CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

GEOLOGICAL SURVEY

PAPER 41-3

PRELIMINARY REPORT

INGRAY LAKE MAP-AREA, NORTHWEST TERRITORIES

BY

C. S. Lord

OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1941

Price, 10 cents

CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

GEOLOGICAL SURVEY

PAPER 41-3

PRELIMINARY REPORT

INGRAY LAKE MAP-AREA, NORTHWEST TERRITORIES

BY

C. S. Lord

OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1941

Price, 10 cents

CONTENTS

Illustration

Ingray Lake Map-Area, Northwest Territories

INTRODUCTION

Ingray Lake map-area is about midway between Great Bear and Great Slave Lakes in Northwest Territories and is bounded by latitudes 64 degrees and 65 degrees, and longitudes 115 degrees and 117 degrees. The centre of the area is 150 miles north-northwest of Yellowknife on the north shore of Great Slave Lake. No geological mapping had been done in the area by the Geological Survey prior to 1939 when J. T. Wilson mapped the south half of the area. The north half of the area was mapped by the writer in 1940. The area is underlain by early and late Precambrian rocks.

Most passengers and freight enter the area by aeroplane from Yellowknife, which may be reached by regular plane from Edmonton, or by boat from Waterways, Alberta. Two transportation companies base aeroplanes for charter at Yellowknife, where prospecting parties can be adequately outfitted and supplied. A Government wireless station, Mining Recorder's office, hotel, post office, bank, and many other facilities are located at Yellowknife. In normal seasons boats and aircraft on floats can operate between Yellowknife and Waterways or Edmonton from about June 7 until about October 7, and aircraft on skis from about December 1 until April 15. Aircraft on floats can operate between Yellowknife and Ingray Lake area from about June 15 to about October 1.

Gold was discovered in the area by prospectors of Territories Exploration Company, Limited, in the summer and autumn of 1938, and one of these discoveries, on Indin (Wray) Lake, contained abundant visible gold. These discoveries became generally known in Yellowknife by about October and resulted in a rush to stake claims in the area during the winter of 1938-39. Some prospecting was done in the area in the spring and early summer of 1939, but very little during the latter part of the summer and during the summer of 1940.

The elevation of the area ranges from about 700 feet to about 1,350 feet above sea-level, and in many places hills rise abruptly more than 150 feet above adjacent lakes, rivers, and muskegs. The area is much more rugged than the country near and east of Yellowknife. A rugged area extending from Snare River, through Indin Lake and Indin River, to Mesa Lake is underlain by sediments and lavas, and in most places the lavas rise abruptly above the adjacent sediments and in part form flat-topped ridges. A region of moderate relief, underlain mainly by granite, lies between this area and a line extending north-northeast from Basler Lake, along Emile River to a point east of Castor Lake, and thence

to a point 7 miles west of the northeast corner of the map-area. Throughout most of its length this line is marked by a deep valley or by a steep escarpment that faces west, and in places the western edge of the granite area is about 350 feet above the bottom of the valley or escarpment. A strip of country marked by a series of prominent ridges and intervening lakes that trend north-northeast parallel to the strike of the underlying sedimentary rocks lies west of the valley or escarpment and is about 6 miles wide. Another particularly rugged area includes Rebesca Lake, Wopmay River, and Little Crapeau and Grant Lakes. The relief here exceeds 400 feet and many ridges trend north to northwest parallel to the trend of the underlying rocks.

Most large lakes in the map-area are underlain wholly or in part by sedimentary and volcanic rocks. Most areas that include numerous, small, irregular lakes are underlain by granite, but a few areas of numerous, small, elongated lakes are underlain by granite-gneiss. Bedrock is well exposed in most areas underlain by granite, but in many places probably 90 per cent of areas underlain by sedimentary and volcanic rocks are obscured by surface deposits. Rudely banded, silty clays occupy low areas from Rebesca Lake to the west border of the map-area and obscure bedrock over wide areas in that region. Most of the area north of latitude 64° 30′ and east of longitude 115° 30′ lies within the barren grounds, where much of the rock is covered with muskeg, drift, or lichens.

The area is well suited for travel by canoe, and in most places the best canoe routes are within or near areas of sedimentary and volcanic rocks. Emile River, and lakes along its course, afford an excellent route, with well-cut portages, from the south boundary of the area to a lake 12 miles south of the north boundary of the area, but are not readily navigable north of that lake. Wopmay River is a good canoe route except for the part north of Grant Lake. It connects, by way of Little Crapeau Lake, with a fair canoe route up Meuse River, to the north boundary of the area. Canoes may be taken from Wopmay River to Emile River through Rebesca Lake, a large lake south of Rebesca Lake, and Castor Lake, and may be taken from this route into Ingray Lake. A large part of the southeast corner of the map-area may be explored from Snare River and Indin Lake.

Most of the map-area is fairly well wooded and the most common trees are black spruce and white birch. A little white spruce occurs throughout the area and a little jack pine, aspen, and tamarack in the southern part of the area. The northeast corner of the area is in the barren grounds, but contains isolated patches of stunted black spruce and sufficient fuel can be found in parts of this area for temporary camps.

Fish and caribou are the only game that occur in sufficient quantities to form reliable sources of food. Fish are plentiful in many of the lakes and streams; pike, lake trout, and whitefish are the common varieties. Grayling are abundant in Wopmay River. The first herds of caribou seen in the area in 1940 were found in the barren grounds near Mesa Lake about the middle of August and were probably abundant in that vicinity for the remainder of the summer. No caribou were seen in timber during the field season, which ended September 29. They are reported to be numerous in parts of the timbered area during the winter. A few moose, black bear, spruce grouse, ptarmigan, and waterfowl were seen.

GENERAL GEOLOGY

TABLE OF FORMATIONS

Proterozoic

Gabbro and diabase
Feldspar porphyry and feldspar-quartz porphyry
Granite, granodiorite, and allied rocks
Snare group: andesite; meta-gabbro, meta-diabase; slate, argillite, cherty argillite, greywacke, quartzite, dolomite, arkose, conglomerate, knotted quartz-mica schist

Archæan

Granite, granodiorite, and allied rocks
Yellowknife group: greywacke, slate, arkose, quartzite, phyllite, knotted quartz-mica schist; andesite, dacite, basalt, rhyolite, tuff, breccia, agglomerate, amphibole and chlorite schist

Precambrian

Mixed assemblage of granitic and metamorphic rocks.

YELLOWKNIFE GROUP

The Yellowknife group of sedimentary and volcanic rocks is the oldest known group of rocks in the map-area. These rocks occur mostly near Snare River, Indin Lake, Indin River, and Mesa Lake, and none was found west of a line passing through Mattberry and Norris Lakes and thence to a point 7 miles west of the northeast corner of the area. The group comprises about one-third volcanic rocks and about two-thirds sedimentary rocks, and the volcanic rocks probably underlie the sedimentary rocks.

The volcanic rocks range from black, basaltic lavas through dark green, andesitic lavas (greenstones) to light grey, banded rhyolites. In places the basaltic lavas are probably the oldest and are overlain mainly by andesitic lavas, which in turn are overlain by more acid lavas, including rhyolite, accompanied by tuff, breccia, and agglomerate. Fine- to medium-grained, andesitic lavas are most widespread and in many places contain pillows, but in other places have been sheared to green amphibole and chlorite schists. Elsewhere they have been altered to massive, dark greenish grey rocks of dioritic texture made up of about equal parts of feldspar and amphibole.

The sedimentary rocks are mostly greywackes and slates, in places altered to phyllites, and in many places, particularly near granitic rocks, altered to knotted quartz-mica schists. They probably lie stratigraphically above the volcanic rocks, and in places appear to grade downwards through tuffaceous sediments to tuffs of the volcanic group. The greywackes are well-bedded, dark grey, sandy textured rocks that weather dark grey, greenish grey, or buff. The beds range in thickness from 6 inches to many feet. Many beds grade from coarse greywacke at the bottom to slate at the top. Slate beds are black and range in thickness up to a few inches. In many places greywacke, slate, and a little impure quartzite and arkose are interbedded. None of the beds are distinctive enough to form horizon markers. The knotted quartz-mica schists are

well-bedded and weather buff to rusty brown, and rounded or rectangular knots or nodules project above the weathered surface and range from a small fraction of an inch to several inches in length. Some of the knots are aggregates of quartz and mica and others are mainly andalusite, staurolite, or cordierite.

SNARE GROUP

Sedimentary and volcanic rocks of the Snare group unconformably overlie Archæan granite and the rocks of the Yellowknife group. They include all sedimentary and volcanic rocks west of a line through Basler and Norris Lakes, and a point 7 miles west of the northeast corner of the map-area.

The sedimentary rocks comprise thin-bedded, black argillite and slate, a little greywacke, white quartzite, and arkose, a few beds of conglomerate, massive, grey, buff-weathering dolomite, and altered equivalents of these rocks. In places the basal rocks are coarse-grained, white quartzite and arkose, and a few beds in these rocks contain abundant pebbles of vein quartz and pink granite. Where the Snare rocks overlie andesitic rocks of the Yellowknife group the basal beds are greywacke or altered greywacke and some beds contain pebbles, most of which are quartz and granite. Most pebbles in the basal beds range from ½ inch to 2 inches in diameter and are well rounded. Black argillite, slate, and greywacke are the most abundant rocks of the Snare group; most of the argillite and slate beds are less than ½ inch thick and most of the greywacke beds are less than 6 inches thick. A little white quartzite with a few conglomerate beds occurs throughout areas of these rocks, but most of it occurs near their eastern border. A little dolomite occurs at many places within these rocks, but most of it is confined to a band up to 1½ miles wide that lies parallel with, and close to, their eastern border. In most places the sedimentary rocks have been cut by Proterozoic granite and much of the slate, argillite, and greywacke has been altered to thin-bedded, light grey, quartz-mica schist or knotted quartz-mica schist. These schists occur 20 miles north-northeast of Norris Lake and in other places. These schistose rocks are very much like those of the Yellowknife group but have more gentle dips, are more thinly bedded, probably contain a greater proportion of white mica, and in places are associated with beds of dolomite or white quartzite. Near Wopmay River some slate and argillite beds have been altered to thin-banded, grey, green, and pink, cherty rocks.

Near Rebesca Lake, Wopmay River, and Little Crapeau and Grant Lakes, altered slates, argillites, and greywackes are cut by massive, coarse-grained, black to dark green meta-gabbro and and meta-diabase, and in places these intrusive rocks become finer grained and appear to grade into dark green, andesitic lavas that overlie slates, argillites, and greywackes. These lavas contain a few pillows, and in many places contain numerous, rounded amygdules that range up to one-half inch in diameter. In places the lavas are fresher than those of the Yellowknife group, but elsewhere lavas of the two groups are indistinguishable in hand specimens.

GRANITE, GRANODIORITE, AND ALLIED ROCKS

Archæan (early Precambrian) and Proterozoic (late Precambrian) granite, granodiorite, and allied rocks underlie about 75 per cent of the area, and rocks near granodiorite in composition are probably most common. Archæan granitic rocks cut the Yellowknife rocks, are overlain unconformably by the Snare rocks, and occur near the east side of Basler and Mattberry Lakes and perhaps elsewhere. Proterozoic granitic rocks cut Yellowknife and Snare rocks and in so far as known include all granitic rocks west of a line through Mattberry and Norris Lakes and thence to a point 7 miles west of the northeast corner of the map-area. The age of the granitic rocks is known only where the nature of their contact with Snare rocks was determined. A common variety of granitic rock is pink to grey, medium- to very coarse-grained, and contains white feldspar and phenocrysts of pink feldspar in about equal proportions, quartz, and a little biotite or amphibole. Elsewhere the granitic rock is pink, fine- to medium-grained, equigranular, and contains feldspar, quartz, and a little biotite or amphibole. A red phase of the granitic rocks occurs in places near Wopmay River and is a medium-grained, equigranular rock composed of about 60 per cent red feldspar and 40 per cent milky white quartz. Parts of the map-area are underlain by granitic gneiss.

MIXED ASSEMBLAGE OF GRANITIC AND METAMORPHIC ROCKS

Bodies of altered sedimentary and volcanic rock that include 25 to 75 per cent intimately associated granitic material are mapped as mixed assemblages of granitic and metamorphic rocks. Bodies of rock including more than 75 per cent granitic material are mapped as granite and bodies including less than 25 per cent granitic material are mapped as sedimentary or volcanic rock. In many places bodies of sedimentary and volcanic rocks are separated from bodies of granitic rocks by such mixed assemblages in zones up to 8 miles wide. In a few places no mixed rocks occur between granitic and sedimentary or volcanic rocks. Mixed rocks border areas of Yellowknife and Snare rocks, but are most extensive near the latter rocks. In most places mixed rocks are quartz-mica schist cut by dykes of granitic rock or are gneiss resulting from the intimate injection of quartz-mica schist by seams and lenses of granitic material. A rusty surface is common on these rocks. Mixed rocks include granitic material of Proterozoic (late Precambrian) age and probably some of Archæan (early Precambrian) age.

FELDSPAR PORPHYRY AND FELDSPAR-QUARTZ PORPHYRY

Feldspar porphyry and feldspar-quartz porphyry bodies of probable intrusive origin underlie a few small areas near the west border of the map-area, west of Grant, Little Crapeau, and Ingray Lakes. The porphyries are massive rocks that weather grey to reddish brown. They contain rounded to rectangular phenocrysts of altered feldspar, and in places a few phenocrysts of clear quartz in a very fine-grained to flinty groundmass. In places the groundmass is visibly crystalline and the porphyries appear to grade into porphyritic granitic rocks of probable Proterozoic (late Precambrian) age,

and in those places the porphyries and granitic rocks may be of about the same age. Most of the porphyry bodies occur near sedimentary or volcanic rocks and they may, in part at least, represent border phases of the granitic rocks that cut these sedimentary and volcanic rocks.

GABBRO AND DIABASE

The youngest rocks in the area are brown weathering, medium-grained, fresh, black gabbro and diabase. In most places they occur as vertical or nearly vertical dykes. Other dykes dip at low angles or are horizontal, and east of Rebesca Lake and between Castor and Ingray Lakes cap areas that range up to 2½ miles wide. The thickness of the dykes ranges from less than 1 foot to more than 200 feet. The maximum thickness of the gently dipping dykes may be greater than this, but this is not known because in many places the dip is not known.

STRUCTURAL GEOLOGY

Rocks of the Yellowknife group commonly strike between north and northeast and dip steeper than 65 degrees. In many places the strike is nearly parallel to the border of the enclosing granitic rocks. The sediments occur as a series of tight, nearly isoclinal folds and the volcanic rocks, which probably underlie the sedimentary rocks, outcrop in bands some of which may be the central parts of complex anticlines. No structural discordance is known to occur between the volcanic and sedimentary rocks. Near Indin Lake the rocks are cut by many faults, most of which trend about northwest.

Snare rocks dipping steeply west are in contact with Yellowknife rocks and granite along a line between Basler Lake and a point 7 miles west of the northeast corner of the area. In places the contact is unconformable, but in other places may be a fault contact. Snare rocks are less tightly folded than those of the Yellowknife group and their dips range from vertical to nearly horizontal, but are commonly less than 45 degrees. Most areas of these rocks are elongated basins in granite and many of the basins trend between north-northeast and northwest, as do the rocks within them.

Many faults have been recognized in the area. They are marked by nearly straight topographic features such as rivers, lakes, valleys, scarps, or large quartz veins, and in most places are covered by drift or water. Straight topographic features are common elsewhere in the area and some of them may mark other faults. Faults have been mapped only where geological features are offset or are inferred to be offset. A fault probably offsets a diabase dyke west of Rebesca Lake, so some faulting is probably younger than the diabase and hence younger than all consolidated rocks in the area. On the other hand a dyke of similar diabase near Indin Lake was probably injected along a fault, so some faulting is probably older than the diabase. Faults trend northwest, north, and east-northeast. The northeast side of northwest trending faults is displaced northwest relative to the southwest side and the maximum displacement noted is about 3 miles. The northwest side of faults that trend east-northeast is displaced northeast relative to the southeast side and the maximum displacement noted is about

3 miles. Faults that trend northwest cut Yellowknife rocks and granite and faults that trend north and east-northeast cut Yellowknife and Snare rocks and granite.

ECONOMIC GEOLOGY

MINERAL DEPOSITS

Dingo Group

The Dingo group is owned by Mercury Gold Mines, Limited, and includes about twenty-four claims located about 2 miles east of, and about 350 feet above, Arseno Lake. The claims were staked by J. D. Mason in July 1939. They have been explored by more than one hundred pits and trenches, most of which are on claims Dingo 2, 3, 4, 12, and 15. Probably more than 85 per cent of bedrock in the vicinity is covered by drift or muskeg. A few men were employed on the property during the summers of 1939 and 1940 and the company plans to continue exploration during the winter of 1940-41.

The following description is mainly from a report[1] by C. S. Lord, and is based on an examination made in 1939.

The rock near the principal known quartz veins is mostly fractured and sheared greenstone of the Yellowknife group; much of it is fine-grained, but some of it has a medium-grained, dioritic texture. The dip and strike of the greenstone is not known. Granite outcrops about ½ mile east of the principal veins and cuts the greenstone. A few dyke-like bodies of feldspar porphyry occur in the greenstone near the veins, trend about northwest, and may average 20 feet wide.

Many narrow quartz veins occur on the claims; most are in shear zones and some contain gold. Most of the shear zones are in greenstone, but some[2] may be in or along the walls of feldspar porphyry bodies. Most of the shear zones and veins strike about north 40 degrees west and dip 70 to 85 degrees northeast. Those on which most work has been done lie within a rectangle about 4,200 feet long from northwest to southeast and about 2,000 feet wide. One vein is traced for 850 feet and may be longer. Many other veins have been traced for shorter distances, but because of heavy overburden, none has been thoroughly explored. The exposed parts of most veins are between 6 inches and 5 feet wide and may average 2 feet. In most places the quartz has sharp walls against the enclosing greenstone or chloritic schist. In many places metallic minerals constitute a few per cent of a quartz vein, but locally they constitute more than 30 per cent of a vein. The following minerals were seen in quartz and are abundant in places: pyrite, pyrrhotite, chalcopyrite, galena, and sphalerite. Smaller quantities of the following minerals also occur in quartz: native copper, gold, pale violet fluorite, and a soft, fibrous, grey, metallic mineral that contains bismuth, sulphur, and possibly other constituents.

Most work has been done on a vein known as the Galena vein, which is on Dingo 4 claim. This vein is traced about 850 feet by nineteen

[1] Lord, C. S.: Mineral Industry of Northwest Territories; Geol. Surv., Canada, Memoir in press.
[2] Mason, J. D.: Personal communication.

trenches and it strikes north 40 degrees west and dips 80 degrees northeast. At the southeast end of the trenches the vein passes under muskeg that borders a lake. The vein is in a shear zone in greenstone. The shear zone ranges from 2 to 6 feet wide and may branch in places. The width of the quartz vein ranges from 1 to 4½ feet and averages about 2½ feet. The vein branches in places. In the most northerly trench the shear is 6 feet wide and encloses 2½ feet of quartz in two veins. The vein is 1 foot wide in the most southerly trench. In many places the walls of the vein are sharp and free, but in some places the vein grades into the enclosing schist through a few inches of schist and quartz stringers. The quartz is milky white and contains pyrite, pyrrhotite, chalcopyrite, galena, sphalerite, gold, and native copper, and many irregular inclusions of chloritic schist. In many places metallic minerals constitute less than 1 per cent of the vein, but in one trench they constitute about 30 per cent of the vein. A sample across 2 feet of vein in this trench is reported to have contained: gold, 0·99 ounce a ton; silver, 5·50 ounces a ton. Fourteen samples from 825 feet of vein are reported to have averaged 0·25 ounce of gold a ton over an average width of about 2½ feet.

Midas Group

The following description is from notes by J. T. Wilson.

The Midas group of claims was staked by Victor Stevens and Malcolm Norris near the north end of Norris Lake, in July 1938. Eleven pits and trenches have been cut in rock on the south side of a bay that forms the northeast corner of the lake and are arranged to crosscut at intervals a rectangular area that extends about 325 feet along a line trending south 20 degrees west. This explored area is about 55 feet wide and the northern end is about 80 feet south of the bay of Norris Lake. The corner common to claims Midas 3, 4, 5, and 6 lies within the explored area. No work was done on the group in 1940. The country rock is rusty weathering, black slate of the Snare group. The slate cleaves along planes commonly spaced less than ¼ inch apart and the cleavage planes range in trend from north to north 60 degrees east and range in dip from 40 to 75 degrees west. Many cleavage planes are stained with iron oxide or contain seams of earthy iron oxide.

The four northern trenches and pits lie from 80 to 180 feet south of the lake, and expose undisturbed slate cut by a few quartz stringers about 1 inch wide and a seam of rusty gouge about 18 inches wide. The quartz contains a little galena and pyrite in places.

Metallic minerals are most plentiful in the next three trenches, which lie from 220 to 320 feet south of the lake. These trenches expose bands of undisturbed slate, and bands of loose, sheared, rusty slate with thin gouge seams. Quartz veins and lenses occur parallel to the cleavage in the undisturbed and in the sheared slate, but are most plentiful in the latter. The veins are commonly about 1 inch wide, but range up to 18 inches wide. Most quartz is white and sugary and some contains fragments of slate. Quartz is probably most plentiful in the northern trench, where it constitutes about 30 per cent of the rock over a width of 25 feet. Metallic minerals are plentiful in places and occur in quartz and slate. Galena is most plentiful and sphalerite, pyrite, and arsenopyrite occur in smaller quantities. No gold was seen.

The four southern trenches are from 370 to 405 feet south of the lake. Much of the rock exposed here is undisturbed slate, but a little is sheared slate and quartz. Quartz occurs in seams and lenses up to 2 feet wide and constitutes about 10 per cent of the exposed rock. Gouge seams occur in a few places and there is a little chalcopyrite.

A picked sample of quartz, arsenopyrite, galena, sphalerite, pyrite, and chalcopyrite taken from the most heavily mineralized parts of most of the trenches contained[1]: gold, 0·07 ounce a ton; silver, 0·73 ounce a ton.

Pa Group

The Pa group of claims is on the north shore of Indin Lake about 8 miles east of the west end of the lake. The claims were staked for Territories Exploration Company, Limited, in August 1938. Most work has been done on the Brown veins of gold-bearing quartz; no work was being done on these veins when visited in August 1939 and no work was done on them in 1940. Pa 1 claim adjoins Pa 2 claim on the north and the veins cross the boundary between these claims about 15 feet from the west side of the claims.

The rock near the west side of Pa 1 and Pa 2 claims is soft, fissile, grey, sericite-carbonate-chlorite schist that is an altered volcanic rock of the Yellowknife group. The foliation strikes about north 10 degrees east and the dip ranges from 75 degrees east to vertical. These rocks are probably cut by a fault that strikes north 35 degrees west. It lies beneath a channel in Indin Lake and the channel trends about parallel to the fault and is about 1,200 feet wide. The veins outcrop on the north side of the channel, strike towards the fault, and pass beneath the channel. The exact position of the fault is not known, but it is probably near the north shore of the channel. The relative age of the fault and veins is not known. The nearest granite outcrops about 5 miles northwest of the Brown veins and cuts rocks of the Yellowknife group.

The Brown veins comprise two parallel quartz veins that are separated by about 12 feet of schist, trend about north 10 degrees east, and dip between 75 degrees east and vertical. They are nearly parallel to the foliation of the enclosing schist, but in places may cross the foliation at very small angles. The east vein is stripped for 145 feet and the width of the exposed part of the vein ranges from 1 foot to 5½ feet and averages 2½ feet. At the south end of the stripped part the vein passes under Indin Lake. At the north end of the stripped part the vein ends on the surface, but the end of the vein plunges north beneath the schist. A lens of quartz about 27 feet long and up to 2½ feet wide outcrops on the strike of the east vein and about 110 feet north of it. No gold or other metallic minerals were seen in the lens. No quartz or shear zone is known to occur north of the lens or between the lens and the east Brown vein. The west vein is stripped for 145 feet and throughout most of this length its width ranges from 6 inches to 3½ feet and averages 1½ feet. At the south end of the stripped part the vein tapers to a point and may end at the edge of the lake. At the north end of the stripped part the vein passes under drift and probably ends a few feet beyond. The east and west veins are broken into three approximately equal lengths by two faults. These faults are nearly vertical cracks and trend about northwest; the veins on the north side

[1]Assay by Bureau of Mines, Department of Mines and Resources, Ottawa.

of each fault are offset about 4 feet northwest relative to the veins on the south side. The walls of the veins are sharp and in many places are bordered by about 3 inches to 2 feet of rusty schist. Most of the quartz in the veins is well-fractured and grey and includes a few seams of schist, which are parallel to the walls. Some quartz is white and vuggy and contains an iron-bearing carbonate. The white quartz occurs as veinlets and irregular masses; some is separated from the grey quartz by sharp walls and some appears to grade into the grey quartz. Locally the grey and white quartz occurs in about equal quantities. Metallic minerals constitute less than 1 per cent of the veins and include pyrite, arsenopyrite, chalcopyrite, pyrrhotite (?), and gold. Visible gold occurs in both types of quartz, but is probably most common in the grey quartz. Fifty feet of the east vein is reported[1] to average 35 inches wide and to contain 1·42 ounces of gold a ton. No underground work has been done on the veins.

Ann Group

The Ann group of claims is on the east shore of Indin Lake and about 8 miles north-northeast of the outlet of the lake. The claims were staked for Territories Exploration Company, Limited, September 11, 1938. Most work was done on the Barker vein, which was explored by nine trenches. About 1,600 pounds of selected ore from the vein, containing about 83 fine ounces of gold, was sent to Yellowknife by aeroplane for treatment. In so far as is known no ore remains in the vein. No work was done on the vein in the summer of 1939, or in 1940.

The rock near the vein is mostly massive, dark green, andesitic lava (greenstone) of the Yellowknife group and much of it is uniformly fine-grained, but some of it contains a few white phenocrysts or amygdules that range up to ½ inch across. The strike and dip of the lavas is not known. Feldspar-quartz porphyry cuts the lavas and outcrops 50 feet east of the vein and in several places about 225 feet northeast of the vein. A granite body about ½ mile in diameter outcrops 2 miles southwest of the vein and another body about 2½ miles in diameter outcrops 5½ miles southeast of the vein. A fault cuts the lavas about ¼ mile west of the vein and strikes north 10 degrees west.

The Barker vein is on Ann 10 claim and about ¼ mile east of Indin Lake. Most rock near the vein is covered with drift, muskeg, or moss. The vein is 40 feet long at the surface, strikes north 25 degrees west, and dips 50 degrees east. It is about 1 foot wide near the south end and gradually widens towards the north, and the northern half of the vein ranges from 3 to 6 feet wide and ends abruptly in soft, grey, flaky schist. In places the rock next the walls of the vein is strongly sheared for about 1 foot. The outcrop of the vein ended to the south against a fissure that strikes north 35 degrees west and dips 70 degrees southwest. The fissure contains a few inches of sheeted rock and gouge and may be a fault. The vein and fissure met along a line that plunged about 35 degrees southeasterly and a pipe-like body of ore with abundant coarse gold occurred along this intersection. The pipe-like body was about 1 foot in diameter and was followed down the intersection of the vein and fissure for about 10 feet and ended at the intersection of the fissure and a vertical fracture that strikes north 75 degrees west. All ore shipped from the vein came

[1] Johnston, A. W.: Personal communication.

from this body. The vein is not known to have been located south of the fissure or south of the vertical fracture. The vein material is a mixture of grey and white quartz, black and white, coarse-grained carbonate, fine-grained, white carbonate, and irregular fragments of chloritic wall-rock. Carbonate and quartz are present in about equal proportions and the carbonate is probably calcite. Metallic minerals may constitute 2 per cent of the vein material; chalcopyrite is most plentiful and there is some galena, sphalerite, pyrite, arsenopyrite, and gold. A little cobalt bloom is reported[1] to have occurred at the surface. Practically all known gold occurred in the pipe-like ore shoot at the south end of the vein and the gangue in this shoot was mostly carbonate. Most of the gold is reported[1] to have occurred in the fine-grained carbonate.

PROSPECTING NOTES

Most prospecting in Ingray Lake area has been done in areas underlain by rocks of the Yellowknife group; several gold deposits are known to occur within these areas and other gold deposits are reported to occur there. A little prospecting has been done in areas underlain by rocks of the Snare group and in so far as is known only one gold deposit and a few deposits of other metals have been found in these rocks.

Nearly all known gold deposits north of Great Slave Lake are in quartz veins within rocks of the Yellowknife group, and bodies of ore or near-ore occur in quartz veins within greenstones, knotted schists and gneisses ("hot sediments"), and fresh greywackes and slates ("cool sediments") of this group. Prospectors should, therefore, pay particular attention to the 750 square miles of Ingray Lake map-area underlain by rocks of the Yellowknife group and should examine them regardless of their composition or degree of metamorphism. All quartz bodies in these rocks should be carefully examined, irrespective of their colour, texture, form, or content of sulphide minerals because none of these features is known to be a reliable indicator of the gold content of veins over large areas. Bodies of gold-bearing quartz should be searched for along faults, shear zones, drag-folds, crests and troughs of tight folds, or in weak, slaty beds that have been squeezed between stronger beds of greywacke. Richest specimens of gold-bearing quartz from Ingray Lake map-area came from two deposits in andesite (greenstone) near faults. Probably most deposits of gold-bearing quartz have been found where known faults are most numerous in Yellowknife rocks, i.e., near a line corresponding approximately with longitude 115°14′ and extending from near the south boundary of the area to near latitude 64°30′. A greater proportion of Yellowknife rocks are covered by drift and muskeg in Ingray Lake area than in Beaulieu River and Yellowknife Bay areas near Great Slave Lake. Drift and muskeg are particularly widespread over Yellowknife rocks in the barren grounds.

Although rocks of the Snare group are known to contain only one gold deposit, they are cut by granite and may contain other deposits of gold or other metals. They contain seams of pyrite in many places and over wide areas the surface is rusty. They are cut by many quartz veins and in places in Ingray Lake area, and in Snare River area, which adjoins it on the south,

[1] Johnston, A. W.: Personal communication.

contain small deposits of galena, sphalerite, pyrite, and chalcopyrite in quartz or in slate. Altered Snare rocks near Rebesca Lake, Wopmay River, and Little Crapeau and Grant Lakes are in part lithologically similar to altered sedimentary and volcanic rocks between Echo Bay (Great Bear Lake) and Beaverlodge Lake, where deposits of pitchblende and silver occur. Similar deposits might occur in Ingray Lake area.