. The appearance and composition of the hornblende gneiss and amphibolite suggest that they are of volcanic origin, but no volcanic structures were noted. Their field relation, however, as small masses conformable with the other rock types, suggests a sedimentary origin like that of most of the rocks of this area.

Gneisses (3, 5) and granite (6) are the most common rocks of the area. Most are red or light brown. Their grain size may be fine or coarse; locally, porphyroblasts of microcline perthite may be abundant. Gneisses of unit 3 can be distinguished from those of unit 5 by their finer grain-size and greater irregularity and sharpness of banding or foliation, believed to be relict bedding—in other words, by their lesser degree of granitization. The granite (6) is a coarse-grained, fairly homogeneous rock that may be either massive or gneissic. It occurs abundantly as sills and dykes of various sizes and as small irregular masses in gneisses (3, 5). These are generally too small to be mapped separately. The mappable bodies are large masses elongated parallel with the trend of the formations; the largest are, in part, closely associated with gneisses (5). All these rocks (3, 5, 6) are believed to be derived from greywacke and feldspathic quartzites by recrystallization. The coarseness of the grain and the homogeneity of the end product varies with the intensity of recrystallization. All are composed of about the same minerals in about the same proportion, and are either quartz-plagioclase-biotite-garnet gneiss, or granite. The plagioclase is andesine-oligoclase in the gneisses, and albite in the red, fairly homogeneous, granite. Locally the andesine is antiperthitic. The quartz may be glassy black, or clear, vitreous and transparent to milky white; both types are almost invariably present in the same rock. The biotite is greenish yellow. Locally hornblende is a common associate of biotite, and in a few specimens hypersthene is present. Garnet is not abundant and generally not conspicuous, but is considered to be a characteristic mineral. In the recognizably garnetiferous zones (5b) the garnet is coarse-grained, conspicuous, and concentrated with quartz in football-like masses. The antiperthitic andesine, the hypersthene, the garnet, and the appearance of the rock as described above suggest that this area is on the border between the amphibolite and the granulite facies.

The gneisses of map-unit 4 are mainly rocks with a high content of hornblende and biotite. Most show a good foliation or banding characterized by narrow bands rich in biotite and/or hornblende alternating with light-colored bands that appear granitic and are almost devoid of mafic minerals. This type of rock is interbedded with wide zones of granitic-looking rocks related to gneisses (3, 5) and granite (6) where the mafic content is fairly low, and also with zones of gabbro and diorite (4a) and anorthositic or amphibolitic rocks (4b). The gabbro, diorite, and anorthositic may be, in part, intrusive, but as they seem to occur in bands intercalated with rocks similar to the gneisses (3, 5) they, like the other components of this map-unit, are probably mainly of metamorphic origin.

Pegmatite dykes, sills, and masses were seen almost everywhere and constitute about 5 per cent of the rock exposed. Locally they are very coarse grained with patches of quartz or feldspar more than a foot long. A few dykes were seen carrying black tourmaline in crystals up to 6 inches in diameter. Most of the pegmatites are made up of white and pink feldspar, quartz, and muscovite.

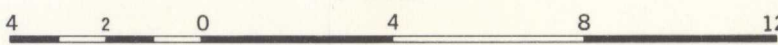
The area south and west of Frobisher, Turnor, and Wasekamio Lakes is believed to be underlain by formations younger than Precambrian. Although these rocks only outcrop along Clearwater River, the difference in topography from that of the area to the east suggests a difference in the underlying rocks. Along Clearwater River, Paleozoic rocks (7) of Devonian age were seen at several places, in general unconformably overlying the Precambrian gneisses and granites. The dolomite (7) is dense to fine grained, light brown, thinly bedded or massive and cavernous. Fossil assemblages from two localities suggest a Middle Devonian age and that the rocks belong to the Methy formation (A. W. Norris, personal communication). The basal conglomerate (7a) consists of angular pebbles and cobbles of granite and gneiss in a light brown, cavernous, dolomitic matrix, the size of the pebbles being larger, closer to the unconformity. Occurrences shown within the indicated area of the Canadian Shield are believed to be outliers and most are probably less than 10 feet thick.

The general trend of the Precambrian formations is northeasterly, and the foliation is believed to be relict bedding. A major anticline plunging about 30° NE was located in Turnor Lake. It may extend as far north as Caren Lake as there are some suggestions of its presence about Sandy Lake. Joints in the area are in four main directions, north, N80°W, N40°E, and N40°W. These form two main conjugate sets.

Because of the granitoid nature of most of the rocks, the relative scarcity of outcrops, and travel difficulties, very little prospecting is going on in the area. A few grains of pyrite were noted here and there in the gabbroic and dioritic rocks (4a) and in some of the amphibolite (4b). The pegmatites, due in places to their large size and coarseness, may prove, in time, to carry economic amounts of such minerals as feldspar and quartz.

MAP 10-1961
GEOLOGY
LA LOCHE
SASKATCHEWAN

Scale: One Inch to Four Miles = $\frac{1}{253,440}$ Miles



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MAP 10-1961
LA LOCHE
SASKATCHEWAN
SHEET 74C

G
3401
C5
1956
G4
omvsc
c2
10-1961