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DEPARTMENT OF MINES AND TECHNICAL SURVEYS
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LEGEND

PROTEROZOIC

8. *Gabbro, in part diabasic; amphibolitic rocks;* 8a, *olivine gabbro, in part diabasic*
8A. *Hornblendite, minor gabbro; may be older than 8*

7 — *Granodiorite, quartz diorite, granite; in part gneissic; minor pegmatite;* 7a, *quartz diorite;* 7b, *granodiorite, minor granite;* 7c, *biotite and biotite-hornblende granite, in part porphyritic (feldspar) and gneissic;* 7d, *pegmatite*

6 — *Mixed rocks: paragneisses, injection gneisses (migmatites), and schists; pegmatites; minor quartz diorite, granodiorite, and granite*

ARCHÆAN

YELLOWKNIFE GROUP (1-5)

5 — *Nodular feldspar-quartz-biotite schist and paragneiss; minor hornfels; (*A*, andalusite-bearing;* C*, cordierite-bearing;* G*, garnet-bearing;* S*, staurolite-bearing;* Si*, sillimanite-bearing)*

3. *Greywacke, argillite, phyllite, slate; minor, impure sandstone and arkose*
4. *Spotted biotite phyllite, feldspar-quartz-mica schist, greywacke*

2 — *Rhyolite, rhyolite breccia, tuff, agglomerate; porphyritic (quartz and/or feldspar) rhyolite, in part intrusive; minor quartz-feldspar-mica gneisses;* 2a, *carbonatized rhyolite, rhyolite breccia, tuff, agglomerate, and porphyritic rhyolite*

1 — *Basalt, andesite, dacite; amygdaloidal and porphyritic andesite; minor agglomerate, tuff, rhyolite, and volcanic breccia; undifferentiated basic intrusions;* 1a, *carbonatized basalt, andesite, and dacite; minor rhyolite and tuff;* 1b, *hornblende schist, hornblende-feldspar gneisses, amphibolite; derived from 1; undifferentiated basic intrusions;* 1c, *banded type of recrystallized and highly altered basic to intermediate volcanic rocks; in part rhyolitic and tuffaceous; agglomerate;* 1d, *porphyritic and amygdaloidal andesite, in part hornblende-feldspar gneisses; minor agglomerate*

Isograd line of metamorphism
Bedding (inclined, vertical, overturned, dip unknown)
Bedding (direction of dip known, upper side of bed unknown)
Bedding (upper side of bed faces as indicated, direction of dip unknown)
Schistosity or foliation (inclined, vertical, dip unknown)
Minor fold, drag fold (arrow indicates direction of plunge)
Fault
Anticline
Syncline
Glacial striæ
Esker
Prospect trench, diamond drill-hole x

MINERAL OCCURRENCES

Gold .... Au
Galena .... Pb

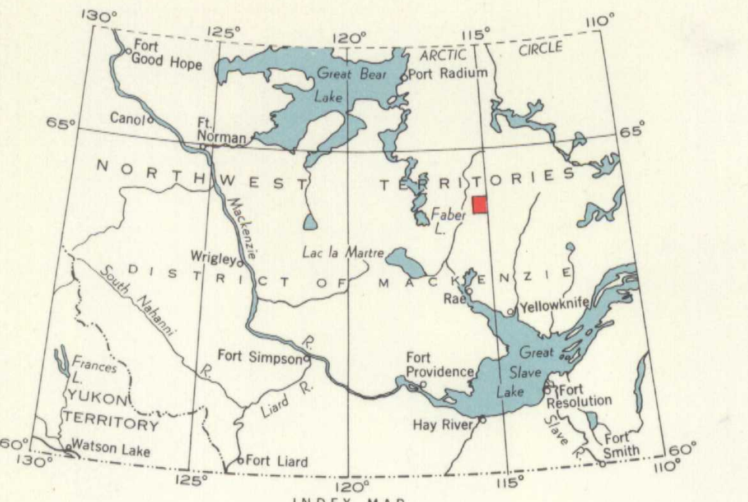
Geology by L.P. Tremblay, G.M. Wright and M.L. Miller, 1947

Cartography by the Geological Cartography Division, 1952

Building
Portage .... P.
Permanent survey monument D50
Intermittent stream
Fall and rapid .... F. R.
Marsh
Non-perennial lake
Reef or small island .... +
Height in feet above mean sea-level (approximate) 886

Base-map surveyed by the Topographical Survey, in 1946
Compiled by the Topographical Survey, in 1947, from air photographs taken in 1945 by the Royal Canadian Air Force

Approximate magnetic declination, 37°20' East



INDEX MAP

DESCRIPTIVE NOTES

The map-area may be reached most readily by chartered aircraft from Yellowknife, a town on Great Slave Lake 125 miles southeast of Ranji Lake. The Snare River system, apart from a mile-long portage in the southwestern corner of the map-area, provides a good canoe route through the western half of the map-area; in the eastern part are several large lakes that are connected for the most part by fairly short portages. From the air, the country appears flat, but in detail the topography is rugged, with a local relief of as much as 400 feet. Areas underlain by granitic and volcanic rocks are commonly higher and more rugged than those underlain by sedimentary rocks; contacts between volcanic and sedimentary rocks are generally marked by steep slopes. Bedrock is exposed in much of the map-area. The region is sparsely timbered; only the sandy terrains support large trees of spruce and jack pine.

Basic to intermediate volcanic rocks (1) of the Yellowknife group are the oldest in the map-area. They commonly weather greenish brown to dark green, are greatly altered or have been largely recrystallized, and show in places malformed pillow structures that can rarely be used for top determination. These rocks occupy two, wide, northerly trending belts within the map-area. In the western belt they are entirely recrystallized to schists and gneisses, which are predominantly hornblende-rich along the western border and biotite-rich and fragmental along the eastern contact. Those of the northern part of the eastern belt are more typical of the volcanic rocks commonly described as greenstone than they are farther south, where the rocks are recrystallized to hornblende schists and gneisses.

The more acidic volcanic rocks (2) of the Yellowknife group are not abundant. Within the southern part of the western belt of basic volcanic rocks, and along the eastern border of the eastern belt, they form continuous bands of irregular width composed mainly of tuff and agglomerate. Along the western border of the eastern belt, they occur as lenses and irregular masses, consist mainly of lava and agglomerate, and in part may be intrusive. Some small masses of acidic rocks much resembling rhyolitic lava and entirely enclosed in sedimentary rocks (3-5) have been included in this map-unit (2), and may be partly intrusive.

The sedimentary rocks (3-5) of the Yellowknife group have been divided into three gradational map-units based on observed metamorphic effects. The least metamorphosed are predominantly argillite and greywacke (3). The argillite is generally fine grained, grey-black to black, and finely bedded, whereas the greywacke is dark grey and of sandy appearance, and generally contains many conspicuous quartz grains in a fine, black groundmass. It is more coarsely bedded than the argillite, and beds in places show grain gradation from sandy at the bottom to argillaceous at the top. Crossbedding and ripple-marks are rare. The appearance of phyllite containing small, macroscopic spots or flakes of biotite marks the outer fringe of the rocks of the biotite zone (4), which are otherwise similar to the least metamorphosed sedimentary rocks. Nearer the granites, the occurrence of nodules marks the zone of nodular schists and gneisses (5). These rocks weather dark grey to brownish grey and have a sandy appearance; in the outcrop the nodules appear to be mainly a mixture of quartz and biotite. Porphyroblasts of andalusite up to 6 inches in length and others of garnet were observed in places. Under the microscope, the nodules are metacrysts of cordierite, andalusite, staurolite, garnet, or sillimanite replete with biotite and quartz inclusions. Evidence of staurolite replaced by andalusite suggests dynamic, followed by thermal, metamorphism.

Between the large intrusive masses and the nodular zones are rocks (6) that comprise a mixed assemblage of paragneisses and irregular, small, granitic bodies, *lit-par-lit* injection gneisses, small areas of granitized sedimentary rocks, and areas of paragneisses cut by many pegmatite dykes. As a whole, the amount of granitic material in this assemblage varies from 25 to 75 per cent. The intruded rocks rarely show the nodular structure so characteristic of the nodular zone.

Acidic intrusive rocks (7) are characterized by a relatively high amount of quartz. They all weather white to greyish white or pink, are massive and fine to coarse grained, and are classified as granodiorite, quartz diorite, and granite. They occur mainly along the eastern and western boundaries of the map-area as part of larger masses that extend beyond the area. Numerous pegmatite dykes intrude the rocks adjoining these intrusive masses; some of them carry abundant crystals of black tourmaline.

The map-area includes numerous dykes, sills, and small masses of gabbro, diabasic gabbro, and amphibolitic rocks (8). The dykes vary in width from a few inches to 500 feet, are persistent in width for long distances, and can be traced for as much as several miles. Dips are commonly vertical, but may be as low as 65 degrees. Most of the dykes strike northwesterly, but others trend northeasterly or northerly.

Structural features, abundantly noticeable in the less altered sedimentary rocks, indicate that the sedimentary strata have been isoclinally folded. The axial planes of folds dip from 70 degrees to vertically, and in some places are not more than a few hundred feet apart. In the south-central part of the map-area, the axial planes appear to strike more irregularly than farther northeast and to indicate more intricate folding. The volcanic rocks rarely show good structural features, but are probably more broadly folded than the sedimentary formations. Several faults of large displacement have been mapped; others of small throw, or that strike parallel with the trend of the formations, were not recognized. The principal known faults strike northwesterly, and several of them are the loci for large diabase dykes. A few faults strike northerly, and are marked by sharp escarpments.

Economic interest in the map-area has so far been limited to a few gold prospects. Several showings have been prospected at the surface or by diamond drilling, but at the time the area was mapped only those on the property of Snowden Yellowknife Mines Limited appeared to have economic significance. A little gold has been reported from all showings. It is found in black to milky white quartz veins and stringers that are commonly slightly mineralized with pyrite and chalcopyrite, and that occur either in carbonatized sheared zones or in open fractures such as joints in basic volcanic rocks.

MAP 1022A

RANJI LAKE

DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES

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

Miles