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GEOLOGICAL SURVEY OF CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES

PAPER 66-24

GEOLOGICAL NOTES ITCHEN LAKE MAP-AREA DISTRICT OF MACKENZIE

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(Report, figure and Map 8-1966)

H. H. Bostock

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ITCHEN LAKE MAP-AREA
DISTRICT OF MACKENZIE

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ABSTRACT

The Itchen Lake map-area lies between 65 and 66 degrees north latitude and between 111 and 113 degrees west longitude.

Rocks of the Yellowknife Group (early Precambrian) are mostly steeply dipping in a broad belt prominently exposed within the map-area. Basic and some acid volcanic rocks with quartz-biotite and quartz-amphibole gneisses are present in the lower part of the group and knotted schist with greywacke are predominant in the upper part. Remnants of siliceous gneisses, possibly of pre-Yellowknife age, are present beyond the southeast margin of the belt. Knotted schists bearing amphibolite bodies characterized by garnet-bearing beds and patches of gossan, are present along the northwest margin of the belt and are tentatively correlated with basic volcanic rocks along the southeast margin. Gold, accompanied by arsenopyrite, pyrrhotite, magnetite, pyrite, chalcopyrite and loelingite, has been found associated with these amphibolites. It is suggested that the belt of Yellowknife rocks forms part of a major synclinal structure.

Slate, argillite, and quartzite with minor carbonate and conglomerate, mostly flat lying in the basin of "Rockinghorse Lake", are correlated with the lower units of the Goulburn Group (Proterozoic) at Contwoyto Lake.

Dykes of diabase and gabbro cut rocks of both the Yellowknife and Goulburn Groups. Rocks of the latter Group are penetrated by sills of similar rock dated at 1,555 million years.

Plutonic rocks ranging from granite to gabbro are present chiefly along the margins of and beyond the belt of Yellowknife rocks. Lit-par-lit gneisses and other hybrid rocks were derived from rocks of the Yellowknife Group. K-Ar ages of biotite and muscovite in these rocks and in rocks of the Yellowknife Group examined to date range from 2,075 to 2,350 million years.

GEOLOGICAL NOTES, ITCHEN LAKE MAP-AREA, DISTRICT OF MACKENZIE

INTRODUCTION

This paper is a preliminary account of geological field work carried out by the writer in Itchen Lake area during the summers of 1964 and 1965. The work of L. P. Tremblay during the same period in the northeastern one-eighth of this region, is adapted for publication on the accompanying map. A broad outline of both the stratigraphic succession and the structural interpretation of rocks of the Yellowknife Group in this area is presented, an outline that represents the writer's present working hypothesis, but which may require modification in the light of continuing work.

Itchen Lake map-area (65° to 66° N; 111° to 113° W) is about 250 miles northeast of Yellowknife and about 150 miles southeast of Bathurst Inlet. It may be reached from Yellowknife by chartered aircraft.

Most outcrops in the area are partly free of snow by the second week in June. Ice leaves the smaller lakes in the southwest corner of the area about the first of July and those in the northeast some ten days later. Ice may be present in the largest lakes in the north and east in August. Snow and bad weather typically curtail field work after the end of August.

Minimum elevation in the map-area is at Point Lake (1,229 feet above sea-level). From there the land surface rises gently to Contwoyto Lake (1,460 feet) and to "Rockinghorse Lake" (1,479 feet). Maximum elevations, slightly over 2,100 feet, are reached on diabase-capped hills in the northern part of the area. Local relief is typically 100 to 300 feet except in the north where diabase-capped bluffs rise some 600 feet above surrounding valleys.

Caribou are most abundant during spring and fall migrations but are occasionally seen in grassy regions in midsummer. Ground squirrels and ptarmigan are common; rabbits, foxes, and wolves are seen from time to time and barren lands grizzlies, wolverine, and lynx are seen rarely. A few small clumps of spruce are present in selected locations about Point Lake but trees are absent in the remainder of the area. Some ten families of Eskimo were resident at the west end of Concession Lake during the course of the present work.

The first geological work in the Point Lake region was done by Stockwell (1933). The west half of the map-area was mapped in the course of Operation Coppermine, 1959, and the east half during Operation Bathurst Inlet, 1962.

PLEISTOCENE GEOLOGY

The best developed glacial striae are oriented northwesterly in the northern and eastern parts of the area and more westerly in the south and west. Southwesterly directed striae indicate another, perhaps earlier, direction of ice movement in Point Lake region. Abandoned drainage courses trend southwestward between Contwoyto and Point Lakes and northwestward between Contwoyto Lake and "Rockinghorse Lake". Drift cover is extensive in the eastern half of the area where the surface is underlain by sedimentary rocks.

GENERAL GEOLOGY

Geological coverage of the map-area was achieved by ground traverses spaced at 1 to 3 mile intervals except in extensive regions of leucocratic granitic rocks where spacings are up to 4 miles. About 35 per cent of the area is underlain by leucocratic plutonic rocks. Roughly 60 per cent is underlain by Archaean rocks of the Yellowknife Group, and their altered equivalents. Nearly 5 per cent is underlain by Proterozoic rocks correlated with those of the Goulburn Group.

ARCHAEAN SEDIMENTARY AND VOLCANIC ROCKS

Early siliceous sediments (1) (Pre-Yellowknife?)

Fine-grained leucocratic biotite-quartz gneiss and some amphibole-quartz gneiss with local plagioclase concentrations, comprise the oldest rocks (1a) known in the map-area. These are commonly recrystallized and grade laterally to quartz monzonite. Remnants of this unit persist here and there in marginal areas about larger bodies of granitic rocks (C). Traces of bedding or schlieren are present locally. Similar rocks, commonly with prominent amphibole-bearing bands, are exposed in dome- and fold-like structures within areas of lit-par-lit gneiss (for example south of Point Lake). Unit 1b consists of grey to white quartzite, dark siltstone, fine-grained laminated buff-pink and green rocks locally similar to ribbon chert, and phyllite. Greenschist, slate, argillite, gneiss, schist, and amphibolite occur in minor amounts. Because it contains a notable proportion of siliceous rocks unit 1b is tentatively correlated with unit 1a in the east half of the map-area.

The disposition of unit 1a suggests that it lies stratigraphically beneath a variable thickness of more mafic sediments and volcanic rocks. Furthermore, conglomerate (4) along the contact between volcanic rocks (2) and slate-greywacke (6b), and locally within the volcanic rocks, contains

Table of Formations

Age	Formation and Lithology		Thickness in feet	
Cenozoic	Silt, sand, gravel, drift.			
	Great unconformity			
Proterozoic	Units 12 and 13; Diabase, gabbro.			50'+
	Intrusive contact			
	Goulburn Group			
	Contwoyto Lake	Rockinghorse Lake		
	Unit 11; Rocks equivalent to units 8, 9, and 10, and rocks younger than unit 10.	Unit 10; Quartzite, greywacke, argillite, minor conglomerate and carbonate.		438'+
		Unit 9; argillite, minor carbonate.		295'+
		Unit 8; argillite, quartzite, minor conglomerate and carbonate.		170'
	Unconformity			
	Unit 7; Intermediate dyke			
	Intrusive contact			
Archaean	Units A, B, &C; Leucocratic to melanocratic plutonic rocks.			
	Intrusive and metamorphic contacts			
	Yellowknife Group			
	Outer (northern) belt	Inner (southern) belt		
	Unit 6; Knotted schist, greywacke, phyllite, minor greenschist.		Unknown	Unknown
	Unit 3; Knotted schist greywacke, phyllite, with minor greenschist; Interbedded amphibolite	Unit 2; Basic volcanic rocks, biotite- and amphibole-quartz gneiss, greenschist; some calc-silicate rocks, marble, agglomerate, acid volcanic rocks.	Unknown	10,000'±
	Units 2, 4, and 5; Basic volcanic rocks, conglomerate, amphibolite		Unknown	
	Pre-Yellowknife (?)			
	Unit 1; Quartzite, dark siltstone, banded siliceous rocks, phyllite; some slate argillite, gneiss, schist and amphibolite.	Unit 1; Leucocratic siliceous gneiss, granite, quartz monzonite.	Unknown	Unknown

some rounded fragments of siliceous sediments. The oldest rocks of the Yellowknife Group, as defined by Lord (1951), are of volcanic origin and it is therefore possible that the siliceous sediments of unit 1 represent a period of pre-Yellowknife sedimentation. The wide distribution of remnants of siliceous sediments along the margins of leucocratic plutonic rocks suggests that the latter may be in part the now thoroughly altered basement upon which basal volcanic rocks of the Yellowknife Group were deposited.

Yellowknife Group (2-6)

Volcanic Rocks and Associated Sediments (2): Overlying unit 1 in the east half of the map-area (and perhaps locally interlensed with it near the contact) are darker and better banded fine-grained gneisses with interlensed pillowed basic volcanic rocks, amphibolite, tuff, acid volcanic rocks, and some marble, calc-silicate rocks, and agglomerate. South of "LeAnn Lake" schistose amphibolite and pillowed basic volcanic rocks (2a) overlie a thick section of biotite-quartz and amphibole-quartz gneisses (2b) with marble and calc-silicate rocks at the base. The continuity of these lithologies and the persistence of their relative positions within a belt stretching some 12 miles along strike, suggests that repetition of beds through folding or faulting has not occurred. A section of 10,000 feet has been measured, but it is possible that the original thickness at the site of the section has been increased by intimate, widespread shearing. Greater thicknesses including some acid volcanic rocks, may be present in areas less well exposed to the east of the measured section. Pillows in volcanic rocks near the north boundary (top) of this section suggest that it underlies the knotted schist to the northwest.

Southwest of the measured section southeast of Itchen Lake the structural complexity of unit 2 increases. Amphibolite and basic volcanic rocks similar to those in the northern (upper) part of the above section persist in a large isolated remnant southeast of Itchen Lake, but it is not clear whether the intervening schists belong to unit 6 or whether they may in part be a highly deformed facies of unit 2b. Farther south many smaller amphibolite bodies form resistant ridges in contorted schists (2c), and correlation is again uncertain.

Fine-grained siliceous rocks, in part of volcanic origin, are prominent (2d) in a belt extending northeast from about 112° W, 65°30' N. Southwest of Contwoyto Lake, unit 2 is thinner and banded biotite-quartz gneiss is prominent, with local amphibolite. Where rocks of unit 2 are more highly altered, amphibolite or dioritic gneiss (2e), or garnet-anthophyllite-cordierite gneiss (2f) is present. The former lies along the margins of some dome- and fold-like structures exposing unit 1 at their cores (for example northeast of Point Lake). The latter (2f) may in part represent downfolded remnants of unit 2 in units 1 or C. Southwest of Point Lake pillowed basic volcanic rocks with minor felsite (?), quartzite, and biotite schist (2g) appear

to underlie knotted schist (6a) to the east. In the northwest corner of the map-area large bodies of greenstone and greenschist, partly altered to dioritic rocks, are probably equivalent to unit 2g to the south.

Amphibolite-bearing schist, slate, and argillite (3): Banded amphibolite-bearing schists (3a) near Itchen Lake pass without apparent non-conformity into rocks of unit 1 to the west, and into schist with few or no banded amphibolite bodies to the east. Banding in the amphibolite bodies consists of well defined layers of variable mafic content (amphibole and chlorite) that are commonly a few inches or less thick. The presence of garnet in some bands is characteristic. Commonly garnet is uniformly distributed within bands being abundant in some, scarce in some, and absent in others; locally however, patches showing abundant garnet crystals transect well-defined banding. Locally one to two inch thick lenses of quartzite, parallel the banding and show development of boudinage. Detrital quartz grains have been noted within amphibole-rich bands (see Schiller and Hornbrook, 1964). Typically patches of gossan are present along some bands within amphibolite bodies. Country rock surrounding the bodies are schists similar to unit 6a.

The well-banded structure of amphibolite bodies, the presence of granular quartz both as individual grains and in lenses, and the continuity of the zone in which amphibolites occur, suggest that they were deposited either as fine clastic (tuffaceous ?) sediments, or as mixtures of clastic sediment and chemical precipitate in an extensive body of water. The position of the amphibolite-bearing zone between units 1 and 6 indicates that deposition of the sediments may have been contemporary with volcanism associated with the deposition of unit 2.

The K-Ar age of biotite from a schist in unit 3a at the south end of Fuz Lake is 2,350 $\pm$ 80 million years. Amphibolite-bearing rocks of unit 3b are believed to be less altered equivalents of unit 3a.

Conglomerate (4): Near Point Lake, at the west border of the map-area, conglomerate (4) is present at and near the contact between volcanic rocks (2g) and slate-argillite-greywacke (6b) believed to be a less altered equivalent of the knotted schists (6a). Since no conglomerate is present within unit 6b, the conglomerate is thought to be of the same age as the upper part of unit 2. Conglomerate (4) is composed of rounded boulders, cobbles, and pebbles chiefly of vein quartz and granitic rocks in a greenish schistose matrix. Granitic gneiss and quartzite are represented locally. Light and dark green ovoids (bombs ?), lenses of carbonate, and sand grains are visible in the matrix at some outcrops. Cobbles of diorite and amphibolite similar to Ad are rare. A K-Ar age determination on muscovite from a boulder

constituent in the conglomerate gave an age of 2,660 ± 75 million years, slightly older than previous radiometric ages determined on material from this region.

Amphibolite, Gabbro, and Greenschist (5): Amphibolite, gabbro, and greenschist (5) form an equidimensional body near the northeast end of Itchen Lake. In part the amphibolite is banded or schistose and intruded by small bodies of massive gabbro, and in part it is massive, fine grained, and homogeneous. The presence of amphibolite suggests that this body may be correlated with unit 2.

Knotted Schist and Greywacke (6): Overlying unit 2 and presumably overlying units 3, 4, and 5, is an unknown thickness of fine-grained to medium-grained, light to dark grey or brownish schist and greywacke (6a) commonly containing cordierite and locally andalusite porphyroblasts. More rarely sillimanite is present. Amphibolite bodies are rare or absent. Chloritic schists and quartzite beds are present locally and phyllite is found in regions of lower metamorphic grade. In some areas schists derived from older units may be included in unit 6. A K-Ar age determination on muscovite from unit 6 along the south shore of Point Lake gave an age of 2,275 ± 60 million years. Slate, argillite and greywacke (6b) are assumed to be less altered rocks of equivalent age.

INTERMEDIATE DYKE (7)

Unit 7 comprises a single very fine-grained light green to buff dyke southwest of "Rockinghorse Lake". This dyke appears to be parallel to lineaments that cut across both plutonic and metasedimentary rocks of unit 6 and is therefore thought to be younger than unit 6.

PROTEROZOIC SEDIMENTARY AND HYPABYSSAL ROCKS

Goulburn Group (8, 9, 10 & 11)

Lying unconformably on hybrid and granitic rocks are Proterozoic sediments, units 8, 9, 10 and 11, tentatively assigned to the Goulburn Group. The present report is chiefly concerned with units 8, 9, and 10 lying in the basin of "Rockinghorse Lake". These rocks are, however, similar to the lower part of the section at the north end of Contwoyto Lake (L. P. Tremblay, 1966a). Unit 11 includes undivided 8, 9, and 10 as well as a considerable thickness of younger rocks.

Quartzite-Argillite (8): Unit 8 is exposed on the east and west margins of the Goulburn Group at "Rockinghorse Lake", and beneath diabase west of the north end of Contwoyto Lake. At "Rockinghorse Lake" it comprises 170 feet of interbedded yellow-green argillite and white to green to brown-mottled quartzite. Up to 5 feet or more of conglomerate with carbonate cement are present locally at the base. Two thin carbonate beds (up to 2 feet thick) were observed higher in this unit east of "Rockinghorse Lake". Darker brown argillaceous quartzite at the western tip of outcrop west of Contwoyto Lake is equivalent to unit 8.

Argillite (9): At "Rockinghorse Lake", unit 9 is present in most of the area underlain by rocks of the Goulburn Group, but on the central islands it is largely concealed by the overlying unit. Purple to green argillite and slate comprise most of the unit. East of "Rockinghorse Lake" upper beds of unit 8 contain prominent brown-weathering carbonate nodules and locally a bed of similar carbonate up to several feet thick. Siliceous lamellae and septa resembling stromatolites are present. West of "Rockinghorse Lake" and on the southern islands carbonate nodules were not observed, and it is possible that a wedge of grey-white quartzite, which thickens westward, is present in the upper argillite beds. The upper limit of unit 9 is placed below the first prominent quartzite overlying purple argillite and therefore the division may not be precisely time-parallel on either side of the lake.

The true thickness of the unit is unknown because no complete section is exposed; however, 295 feet are present in bluffs capped by diabase at the southeast corner of "Rockinghorse Lake". The concretionary argillite is not present in the section measured, and for this reason and because this layer elsewhere reaches thicknesses up to at least 50 feet, unit 9 may be close to 350 feet thick.

Quartzite - Greywacke (10): Quartzite of unit 10 is best exposed on the two prominent peninsulas in "Rockinghorse Lake" and on the central islands. Only a few feet at the base of the unit are exposed at the tops of bluffs to the west. More thinly bedded quartzite, greywacke and argillite are present on the largest central island and on the southeast peninsula. The true thickness of the unit is unknown but 438 feet have been measured beneath diabase on the southeast peninsula.

Unit 10 comprises chiefly purple, buff, pink, white, or greenish quartzite with local thin quartz-jasper-pebble conglomerate beds. A carbonate bed up to 12 feet thick is present at or near the base of the section in the western part of the basin. A thin carbonate bed may be present higher in this interval. Pink to buff quartzite in beds up to 2 feet thick are interbedded with greenish greywacke and argillite near the top of the section.

Diabase and Gabbro Sills and Dykes (11 & 12)

Diabase and gabbro sills (11) overlie a large proportion of the Goulburn Group in the map-area. These commonly transect bedding at very shallow angles, but locally the intersection is more abrupt. A K-Ar age determined on diabase from the large sill east of "Rockinghorse Lake" is 1,555 million years. Whether the sills are all of the same age is not known.

Very fine grained to coarse-grained, typically equigranular, and commonly little altered dykes (12), mostly less than 120 feet thick, can be found throughout the map-area. Locally, as northwest of "Concession Lake", varieties containing coarsely porphyritic feldspar are present. Some dykes are intruded through diabase sills (11) but some may be older than the sills.

HYBRID ROCKS (A)

Hybrid rocks (A) were derived from earlier rocks, chiefly Yellowknife Group, by metamorphism, deformation, and intrusion of granitic material. In the northeast a wide belt of predominantly granitic rocks (Aa) contains scattered remnants of garnetiferous amphibolite accompanied by gossan thus differing from similar rocks to the south and southwest. Muscovite in addition to biotite is commonly present in the granitic rocks of this belt and appears most abundant near Contwoyto Lake. In the south-central part of the area schist and greywacke (6a) grade into lit-par-lit gneiss (Ab) with increase in proportion of intimately associated granitic material, increase in degree of recrystallization and local increase in deformation. The change across a broad zone is commonly oscillatory, rather than continuous. There is thus little doubt that unit Ab is an altered equivalent of unit 6a. Areas of schist abundantly intruded by pegmatite or quartz monzonite (Ac) are common along and near contacts with granitic rocks. Grey to white pegmatite in these areas commonly carries fine- to coarse-grained black tourmaline. Amphibole-rich rocks (Ad) northeast of Point Lake may form remnants of a southern extension of volcanic rocks (2) to the north.

MELANOCRATIC PLUTONIC ROCKS (B)

Large bodies of melanocratic plutonic rocks (B) are present along the margins of the schist belt (3 & 6), and in belts containing remnants of basic volcanic rocks in the far western part of the area. Locally these rocks are dark green and amphibole-rich. Elsewhere they are more feldspathic and may contain quartz and abundant biotite. South and west of "Concession Lake" these rocks are typically massive; to the southeast they are commonly foliated with biotite- and hornblende-biotite augen-gneiss developed. Smaller bodies consisting of diorite, gabbro, pyroxenite (?), or greenstone, commonly of dyke-like form, and showing varying degrees of alteration, are tentatively included in the group.

LEUCOCRATIC PLUTONIC ROCKS (C)

Leucocratic plutonic rocks (C) are mostly medium to coarse grained, pink, grey-white or buff, biotite-quartz monzonite and granodiorite with locally abundant pegmatite. In the southeast and northwest parts of the map-area large areas of unit (C) are massive and slightly porphyritic, but here and there in the east-central part remnants of quartz-biotite gneiss and biotite schlieren are common.

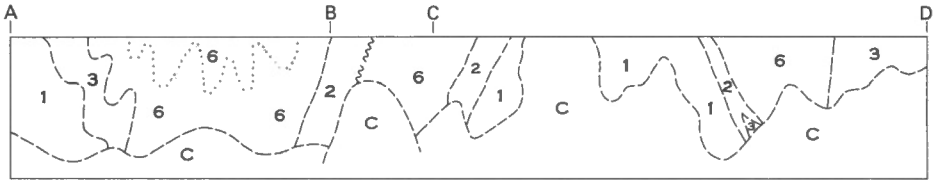
STRUCTURAL GEOLOGY

YELLOWKNIFE GROUP

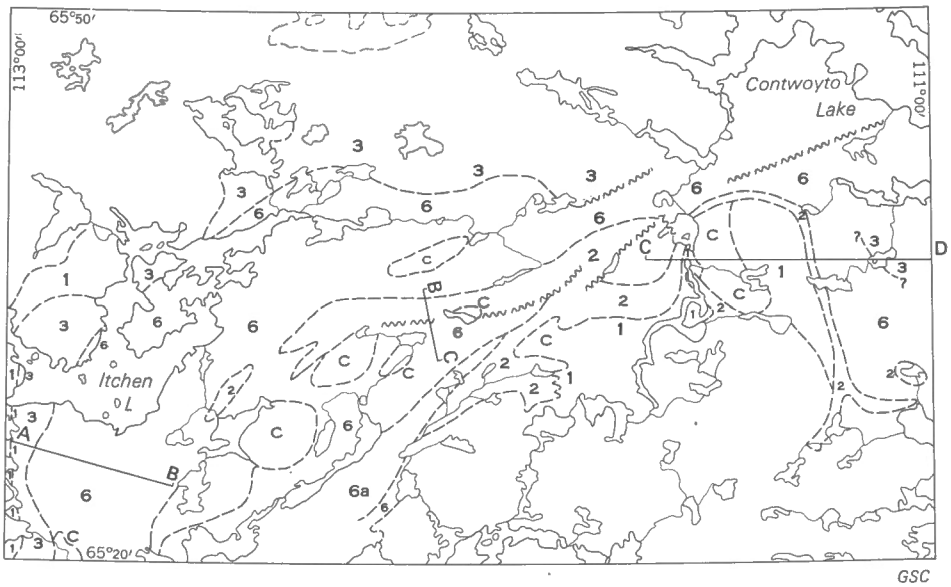
The Yellowknife Group forms a broad belt stretching northwards from south of Point Lake, curving eastward through Itchen Lake to Contwoyto Lake, and eventually passing southeastward beyond the east boundary of the area. Though the structure of this belt appears to be complex in detail it was found that, allowing for repetition by faulting, the lithologic sequences encountered in progressing inward from the margins of the belt have notable similarities. Unit 1 includes siliceous sediments on both the east and west margins; unit 2 near the east margin includes a considerable proportion of volcanic rocks with more mafic sediments, whereas unit 3 near the west margin, thought to be stratigraphically equivalent to unit 2, includes amphibolites (possibly related to volcanism) in argillaceous rocks. The central part of the belt consists of argillaceous rocks without amphibolite. This parallelism of lithologic sequence suggests that the belt outlined is part of a large downfold, or major synclinal structure, preserving the Yellowknife Group along its axis and bringing the now largely granitized and partly remobilized early basement to the surface in intervening areas. The structure and facies changes implied in this hypothesis, are illustrated by Figure 1.

The existence of a prominent fault zone along the south margin of the belt of unit 2 stretching from the granitic plugs east of Itchen Lake to southwest of Contwoyto Lake is inherent in the conception of a major synclinal structure outlined above. The northeast end of the fault is delineated by Tremblay (1966b) and shows a right lateral displacement of isograds (zones of metamorphism). The east end of the fault is separated from the central and western parts by an area of poor exposure. In the latter parts no offset has been demonstrated but, north of the fault, the gneisses show a notable and widespread foliation.

The alternative to a fault interpretation would be that the belt of unit 2 south of "LeAnn Lake" represents a second volcanic unit of lithology similar to unit 2, but younger than unit 6. Because unit 6 appears on both sides



Hypothetical section along lines A-B, B-C and C-D



LEGEND (Simplified)

6	*Knotted schist, greywacke, phyllite; minor greenschist without amphibolite; 6a, rocks of lower metamorphic grade equivalent to 6*
2	*Volcanic rocks and related gneisses, amphibolite*
3	*Rock similar to 6 and 6a but including amphibolite*
1	*Siliceous gneisses*
C	*Granitic rocks*

Fault . . . . . .

Miles 0 5 10 15

Figure 1. Hypothetical section and generalized map of the Yellowknife Group in Itchen Lake map-area.

of the belt, a syncline preserving the supposed younger rocks at its core might be suggested. This however, seems unlikely because pillows along the north margin of the belt suggest that it underlies the schist, and no elements of symmetry have been found in the sequence of lithologies encountered in the section.

A similar subsidiary synclinal structure may exist in the belt of dominantly lit-par-lit gneisses in the area between the east end of Point Lake and the eastern limit of the map-area. A crossbedded quartzite lens near the south margin of the belt suggests that the lit-par-lit gneisses overlie their contact with the leucocratic granitic rocks (C) to the south. Furthermore, amphibole-bearing gneisses commonly appear along contacts between lit-par-lit gneisses and either unit 1 or granitic rocks (C). The same sequence of lithologies therefore appears to obtain in this belt as in the belt of less altered rocks to the north and west.

Although the lithologic sequence described above can be applied with confidence along the east and south margins of the belt of Yellowknife rocks, the parallel interpretation of the west and north margin remains tentative and will be the subject of further investigation. Isoclinal folding is evident in the central part of the belt at the east end of Point Lake and in unit 3b (Tremblay, 1966b). Along the west and north margins of the belt, however, where the overall attitude should be eastward-facing, most critical structures indicate that beds are facing westward. This feature may be a result of isoclinal folding and faulting, but it indicates that further data are required before the major synclinal hypothesis for the structure of the Yellowknife belt in the map-area can be considered established.

GOULBURN GROUP

Rocks of the Goulburn Group (8, 9, and 10) are flat lying to gently dipping. At "Rockinghorse Lake" dips are 15 degrees or less in most exposures. In a narrow zone along the north border of the basin southeast dips of 70 degrees have been recorded. The Goulburn Group at "Rockinghorse Lake" is intersected by a southeast trending graben outlined by a major fault near the east shore of the lake, and by a zone of warping and lesser faulting near the west shore.

ECONOMIC GEOLOGY

Gold in association with pyrrhotite, magnetite, arsenopyrite, loelingite (McConnel,1964, Schiller and Hornbrook, 1964), pyrite and chalcopyrite is reported in zones in garnetiferous amphibolite bodies in unit 3, and in equivalent hybrid rocks to the north. To date the most extensively developed deposit is that of Canadian Nickel Company near the northeast end

of Contwoyto Lake. Nickel is reported in similar rocks northwest of Itchen Lake. The persistence of garnetiferous amphibolite-gossan remnants in a belt stretching north from the northeast corner of "Rockinghorse Lake" suggests that gold-bearing equivalents of unit 3 may be present in the extensive area of little known volcanic rocks that lies immediately northeast of this part of the map-area.

Elsewhere pyrite, pyrrhotite, and some chalcopyrite have been recognized in gossan zones. The most extensive of these is on the south shore of an inlet at the southeast end of Point Lake. Dark slaty to siliceous rocks (6b) containing disseminated pyrite form relatively extensive gossans close to the south shore of Point Lake near the west border of the map-area. At the east end of Point Lake, commencing on the north shore, a discontinuous band of small gossans extends northeastward for about 10 miles. Although the gossans examined appear to be of little value, their existence at numerous traverse intersections along an extended zone is of interest.

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