

130°00' 45' 30' 15' 120°00' 45' 30' 15' 128°00' 63°00' 45' 30' 15' 62°00'

DESCRIPTIVE NOTES

From Watson Lake, the nearest base, the area is accessible by float-equipped aircraft. There is a small airstrip at the Canada Tungsten Mining Corporation property on Flat River, and a much larger one is under construction. The main valleys are suitable for travel by pack-horses, but the area is so remote that much of the season is lost in reaching it by this means. None of the rivers is easily navigable, even for small boats.

The map-area has been heavily glaciated. As precipitation in the area is evidently more abundant than in the less-mountainous country to the west, and as many glaciers still exist, the area was probably a centre of ice-accumulation during the Pleistocene. Unit 1 has a total thickness probably in excess of 10,000 feet, although both the thickness and stratigraphic succession are in doubt owing to intense deformation. The lowest exposed rocks consist of several thousand feet of massive, grey and buff, quartz-pebble quartzite, dark shale, and thin beds of finely crystalline limestone. The quartzite is very coarse in place (pebbles up to 6 mm in diameter) and commonly has some carbonate, probably ankerite, in the matrix. Overlying this sequence is a conspicuous and unusually persistent succession of green and maroon shale with interbedded dark shale, totalling perhaps 1,000 feet. The upper 2,000 feet or more consists of light grey, medium-grained quartzite, grey-green shale and phyllite, limy shale, and limestone. Unit 1a includes some of the green and maroon shales locally, but is composed mainly of the overlying sequence.

The thickness of unit 2 is uncertain, but its uniform character over wide areas indicates several thousand feet.

Unit 3 is exposed in an open anticline northeast of South Nahanni River. About 500 feet of buff-weathering, massive, even-grained dolomite (3b) is visible in the core of the anticline. The dolomite overlies by about 4,000 feet of deep-red-weathering interbedded quartzite and shale (3a).

It is not known whether the Precambrian units (1, 2, and 3) represent a lateral change in facies, or a stratigraphic sequence bevelled at a low angle by an unconformity beneath the Cambrian sediments.

Unit 4 appears to overlie unit 3 conformably east of South Nahanni River, where it is less than 1,000 feet thick. It is mainly a carbonaceous sequence and contains two distinctive rock types that are recognizable both in the open anticline and in the structurally complex area to the southwest. The first, forming the bulk of the unit, is the 'Swiss-cheese' limestone—so designated because of the honeycombed character of the weathered surface. It consists of thin-bedded, buff-weathering siltstone with spheroids and pods of grey limestone ranging up to about 4 inches in diameter and several times as long. The limestone is commonly less than half of the rock. The second distinctive bed—a mottled grey- and pink-weathering dolomite about 200 feet thick—comprises the top of unit 4.

Lower Cambrian trilobites were found in a thin siltstone (base of unit 5) immediately overlying the dolomite. The Cambrian has, arbitrarily, been extended down to the base of the 'Swiss-cheese' limestone, where the type of sedimentation changes abruptly. The limy and argillaceous assemblage comprising unit 5 is about 1,000 feet thick east of South Nahanni River. The top of the unit has been drawn at a buff-yellow-weathering siltstone that separates the varied rocks of unit 5 from the overlying, more uniform, Middle and Upper Cambrian strata (6).

Unit 6 east of South Nahanni River is believed to be as much as 5,000 feet thick consisting of thin-bedded limestone and siltstone. Most of the fossils collected from this unit are Middle and Upper Cambrian, but a collection from near the top of one section is probably Ordovician. West of South Nahanni River, similar strata (6a) appear between units 1 and 9, but, as the fossils collected from it were not diagnostic, the correlation between units 6 and 6a is tentative.

Unit 8 is possibly 5,000 feet thick northeast of South Nahanni River. One collection of Silurian fossils was made at the top of the unit. Forming a distinctive marker near the base of the unit on the slope above the river, is a bright red- to orange-weathering band consisting of several hundred feet of thin-bedded dolomite, dolomitic quartzite, and siltstone. To the northeast, as much as 500 feet of light buff to orange-weathering, cross-bedded, quartzite is present beneath the dolomite. Unit 8 appears to lie unconformably on unit 6.

A major facies change from argillaceous rocks in the west to carbonate in the east—exists in the Ordovician and Silurian strata within the map-area. The characteristic black shales of unit 9 contain Ordovician and Silurian graptolites west of South Nahanni River, and Silurian graptolites immediately above the contact with the Silurian dolomite (8) east of the river. Unit 9 appears, therefore, to be a time-equivalent of unit 8 and possibly of the upper part of unit 6. Where unit 9 is conglomeratic (9a), it contains fragments of chert, quartz, and black argillite in a dark grey quartzose matrix. Lithological similarities suggest that unit 9a and units of unit 9 may be equivalent to Upper Devonian rocks west of the map-area.

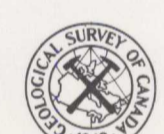
In the partly mapped area, north of the open anticline, unit 10 contains fossils of early, late Middle Devonian age. Consequently, the unit has been correlated with the Nahanni formation east of the map-area. Middle Devonian fossils were collected from a siltstone limestone underlying the unit.

Granitic rocks (11) cut both the intensely deformed strata west of South Nahanni River and the less severely deformed rocks east of the river. Although locally migmatitic, the contacts are generally sharp and cross-cutting. The granitic rocks are clearly intrusive and contain very few xenoliths. Highly porphyritic phases are common. Appreciable contact metamorphism is generally limited to narrow zones around the stocks.

Most of the major structures trend northwest, as is reflected in the drainage pattern of the area. Three structural belts have been recognized: complexly folded Precambrian rocks, mainly west of Hyland River and south of Summit Lake; intensely deformed Precambrian phyllites and Palaeozoic strata between Summit Lake and South Nahanni River; and open-folded Precambrian and Palaeozoic rocks northeast of South Nahanni River. In the first belt, competent quartz-pebble quartzites (1) are closely folded and are upright to strongly overthrust to the northeast. This folding is spectacularly exposed around Mount Pike and south of Upper Hyland Lake. In the second belt, structures are believed to be more complex owing to the lesser competence of the rocks involved, although observations are hampered by the poor outcrops of unit 9. Bedding is rarely visible in the slates and phyllites of unit 3, but steeply dipping foliation is common. The younger rocks in this belt are in most places complexly folded, and strong overthrusting is evident in the Flat River area. The linear belt of unit 9 in Flat River valley may be the result of either complex folding or a graben structure. The third belt consists of primarily open-folded Precambrian and Palaeozoic rocks. The major feature of this belt is the open anticline, which in the map-area plunges northwest but east of the map-area plunges southeast. Local complexity and thrust faulting are suspected in the unmapped area to the north.

At present, Canada Tungsten Mining Corporation is developing its property near Flat River. There, a skarn developed in Cambrian limestone near a contact with granitic rocks is mineralized with pyrrhotite, scheelite, and chalcopyrite.

The most favourable area for prospecting appears to be the highly deformed belt between South Nahanni and Hyland Rivers, especially where complexly folded Cambrian limestone has been intruded by granitic stocks. This belt disappears to the northwest beneath younger shales, but it seems to extend for some distance southeast of the map-area. Considerable iron-staining and numerous gossans are present near the granitic body southeast of O'Grady Lake, but no mineral occurrences have been reported from this area.

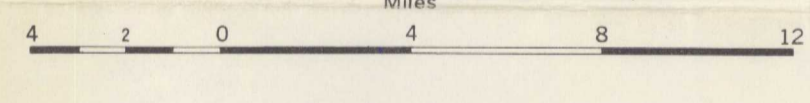


GEOLOGICAL SURVEY OF CANADA DEPARTMENT OF MINES AND TECHNICAL SURVEYS

MAP 14-1961 GEOLOGY NAHANNI

YUKON TERRITORY AND DISTRICT OF MACKENZIE

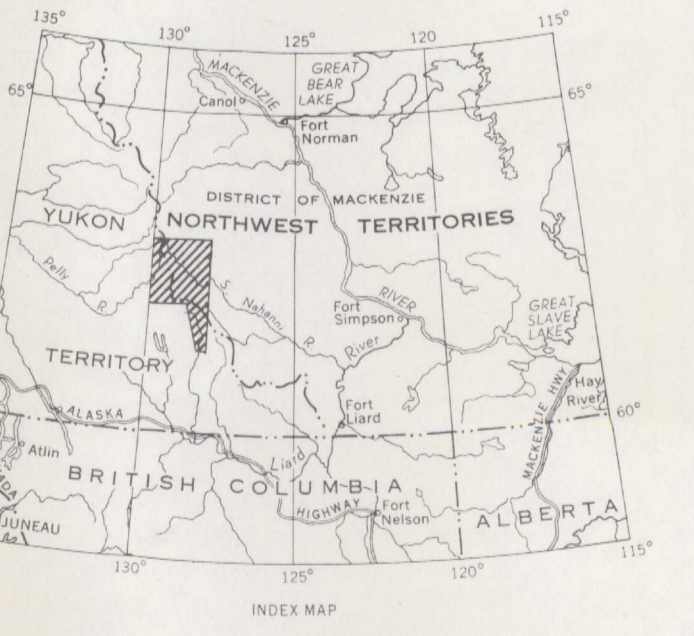
Scale: One Inch to Four Miles = 1/253,440 Miles



14-1961 c.2 14-1

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 some of the map-units are hand-coloured



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LEGEND

- QUATERNARY 12 Unconsolidated glacial, alluvial, and bog deposits, and volcanic ash
CRETACEOUS (?) 11 Medium-grained, biotite and minor biotite-hornblende granodiorite and quartz monzonite, in part porphyritic
DEVONIAN MIDDLE DEVONIAN NAHANNI FORMATION: massive grey crinoidal limestone
ORDOVICIAN (?) TO SILURIAN 8 Light grey buff-weathering, medium to dark grey, thick-bedded dolomite; minor thin-bedded dolomite and limestone; local red to orange-weathering, thin-bedded dolomite, dolomitic quartzite, and siltstone; local orange-weathering basal quartzite
ORDOVICIAN AND SILURIAN 9 Black shale, slate, chert, and phyllite, dark greywacke; minor siltstone, quartzite, limestone, and conglomerate; in part younger than 8; 9a, conglomerate; minor greywacke and shale
CAMBRIAN TO ORDOVICIAN MIDDLE AND UPPER CAMBRIAN (in part later) 6 Brown-weathering, thin-bedded, grey to dark grey limestone, limy siltstone, and siltstone; locally includes Ordovician rocks; 6a, thin-bedded limestone and siltstone, probably equivalent to 6 but age not well established
CAMBRIAN LOWER CAMBRIAN 5 Interbedded, red-, buff-, and yellow-weathering, pale buff, carbonate-cemented sandstone; grey, buff, green, and maroon siltstone and shale; minor limestone and dolomite
7 Undifferentiated units 4, 5 and 6; 7a, mainly 6; 7b, mainly 4
4 Mottled, grey-, pink-, and buff-weathering, massive, light grey dolomite, brown-weathering siltstone with irregular blots and pods of grey limestone ('Swiss-cheese' limestone); minor dolomite, limestone, and carbonate-cemented sandstone
3 3a, deep blood-red weathering, iron-flecked, grey to green, interbedded quartzite, siltstone, and argillite; minor fine conglomerate; 3b, buff to red-weathering, light grey, dolomite; 3 may be in part equivalent to 1 and/or 2
2 Grey, green, and black slates and phyllites; minor siltstone; may be in part equivalent to 1 and/or 3
1 Grey- and buff-weathering, quartz-pebble quartzite, and quartzite; grey, green, and maroon shale and phyllite; minor quartzite; 1a, mainly grey and green shale and phyllite; minor quartzite; 1, especially 1a, may be in part equivalent to 2 and/or 3

- Geological boundary (defined, approximate, assumed)
Limit of geological mapping
Bedding (horizontal, inclined, vertical)
Bedding (dip known, tops unknown)
Bedding (estimated attitudes, may include foliation; dip: g, gentle; m, medium; s, steep)
Foliation (inclined, vertical)
Fault (approximate, assumed)
Anticline
Syncline
Provincial boundary
Intermittent stream
Marsh
Glacier or snowfield
Contours (interval 500 feet)
Height in feet above mean sea-level
Fossil locality
Mineral prospect or occurrence (tungsten, W)

Geology by L. H. Green and J. A. Roddick, 1960

Cartography by the Geological Survey of Canada, 1961

Base-map prepared by the Army Survey Establishment, R.C.E., 1949-1954 with minor revisions by the Geological Survey of Canada, 1961.

Approximate magnetic declination, 35° 00' East