GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

86 B/4

LEGEND

LOWER PROTEROZOIC

SNARE GROUP (9)

9 — Thinly bedded to massive dolomite; includes a few beds of limestone and quartzite, and siltstone lenses in upper part of section; 9a, thinly bedded to massive, pebbly quartzite

8 — Diabase; may be younger than 9

ARCHAEAN

7 — Massive to weakly foliated, biotite granite and granodiorite, fine to medium grained. Similar to 4a

6 — Massive to weakly foliated biotite granite, medium grained; ovoid to euhedral potash feldspar phenocrysts (porphyroblasts?) common

5 — Pegmatite

4 — Massive to foliated, muscovite-biotite granite-granodiorite, fine to medium grained; 4a, similar to 4 except for the absence of muscovite

3 — Massive to foliated, biotite granite-granodiorite; coarse to very coarse grained, locally pegmatitic. Potash feldspar phenocrysts (porphyroblasts?) common. 3a, similar to 3 except for a markedly higher phenocryst content

2 — Migmatite: units 3 and 4a intermixed with gneiss and schist (1b), granitic material predominant; 2a, migmatite, similar to 2, except granitic material comprises units 4, 4a, and 5. Gneiss and schist (1b) predominant

YELLOWKNIFE GROUP (1)

1 — 1a, graded units of greywacke and shale metamorphosed to phyllite and knotted phyllite; 1b, granulite and schist derived from 1a and consisting of interbanded feldpar-quartz-biotite granulite (minor cordierite), and feldspar-quartz-biotite-cordierite schist; 1c, granulite, schist, and gneiss, derived from 1a and similar to 1b except for common granitic stringers and lenses, and near-absence of recognizable schist/granulite layering; 1d, banded actinolite/hornblende schist, with amphibolite lenses

Drift-covered area
Geological boundary (observed, approximate or assumed)
Limit of geological mapping
Bedding, tops known (inclined, vertical, overturned)
Bedding, tops unknown, (inclined, vertical)
Foliation, undifferentiated: may be bedding, axial plane foliation, foliation in gneissose and granitic rocks (horizontal, inclined, vertical)
Lineation, includes fold axes, s-surface intersections, elongate porphyroblasts, quartz rods (horizontal, inclined)
Antiform (surface trace of axial plane, assumed)
Synform (surface trace of axial plane, assumed)
Fault (defined, approximate)
Thrust fault (teeth in direction of dip; approximate, assumed)
Gossan
Garnet (almandine) . . . gt
Sillimanite . . . sil

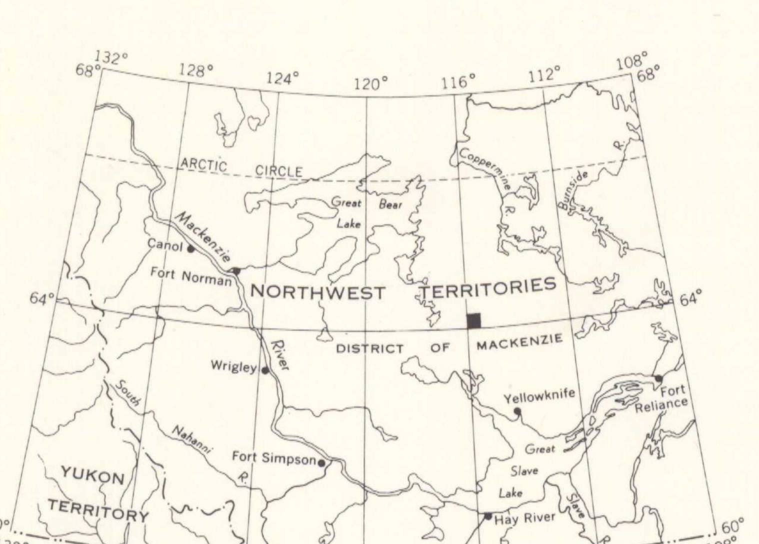
Geology by P. H. Smith, 1961, 1962

Cartography by the Geological Survey of Canada, 1963

Winter road
Esker
Intermittent stream
Marsh
Rock, reef or small island
Height in feet above mean sea-level . . . 1050

Base map by the Surveys and Mapping Branch, 1950

Approximate magnetic declination, 36°13' East, decreasing 7.1' annually



INDEX MAP

PUBLISHED, 1963
COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA

PRINTED BY THE SURVEYS AND MAPPING BRANCH

MAP 44-1963

GEOLOGY

MATTBERRY LAKE

DISTRICT OF MACKENZIE

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

Miles

1 ½ 0 1 2 3

DESCRIPTIVE NOTES

The map-area lies about 20 miles south-southwest of the northern limit of trees. Forest cover is light, and rock exposure excellent. Drift cover is locally heavy in the area between Lakes A and B, and in the area north of unit 6. The major topographic feature is a peneplain underlain by the Basler batholith of granitic rocks.(3). Low hills underlain by hornblendic rocks (1c) and pegmatite (5) rise above this surface; areas underlain by schist (1c) tend to lie below it. Summit levels accordant with this surface occur in the hilly region to the west underlain by the Snare Group (9). Local relief is greatest at Basler Lake, attaining perhaps 600 feet.

The metamorphosed sequence of fine-grained, graded greywackes (1a, 1b, 1c,) and occasional interbedded tuffs and volcanic rocks (1d) are part of the Yellowknife Group and comprise the country rocks of the Archaean basement. Unit 1a comprises graded beds of dark grey, phyllitic, fine-grained greywacke. Very fine grained biotite is commonly present along foliation planes, and small, anhedral cordierite porphyroblasts (largely sericitized) are abundantly developed in argillaceous horizons. A gneissic, pegmatite-rich aureole (not shown on map), up to 200 feet wide, separates unit 1a from granite units 3 and 6. Unit 1b comprises brown-weathering, medium grey biotite granulites and knotted biotite schists. Although completely recrystallized, these rocks retain original bedding structures. Unit 1c is similar to 1b except for the obliteration of almost all traces of bedding by further recrystallization and deformation. Sillimanite occurs locally in the unit as do small almandine garnets. Granitic material occurring as lenses and bands within the foliation generally constitutes less than 10 per cent of the total rock. Actinolite/hornblende schist (1d) contains thin streaks and bands of light grey quartzo-feldspathic material; calcite is commonly associated with these. Rocks of this unit (1d) underlying two islands in Mattberry Lake may either be a part of the Yellowknife Group (1), or a metamorphosed equivalent of the Snare Group (9).

Map-units 1a, 1b, 1c, and 1d essentially coincide with Eskola's metamorphic facies zones[1]—unit 1a to the greenschist facies, units 1b, 1c and 1d to the amphibolite facies. Although the mineral assemblages are typical of rocks that have undergone contact metamorphism[2], these units are structurally and texturally more characteristic of regionally metamorphosed rocks. Metamorphism was largely synkinematic or dynamic, and hornfels is uncommon, being confined to xenoliths and a few zones along the west and southwest contacts of units 3 and 6.

A great variety of granitic rocks occurs in the area. Coarse- to very-coarse-grained granites (3 and 3a), like the fine-grained types (4), are characterized by the predominance of biotite and rarity of muscovite. Potash feldspar phenocrysts (porphyroblasts?) are common and vary in habit from anhedral, to ovoid and euhedral, some attaining lengths up to 2 inches. They rarely show preferred orientation, even in foliated zones. Units 4, 4a, 6, and 7 comprise the smallest masses and show the greatest compositional and structural variety. Biotite-bearing types predominate (4a, 6, and 7). Muscovite occurs only locally, and characteristically in the smaller granite bodies (4), which themselves are often associated with pegmatites (5). In some places the biotite- and muscovite-bearing types (4 and 4a) are gradational. Rapakivi structures occur sporadically throughout unit 6. Schist (1c) xenoliths and irregular patches of fine-grained granites (4, 4a) are abundant in the eastern two thirds of the Basler Batholith (3). In contrast, the western third of this body is virtually devoid of xenoliths and fine-grained granites. Pegmatite (5) is common, comprising dykes and sills, and irregular patches gradational with enclosing granites or schists. The pegmatites contain mainly quartz and perthite, with accessory albite, muscovite, and black tourmaline.

The youngest rocks in the area are those of the Snare Group (9), resting with major unconformity on the Archaean basement. The base of the Snare (9a) is a thin unit of crossbedded, ripple-marked, feldspathic quartzite, with lenses of quartz-pebble conglomerate at the base, grading into sandy dolomite and interbedded limestone at its top. Most of the Snare Group in the map-area comprises buff-weathering, cherty dolomite, with a few interbedded limestones, quartzites, and siltstones. Limestone becomes more common in the section toward the northern part of the area. Some horizons in the carbonate sequence are rich in algal structures. Rocks of the group show little sign of metamorphism, except for probable recrystallization of the carbonates in zones of severe deformation. Immediately west of the map-area, however, the Snare Group (9) is highly metamorphosed and intruded by granite[3].

Structure in the eastern two thirds of the area is dominated by north- and northeast-plunging lineations produced by the intersection of a steeply dipping, north- to northeast-striking axial-plane foliation on older northwest-dipping structures (mainly bedding). Small-scale folds in both bedding and axial-plane foliations are homoaxial with these lineations. These structures apparently developed concurrently with metamorphism and granite emplacement. The older, northwest-dipping bedding foliations so commonly observed in the region may reflect a series of isoclinal, recumbent folds, overturned to the southeast. The only evidence for such structures was observed north of Lake A (about a mile north of the map-area) where the northwest-dipping bedding foliations form the limbs of outcrop-scale recumbent folds. The axes of these folds plunge gently north-northwest. Northwest structural trends of uncertain age occur near Lake D. Granite contacts in the eastern region (including those in the migmatites 2, 2a) are nearly everywhere concordant with structure in the adjacent schists.

Structure in the Yellowknife Group (1) west of the Basler Batholith (3) is marked by northeast-plunging lineations and some small-scale isoclinal folds within steeply dipping, northeast-striking bedding foliations. Axial-plane foliations have the same orientation as bedding. In the vicinity of unit 6, folds of similar axial-plane orientation, and lineations plunge steeply northwest. Granite contacts in this region are characteristically crosscutting.

Deformation in the Snare Group (9) increases in intensity up-section. The unconformity dips consistently west at about 50°, and the basal 100 or so feet of strata reflects this structure. Upward and westward, dips steepen, and the rocks are tightly folded about near-horizontal, north-trending axes. Weakly developed cross-folds are superimposed on these structures. Extensive flowage of carbonates has occurred in zones of tight folding, and bedding is commonly obliterated. Proterozoic deformation has also affected the Archaean basement. Preliminary work suggests that this later deformation involved westward tilting and rotation of the western part of the Archaean basement (in the map-area), such that the Basler Batholith as now exposed represents a cross-section through the original structure—the granite in its eastern part representing a structurally lower level than the same granite in the west.

Faults are abundant in the region, and nearly all are marked by topographically prominent, linear depressions. Dips on these faults appear steep, but the possibility that some are of low angle should not be discounted. The faults are in part at least of Proterozoic age. Diabase dykes (8) are commonly associated with the faults, and in many places are themselves sheared. These dykes may also be of Proterozoic age, although none was observed to cut Snare strata.

Mineralized zones are uncommon, and were noted only in rocks of the Yellowknife Group. The zones are small, are marked by gossans, and appear to be associated with faults. Pyrite seems to be the major sulphide present.

[1]Eskola, P.: The Mineral Facies of Rocks; Norsk. Geol. Tidsskr., vol. 6, pp. 143-194 (1920).

[2]Turner, F. J., and Verhoogen, J.: Igneous and Metamorphic Petrology (2nd Edn.; New York, McGraw-Hill Book Co. Inc. (1960).

[3]Lord, C.S.: Snare River and Ingray Lake Map-areas, Northwest Territories, Geol. Surv., Canada, Mem. 235 (1942).