PRELIMINARY SERIES

GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

66 A

LEGEND

MIDDLE PROTEROZOIC

- 14 — Diabase
- DUBAWNT GROUP (9-13)
- 13 — THELON FORMATION: 13a, conglomerate, minor red siltstone; 13b, pebbly sandstone; 13c, sandstone
- 12 — Regolith: deep red, locally silicified; includes some red argillite related to unit 8, plus small patches of other older rocks
- 11 — PITZ FORMATION: red and mauve quartz-feldspar porphyries, agglomerate, and minor interflow sedimentary rocks; includes small areas of undifferentiated Christopher Island Formation
- 10 — MARTELL SYENITE: massive biotite syenite
- 9 — KAZAN FORMATION: sandstone; minor siltstone and mudstone

LOWER PROTEROZOIC

- HURWITZ GROUP (7 and 8)
- 8 — Orthoquartzite; minor slate, argillite, conglomerate, and impure quartzite
- 7 — 7a, phyllite; 7b, conglomerate

ARCHAEAN AND/OR LOWER PROTEROZOIC

- 6 — Gabbro, diorite
- 5 — Granite, quartz monzonite, granodiorite; minor syenite; syenodiorite
- 4 — Migmatite; fine-grained gneiss and schist
- 3 — Ultrabasic rocks
- 2 — Volcanic rocks; in part may be interlayered with units 7 and 8
- 1 — Schist, phyllite, greywacke, argillite; includes undifferentiated volcanic rocks and minor quartzite

Drift-covered area
Geological boundary (defined or approximate, assumed)
Geological boundary (gradational)
Bedding, tops known (horizontal, inclined)
Bedding, tops unknown (inclined)
Gneissosity, schistosity, cleavage (inclined, vertical, dip unknown)
Lineation (horizontal, inclined)
Fault (defined, approximate, assumed)
Joint (inclined, vertical)
Glacial striae (direction of ice movement known)
Minor moraines, transverse till ridges
Drumlins
Eskers, sand ridges
Raised beaches
Mineral occurrence (galena) . . . gn ×
Gossan . . . G

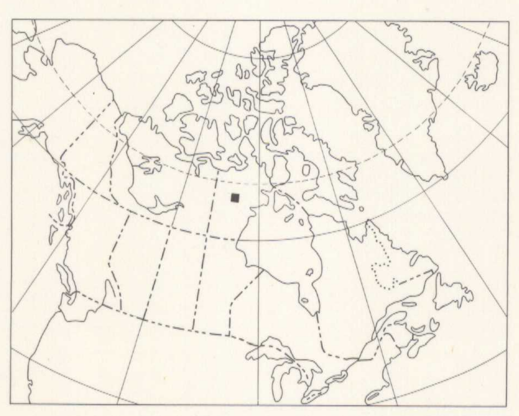
Geology by J. A. Donaldson, 1965

Geological cartography by the Geological Survey of Canada, 1966

Road, all weather
Airport
Post Office
RCMP Post
Horizontal control point
Astronomical monument
Intermittent stream
Rapids
Marsh
Contours (interval 100 feet)
Height in feet above mean sea-level

Base-map compiled and drawn by the Army Survey Establishment, R. C. E., 1966

The daily change of the North Magnetic Pole causes the magnetic compass to be very erratic in this area. Mean magnetic declination, 6°00' East, increasing 5.0' annually. Readings vary from 3°36' at the centre of the east edge to 9°09' at the centre of the west edge



INDEX MAP

Published, 1966
Copies of this map may be obtained from the Director, Geological Survey of Canada, Ottawa

Printed by the Surveys and Mapping Branch

MAP 7-1966

GEOLOGY

SCHULTZ LAKE

DISTRICT OF KEEWATIN

Scale 1:253,440
1 inch to 4 miles

Miles 4 0 4 8 12 Miles
Kilometres 6 0 6 12 18 Kilometres

DESCRIPTIVE NOTES

The settlement of Baker Lake, near the eastern boundary of the map-area, is served by year-round scheduled flights out of Churchill, Manitoba, 400 miles to the south. Float-equipped aircraft may be chartered at Churchill, or at the more distant bases of Uranium City, Yellowknife, and Lynn Lake.

Although the area is relatively free from snow cover by the middle of June, lake ice hampers water travel and restricts float landings until well into August. Areas of good exposure around Schultz and Whitehills Lakes were traversed on foot during the break-up period; the rest of the area was mapped by helicopter traverses designed to supplement earlier reconnaissance of a large region that includes Schultz Lake map-area (Wright, 1955).

Sandy till, containing locally-derived boulders, mantles much of the area, but washed sand forms thick deposits southwest of Baker Lake, and pockets of shell-rich marine silt occur along the banks of Thelon River. Boulder fields are abundant, particularly in the northwest quarter of the area. Drumlins and small moraines are prominent in areas of thick drift, but eskers are scarce. Numerous raised beaches flank high hills; the highest beach closely follows the 500-foot contour south of Schultz Lake. Striae trend northwest throughout most of the area, but westward advance is indicated by both drumlins and striae near the western margin of the area, and southeastward movement is recorded south of the ice divide recognized by Fyles (in Wright, 1955, p. 3).

Fine-grained, grey to greyish green schist, phyllite, greywacke, and argillite (1) appear to be the oldest rocks in the area. Primary structures are obscured or obliterated in most places by one or more prominent cleavages, but bedding (commonly graded) can be seen in water-worn exposures along the Thelon River. Near the eastern boundary of the area agglomeratic zones and pillow structures indicate the presence of associated volcanic rocks. Much of the belt, particularly the northern part, probably is tuffaceous. Layers of impure quartzite are here and there intercalated with pelitic schists and possibly some isolated areas of quartzite (8) are related to unit 1, particularly in the poorly exposed southwestern part of the area.

The metamorphosed volcanic rocks (2) are massive to schistose, dark green to greenish black, and weather buff brown to pale greenish grey. The range in ratio of plagioclase to mafic minerals (mostly chlorite and actinolite) suggests original basaltic to andesitic composition. Pillow structures are rare, but pyroclastic layers occur in numerous outcrops. The volcanics for the most part are probably related in age to unit 1, but distribution at Whitehills Lake suggests that some volcanics, unless repeated by faulting, are intercalated with rocks of unit 8.

Ultrabasic rocks (3) consisting mainly of tremolite, serpentine, talc, and magnetite, are exposed southwest of Schultz Lake in a small window flanked by Dubawnt sediments (13). The ultrabasics range from pale green to black, weather greenish buff to rusty brown, and are medium grained to aphanitic.

Migmatites (4) compose a gradational zone between the belt of schists (1) and adjacent granitic rocks (5). The scale of the interlayering of constituent rock types varies from discrete layers several meters thick to lit-par-lit interlayering measurable in centimeters. Grouped with the migmatites south of Schultz Lake are well-layered, commonly biotite-rich schists and fine-grained gneisses.

Granitoid rocks (5) are for the most part massive, equigranular, medium grained, leucocratic, and homogeneous. North of Schultz Lake foliation is less prominent than to the south; minor amounts of well-layered granitic gneisses north of Baker Lake and in the southwestern part of the area are included in unit 5. Biotite and amphibole are the main varietal minerals, but muscovite occurs in a few places. Some massive granites south of Schultz Lake contain visible grains of fluorite. The granitoid rocks are nonconformably overlain in several places by rocks of the Hurwitz Group (7, 8), but undoubtedly unit 5 includes intrusive rocks of several ages. Direct evidence for post-Hurwitz granite is lacking, but the lens of quartzite north of Pitz Lake appears to be engulfed by granitoid rocks. Downfaulting offers an alternative explanation.

Intrusions of light grey to greenish black gabbro and diorite (6) that outcrop near the centre of the area are relatively massive, medium to coarse grained, and show a wide range in mafic content. Original pyroxene has been replaced largely by amphibole. Ophitic texture is well developed in coarser phases of these intrusions.

Wright (1955, p. 6) defined the Hurwitz Group with reference to a type area in southern Keewatin, and extended the name to similar rocks throughout a large region of the central Barrens. Although Eade (1964, p. 4) has redefined the Group on the basis of detailed study in the type area, Hurwitz designation is tentatively retained for rocks originally mapped as Hurwitz in Schultz Lake map-area, primarily because of lithologic and stratigraphic similarity to lower units of Eade's redefined Hurwitz. Phyllite and conglomerate (7) constitute a basal unit of the Hurwitz Group in Half Way Hills, but elsewhere these rocks are present only locally. The phyllite (7a) is buff, pink, or light grey, and typically shows one or more crinkle lineations as well as marked schistosity. Conglomerate (7b), well exposed on the north shore of Whitehills Lake, contains well rounded pebbles and cobbles of granite, fine-grained grey sandstone, white quartz, chert, and greenstone, in a buff-weathering sandy matrix. Orthoquartzite (8) is typically white to greenish white or light grey, and forms massive blocky outcrop areas in which bedding can be only rarely discerned. Minor amounts of black slate and thin-bedded argillite are intercalated with the quartzite, and in places south of Schultz Lake black and red slates appear to overlie this unit. Thin layers of quartz-pebble conglomerate occur in the quartzite, predominantly in the lower part.

The Dubawnt Group (9-13) overlies the Hurwitz Group and older rocks with profound unconformity. The Kazan Formation (9), widely exposed in the type area south of Baker Lake (Donaldson, 1964, p. 4), is represented within Schultz Lake map-area by a small outcrop area north of Pitz Lake. Although the sandstones exposed here are, like typical Kazan sandstones, deep red in colour, they are compositionally more mature, and because similar red sandstones occur elsewhere in basal zones of the Thelon Formation (13), designation as Kazan is tentative. The only intrusions of Martell Syenite (10) occur on islands in Whitehills Lake. The syenite is dull pink to dark grey, fine to medium grained. biotite-rich, and massive. Related trachytic dykes with a northwest trend are locally abundant. The Pitz Formation (11) includes a wide variety of volcanic flows, flow breccias, tuffs, and interflow sedimentary lenses. Massive, deep red and mauve flows characterized by phenocrysts of glassy quartz and pink to chalky white feldspar predominate. Trachytes of the older Christopher Island Formation are not differentiated on the map.

A long period of post-volcanic erosion is marked by a well-developed regolith (12) beneath the upper sedimentary sequence of the Dubawnt. Red hematitic weathering profiles as much as 20 feet thick are clearly seen in both fault scarps and exhumed "fossil landscapes". Conglomerate (13a) occurs both basally and as sheets and channels within the flat-lying Thelon Formation. In basal exposures, the matrix is typically red and silty, and the framework texturally and compositionally immature. Boulders up to 60 cm in diameter are not uncommon. Pebbles and cobbles of Hurwitz quartzite and vein quartz predominate in stratigraphically higher units. Siltstones showing varve-like graded bedding, small crossbeds, mudcracks, and miniature sandstone dykes are associated with basal conglomerates south of the west end of Schultz Lake. Pebbly sandstone (13b) and sandstone (13c) are typically cream, greyish white, buff, mauve, or pink; variegated coloration is common. Well-rounded ellipsoidal to spherical pebbles of mosaic quartz and quartzite commonly occur along bedding planes or scattered throughout the sandstones. Units having a pebble content of more than 10 per cent by volume are differentiated as pebbly sandstone (13b). Most of the sandstone is medium grained, poorly to moderately-well indurated, and in many places characterized by trough or festoon crossbedding. Orthoquartzites with interstitial kaolinite and siliceous cement are most abundant, but basal beds are commonly arkosic and contain abundant grains of Dubawnt volcanic rocks.

Diabase dykes are vertical or nearly so and have two major trends. A northwest-trending and presumably younger set is represented by a segmented dyke that can be traced beyond the area and has a total length of more than 150 miles. Several smaller dykes parallel this trend. All are fresh, massive, and ophitic. A set with an east-northeast trend is represented by dykes in the northeastern part of the area.

The belt of schist, phyllite, greywacke, and argillite (1) appears to form a broad syncline in the vicinity of the Thelon River, and bedding-cleavage relationships indicate folding about near-horizontal axes throughout most of the belt. The quartzites and associated rocks form a faulted synclinal structure underlying Half Way Hills; synclinal folds predominate in preserved exposures of quartzite elsewhere. Joint sets are well developed in the granitoid rocks (5), particularly north of Schultz Lake. Truncation of flat-lying rocks of the Dubawnt Group serves to accentuate major faults, most of which involve little or no transcurrent movement. Most faults are high angle normal faults, but small scale low angle thrust faults were seen and may be abundant. Offset along some faults is reflected topographically, suggesting the possibility of relatively recent movement.

Schist, phyllite, greywacke, and argillite (1) commonly contain scattered grains of pyrite, and small quartz veins are abundant. Chalcopyrite as well as pyrite is locally disseminated, and to a lesser extent occurs along fractures, in the volcanic rocks (2) and gabbro (6). Several gossans observed in the volcanics are shown on the map. Small amounts of galena occur in milky vein quartz along the west margin of the granitic plug (or dome) four miles northwest of Whitehills Lake. Pebbles and cobbles of banded cherty iron formation containing 50 to 60 per cent specularite are abundant in some outcrops of Thelon conglomerates. Their source is unknown, but paleocurrent data indicate derivation from southeast of Schultz Lake; source rocks may have been completely eroded, but the possibility that the source lies undetected because of drift cover should be considered. Small veinlets of inflexible cross-fibre asbestos occur in the ultrabasic body southwest of Schultz Lake. Although only minor talcose soapstone was observed in outcrops of this body, blasting might reveal material suitable for the growing carving industry at Baker Lake. Baker Lake is accessible by sea via Chesterfield Inlet during short ice-free periods each year, thus the quartzites (particularly thick orthoquartzitic units (8) in Half Way Hills) offer a possible economic source of industrial silica. Limited checks for radioactivity in Martell Syenite and both conglomerates and sandstones of the Thelon Formation and Hurwitz Group yielded negative results, but the possibility of local radioactive mineralization remains. Intensive sampling would be required to test the possibility of placer deposits of gold and other heavy minerals in the Thelon Formation and units of the Hurwitz Group.

Donaldson, J. A.: The Dubawnt Group, Districts of Keewatin and Mackenzie; Geol. Surv. Can., Paper 64-20.

Eade, K. E.: Preliminary report, Kognak River map-area (east half), District of Keewatin; Geol. Surv. Can., Paper 64-27.

Wright, G. M.: Geological notes on central District of Keewatin, Northwest Territories; Geol. Surv. Can., Paper 55-17.

5.1.5
A, Geol.
N.W.T. Schultz Lake
1 inch to 4 miles
Map 7-1966 C.2

This map has been produced from a scanned version of the original map
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