

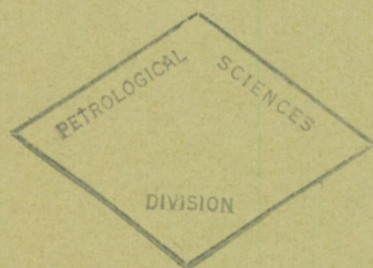
GEOLOGICAL
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DEPARTMENT OF MINES
AND TECHNICAL SURVEYS

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MINERAL INDUSTRY OF
DISTRICT OF MACKENZIE,



1962

W. R. A. Baragar and E. H. Hornbrook



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MINERAL INDUSTRY OF DISTRICT OF MACKENZIE, 1962

INTRODUCTION

This paper, like its predecessors of the past two years, is composed mainly of reports based on visits to properties by the writers in the course of the year. An attempt was made to visit all properties on which a significant amount of work was being done. Visits to properties were greatly facilitated by the generous cooperation of owners and their representatives. The writers are grateful for the many kindnesses shown them on all occasions.

TRANSPORTATION

Yellowknife is linked to Edmonton by an all-weather gravel road that passes around the west side of Great Slave Lake and joins the Mackenzie highway at Enterprise, about 28 miles south of Hay River. The Mackenzie River is crossed near Fort Providence where a government ferry is in service during the summer and an ice bridge during the winter. Traffic is suspended for periods of 4 to 6 weeks at break-up and freeze-up. This year it was suspended between about April 25 and May 30 but at the time of writing (November 5) had not yet been halted for freeze-up. At these times freight is carried from Hay River to Yellowknife by aircraft.

Most of the freight brought to Yellowknife is now transported by truck although bus, aircraft, and barge provide alternative services. A comparison of the cost of shipping by the different methods is as follows:

Trucking (Edmonton to Yellowknife)

Class	1	2	3	4	5
Cost (dollars per 100 lb)..	6.03	5.11	4.24	3.55	3.00

Bus (express, Edmonton to Yellowknife)

Pounds	0-5	5-10	10-20	20-30	30-40	
Rate	\$ 1.35	1.50	2.40	2.70	3.45	
Pounds	40-50	50-60	60-70	70-80	80-90	90-100
Rate	\$ 4.20	4.80	5.75	6.80	7.85	9.00

Barge (Waterways to Yellowknife)

Class 5 (general cargo)	\$1.75 per 100 lb
Heavy weights 2,000 - 10,000 lb .	110 per cent of class 5
10,000 and up	120 per cent of class 5

Air Cargo (daily scheduled service)

Pounds	Edmonton to Yellowknife	Yellowknife to Edmonton
Less than 100	\$.18/lb	\$.09/lb
100 to 1,800	14.97/100 lb	7.65/100 lb
1,800 to 3,000	13.02/100 lb	6.65/100 lb
More than 3,000 ...	11.53/100 lb	5.89/100 lb

Six charter airline companies provide a wide range of aircraft to service outlying points.

A pioneer-type, all-weather road east of Yellowknife was opened this spring with the completion of a steel bridge across Yellowknife River at the head of Yellowknife Bay. The road is 20 miles long and passes just south of Prosperous and Prelude Lakes. It was built with a 15-foot shoulder-to-shoulder width and a maximum grade of 8 or 10 per cent, but by fall a program to widen the road to 24 feet was already under way. An additional 60 miles of right-of-way has been cleared and road-construction in this section is expected to follow shortly. The course of the proposed road passes the south end of Ross Lake and reaches Beaulieu River near latitude 63°00'N.

Freighting by trucks on primitive winter roads, first started 2 years ago, continued to service Discovery and Taurcanis mines last winter and was extended to include Camlaren mine on Gordon Lake where preparation for mining was under way. Ore stock-piled at Camlaren this summer is to be shipped to Discovery when the trucking season commences. Last winter such roads were serviceable between about February 1 and late April.

GENERAL PROSPECTING

Reorganization of the mining districts of the Northwest Territories took place during the year. Effective April 1 the former Yellowknife Mining District was eliminated, the boundaries of the Mackenzie and Arctic and Hudson Bay Mining Districts were redrawn, and a new mining district, the Nahanni, was created in the southwest corner of the former Mackenzie Mining District. Details of the new boundaries are given in the Canada Gazette (1962) but are roughly as follows: the Nahanni Mining District is bounded on the north by the Canol road, on the east by Mackenzie River, and on the south and west by the boundaries of British Columbia and Yukon Territory; the new Mackenzie Mining District, bounded on the east by an irregular line formed mainly by the courses of Dubawnt, Clarke, Hanbury, Baillie, and Back Rivers, occupies remaining areas of the Mackenzie and included parts of Keewatin Districts and contains in addition Victoria, Banks, Stefansson, and King William Islands.

Claim applications received for recording between November 1, 1961, and April 30, 1962, totalled 579 in the Yellowknife Mining District and 376 in the Mackenzie Mining District. Following reorganization of the districts, claim applications received for recording in the new Mackenzie Mining District to November 1, 1962, totalled 2,820 and in the Nahanni Mining District during the same period, 58. In addition, 7 prospect permit areas were taken out in this region by three companies as follows (N.T.S. system): Canadian Nickel Company— 76 E/10, 76 E/12, 76 E/15; Canada Tungsten Mining Corporation Limited— 95 E/12; and Redstone Mines Limited— 95 L/10, 95 L/15, 95 M/2.

Gold occurrences in the Contwoyto Lake area where Canadian Nickel Company had staked 296 claims last summer were a source of major interest this year. During the winter adjoining ground was staked by a number of companies and individuals, notably the Big Four Syndicate, the Earl-Jack Syndicate, Conwest Exploration Company Limited, and an independent group known as the 'Eskimo Syndicate'. In April, Canadian Nickel Company was awarded prospecting permits for areas adjoining those in which its major block of claims is located. In early May the company started work on its properties. Three drills were in use throughout the summer and some 70 men were employed. Other companies began work as soon as snow conditions permitted and, as the season progressed and more information on the geology, occurrence, and extent of the gold deposits became known, interest intensified and finally culminated in a minor staking rush in July. In addition to companies already named, participants included Giant Yellowknife Mines Limited, Hugh Roberts Mining Company, Prospectors Airways Company Limited, New Athona Mines Limited, North Goldcrest Mines Limited, and several individuals. By October 31 a total of 1,898 claims had been staked in map-areas 76 E/11, 76 E/14, 76 E/6, and 76 E/5; most of these are in the first two map-areas. Work performed by the various owners ranged from reconnaissance of properties to comprehensive mapping, and geo-physical, and drilling programs. Falconbridge Nickel Mines Limited, New Athona Mines Limited, the Big Four Syndicate, and a group comprising Gunnex Mines Limited, Amalgamated Larder Mines Limited, Rayrock Mines Limited, and Faraday Uranium Mines Limited all did some drilling on their properties. Near the end of the field season exploration seemed to spread laterally from Contwoyto Lake. In October Falconbridge Nickel Mines Limited recorded 97 claims staked at Regan Lake about 120 miles southeast of their property at Contwoyto Lake. These included gold prospects formerly held by Algood Gold Mines Limited (Lord, 1951, pp. 68-70)¹. In the same month Canadian Nickel Company recorded 424 claims staked in the Itchen Lake area about 50 miles southwest of the scene of activity at Contwoyto Lake.

¹Names and/or dates in parentheses refer to publications listed in the References.

Copper-silver discoveries made last summer by the Nahanni Sixty Syndicate near the head of Redstone River in Mackenzie Mountains were followed up this summer by a newly-organized company, Redstone Mines Limited. Three prospecting permit areas covering most of the known prospects were awarded the company this spring, and during the summer these were vigorously explored and mapped by helicopter-supported parties from a base camp at Dal Lake. Further discoveries of a similar nature were made and known deposits were trenched and sampled. The McBean showing on staked ground a few miles south of the southernmost permit area (95 L/10) was drilled early in the summer. Seventeen drill holes aggregating 2,080 feet were completed. The ore minerals are primarily pyrite and zinc minerals in contrast with the tetrahedrite-chalcopyrite mineralization characteristic of most of the other prospects.

Underground workings at the Camlaren property on Gordon Lake were reopened in the spring by Consolidated Discovery Yellowknife Mines Limited. The company, in agreement with the owners of the property, Mining Corporation of Canada Limited, planned to mine out ore shoots above the 350-foot level and during the winter to truck the stockpiled ore about 45 miles to the Discovery mill. By October 7 about 7,000 tons of ore containing slightly more than 1 ounce of gold a ton had been stockpiled on the surface. Possibly with a similar project in view, Consolidated Discovery Yellowknife Mines Limited optioned the W.T. claims about 14 miles south of Camlaren, and in July and August completed 1,206 feet of diamond-drilling on the property. Sixteen holes were drilled into No. 1 Zone (Baragar, 1962, pp. 35-36). The claims are part of the former S.D.C. property of Dome Mines Limited near Dome Lake. They are currently held by Walter Ternowski of Yellowknife. Last year the showings were resampled by Giant Yellowknife Mines Limited and No. 1 Zone was estimated to contain 559 tons per vertical foot, containing about 0.25 ounce of gold a ton. A higher-grade shoot within the deposit was indicated and this year's work by the Consolidated Discovery Company was undertaken to provide further information on this shoot.

North Goldcrest Mines Limited optioned a five-claim property on Easter Island in the East Arm of Great Slave Lake from Frank Morrison of Yellowknife, and in May and June carried out a program of drilling and sampling. The object of the work was to test nickel-copper-bearing zones in a dyke of intermediate composition that outcrops for a length of about 16 miles on Simpson and Easter Islands. Claims belonging to North Goldcrest Mines Limited and associated companies cover most of the remaining length of dyke. Six diamond-drill holes were completed and a number of trenches and pits were sampled. The option was later relinquished.

Gunnar Mining Limited have maintained prospecting parties in the Mackenzie District for the last two summers. In May they recorded 16 claims staked on an old gold prospect just east of Spencer Lake in the Carp Lakes area. Between July and October they recorded an additional 135 claims staked along Rutledge Lake south of

the East Arm of Great Slave Lake.

A new copper-lead-zinc prospect at Thubin Lake was staked this summer by Frank Avery of Yellowknife (DIK group). A number of pits and trenches were excavated on the mineralized zone and a few samples taken.

Diamond-drilling was conducted during the summer on the Pearl group of claims on the south shore of Great Slave Lake about 65 miles east of Fort Resolution. The property contains copper and copper-lead-zinc prospects and is owned by Fred Diamion of Hay River.

Consolidated Mining and Smelting Company of Canada Limited began drilling at Pine Point in July and continued for the rest of the summer. The exploration branch of the company maintained one or more prospecting parties in the District of Mackenzie this summer and in September recorded 114 claims staked along Back River about 12 miles southwest of Regan Lake. The discoveries are rumoured to be gold occurrences in acid volcanic rocks.

Crest Exploration Limited, a subsidiary of Standard Oil of California, recorded 369 claims in July, staked along the Yukon boundary, approximately at latitude $65^{\circ}15'$. The claims adjoin a much larger block in Yukon Territory and the properties together cover the much-publicized iron discovery of the Snake River area.

A new copper prospect in the vicinity of Tommie Lake in the Lever Lake area was revealed this summer by the work of S. Yanik and J. Price, and the resulting Measin group of twelve claims was recorded in October.

Work continued through the summer on the H.M. group of claims at Hidden Lake. The property contains a gold prospect on which a 75-foot shaft has been sunk. During the latter part of the summer a drift was driven south along the bottom of the vein for a distance of about 50 feet. Virtually all the work is being done by J. Herriman and C. McChesney and they expect to continue through the winter.

Other prospecting in the district this year was carried out by Giant Yellowknife Mines Limited, Earl-Jack Syndicate, Kerr Addison Gold Mines Limited, and private prospectors. Several parties of both private and company-sponsored prospectors benefited from the new prospectors' assistance program. Twelve parties were initially approved for assistance and nine entered the field under the terms of the program. A few companies not directly engaged in prospecting in the district had representatives there to examine prospects. These included Prospectors Airways Company Limited, and the Hugh Roberts Mining Company (managed by W.S. Moore Company).

DESCRIPTION OF PROPERTIES

BAIRN GROUP

The Bairn group of ten claims is on the south side of Murray Lake ($63^{\circ}1/2'N$, $113^{\circ}24'W$) about 48 miles northeast of Yellowknife. The property is the former Pan group of Consolidated Mining and Smelting Company and most of the work presently evident in the claims area was performed by that company, between 1937 and 1940. The claims were restaked as the Bairn Group by Alex Mitchell of Yellowknife in May 1957 and in November 1961, as the Pan claims lapsed. Trenches on some of the showings have since been reopened and extended. The writers visited the property on September 21, 1962.

The geology of the Pan group was described by Lord (1951, pp.227-229) and the following account includes only the showings on which new work has been done.

The Bairn group is underlain by greywackes and slates of the Yellowknife Group tightly folded along northwest trending axial planes. They are just outside the knotted schist zone that surrounds the Prelude Lake - Duncan Lake granite bodies and in outcrop show little or no evidence of metamorphism. Several large diabase dykes with north to northwesterly trends cross the property.

In many parts of the property the sedimentary rocks contain abundant quartz bodies ranging from well-defined veins some tens of feet long to nests of irregular quartz masses from a few inches to several feet across. Numerous trenches surviving from the early Cominco work mark the many quartz-bearing zones on the property and testify to the vigour with which the initial exploration work was carried out. More than 20 zones were investigated by the Consolidated Company and Lord reports that more than 110 pits and trenches had been excavated up to the time work stopped in 1939. The following descriptions use the Cominco zone designations.

Zone 5 is on claim Bairn 4 approximately 500 feet south-east of the northwest corner of the claim. A discontinuous quartz vein occupying a north-south fracture has been traced through three trenches for a total length of 140 feet. The northern trench crosses the fracture zone and exposes about $1\frac{1}{2}$ feet of rusty-weathering slate and quartz. The other trenches have been excavated along the vein. The middle trench extends from 22 to 43 feet south of the north trench and exposes a single quartz vein that ranges from 14 to 20 inches wide. The southern trench is continuous from 65 to 140 feet south of the northern trench and exposes two lengths of quartz vein separated near the mid-point of the trench by about 10 feet of barren fracture zone. In this trench the quartz vein ranges in width from 3 inches to 3 feet but averages about 1 to $1\frac{1}{2}$ feet. The vein has a constant dip of about $70^{\circ}W$. These three trenches are part of the recent work done on the property; three older trenches, two of which cross the projected strike of the vein, lie within

50 feet of the south end of the southern trench. They are now largely overgrown but former assay results give no indication that the vein continues through them. North of the north trench the vein abuts a thick diabase dyke that crosses its projected trend with a strike of about N15°W.

Bedding in the vicinity of the vein strikes generally northwesterly and dips steeply northeast. However, on the west side of the vein the bedding swings south as the vein is approached and in the wall-rock immediately adjoining, parallels it. Bedding on the east side is truncated by the vein. Probably, therefore, the vein occupies a fault that was originally partly bedding and partly transverse in character. Subsequent movement along the fault can be interpreted as bringing the wall-rock characteristic of each part into opposing position.

Vein material is composed of grey quartz and white milky quartz containing generally less than 1 or 2 per cent metallic minerals. In approximate order of abundance these are: pyrrhotite, pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, and gold. Visible gold was found in two places in the southern trench, 4 and 55 feet from the north end, and at the south end of the middle trench. It occurs in grey quartz closely associated with pyrrhotite.

Zone 6 is near the mid-point of the west boundary of claim Bairn 4. Possibly a dozen old trenches are clustered about the showing. Many are caved and overgrown but most seem to have been excavated on individual quartz bodies rather than on a continuous vein zone. Recent work has been confined to two trenches.

Greywackes and slates in the vicinity of the recent trenches strike generally northwest and dip 75 to 80°NE. Lord reported (1951, p. 228) that gold-bearing quartz bodies lie between adjacent anticlinal axes 175 feet apart and are probably close to the axial plane of the syncline. Presumably one of the recent trenches has been excavated on one of the quartz bodies referred to.

The main trench exposes a large irregular quartz body, 20 feet by a maximum of 8 feet, that crosses the bedding in a roughly northeasterly direction. At its western end the quartz body swings into a bedding plane and continues as a vein for an exposed distance of about 20 feet. Near the south end of the trench, visible gold is found in grey quartz in association with pyrrhotite. Other metallic minerals include pyrite, chalcopyrite, and arsenopyrite. The large bulbous mass of quartz at the north end was largely under water at the time of the writers' visit and was not examined.

The second trench is a shallow east-west trench about 20 feet northwest of the main trench. It exposes a narrow bedding vein of grey-black quartz containing about 2 per cent pyrite and pyrrhotite. No gold was observed.

Zone 7 is on claim Bairn 7 about 900 feet due south of Zone 6. It has been fully described by Lord but as work has been performed since his account was written a review may be desirable. The zone comprises three veins that cut across the middle limb of a double fold in greywacke and slates. Following is the description given by Lord (1951, p. 229):

The slate and greywacke trends about northwest and dips nearly vertically, and many beds are less than 4 inches thick. The axial plane of a syncline is southwest of the veins and trends northwest. The axial plane of an anticline northeast of the veins and about 200 feet from the axial plane of the syncline strikes about northwest in most places, but north of the veins the plane may have been warped and may strike about west-southwest for about 50 feet parallel with the adjacent beds. The quartz occurs about midway between the axial planes as three veins, designated, from west to east, A, B, and C. Vein A is exposed for 35 feet, trends east, and averages about 1 foot wide. It is nearly vertical and has sharp, sinuous, and unsheared walls. It passes under drift at the west end and may end to the east against a zone of sheared rock that is 7 feet wide and trends north and separates vein A from the west end of vein B. Vein B strikes about east for 50 feet from this shear zone, then strikes about northeast for 35 feet and enters a trench that was filled with water when examined. The vein dips about 80 degrees north and the walls are sinuous and sharp and in places are slightly sheared so that the quartz parts from the wall-rock. The northwest end of the outcrop of vein C is about 27 feet northeast of the east end of vein B. Vein C strikes about southeast and averages about 1 foot wide for a length of 37 feet, but veinlets branch from the main vein at many places throughout this length. Southeast of this 37-foot section the vein branches and ends. The northwest end of the 37-foot section passes under drift. Most quartz in veins A, B, and C is fine grained and grey and contains a little white weathered feldspar and a very little pyrite. No gold was seen in the quartz, but gold is reported to occur in many places in veins A and B and to be plentiful in some places. Vein C is cut in one place by a veinlet of coarse-grained, glassy quartz 3 inches wide, which contains plentiful white weathered feldspar. In many places the wall-rock is cut by a multitude of quartz veinlets, but so far as known these do not contain appreciable quantities of gold.

In 1940 a prospect shaft was sunk to a depth of 30 feet on vein B at approximately the point where the vein swings from east to northeast. This is presently filled with water. Recently a trench has been blasted along veins A and B from the prospect shaft westward. This trench was closely examined.

Veins A and B west of the shaft follow an extremely sinuous course in detail but in general adhere to a constant east-west strike and steep northerly dip. Individual crenulations have amplitudes that range from a few inches to about 8 feet and they pitch about 75°E.

Mostly the veins range in width from about 2 to 12 inches but probably average about 8 to 10 inches. Locally they thicken into irregular masses 2 to 3 feet across. The quartz contains less than 1 or 2 per cent metallic minerals. Pyrrhotite, pyrite, arsenopyrite, galena, sphalerite, and gold were observed in approximately this order of abundance. A number of specks of gold were seen in vein B about 30 feet west of the shaft and one particle in vein A about 60 feet west of the shaft. Gold was also observed in two places in the northeast segment of vein B, 15 and 30 feet from the shaft.

CAMLAREN MINES LIMITED

The property of Camlaren Mines Limited covers several islands on the east side of Gordon Lake about 50 miles northeast of Yellowknife. The company was organized in 1937 and is controlled by Mining Corporation of Canada. Early in its history a 380-foot shaft was sunk and 2,241 feet of lateral workings driven on the 200- and 350-foot levels to explore and develop the 'Hump' vein. An estimated 13,177 tons of ore containing somewhat less than 1 ounce of gold a ton was indicated by this work (Lord, 1951, p. 89). In 1958 the property was optioned by Consolidated Northland Mines Limited and surface exploration carried out. This spring the company reached an agreement with Consolidated Discovery Yellowknife Mines Limited on a proposal to mine and stockpile ore in the 'Hump' vein above the 350-foot level with a view to trucking it to the Discovery mill during the winter. The full cost of the project is to be borne by Consolidated Discovery Yellowknife Mines Limited with resulting profits shared equally between the two companies.

The writer (Baragar) visited the property on July 23. A description of the geology has already been given by Lord (1951, pp. 89-91), hence the following account is mainly a review of the geology and a summary of recent developments.

The 'Hump' vein outcrops near the south end of an island at approximately $62^{\circ}59'2.5''N$, $113^{\circ}12'10''W$. It occurs in a tightly folded succession of thinly bedded greywackes and slates that strike about $N30^{\circ}E$ and dip 75 to $80^{\circ}E$. The vein parallels the bedding and for the most part is 2 to 4 feet in width. At the south end of the island a mass of quartz branches westward from the vein and swings through a tight anticlinal arc open to the south. Quartz forming the arcuate body is 25 to 30 feet across, 12 or 13 feet thick, and pinches out abruptly on the west limb. The quartz mass adheres faithfully to the side of the vein with little change in dimensions as it is traced down the plunge at a constant angle of $55^{\circ}N$ to the 350-foot level. The main ore shoot involves the quartz mass and a 40- to 80- foot length of the adjoining vein. A second ore shoot begins in the vein about 125 feet south of its junction with the quartz mass and continues for an additional 110 feet southward.

The current program involved de-icing and renovating the old workings, driving a raise in the apex of the quartz body from the 350-foot level to the surface, and mining the known ore shoots. By October 7 just over 7,000 tons carrying slightly better than 1 ounce of gold a ton had been stockpiled on the surface. The main ore shoot had been stoped from the 350-foot level to just below the 200-foot level and from the 200-foot level to just below the surface. Stoping was under way in the second ore shoot on the 350-foot level.

Buildings in use at the camp at the time of the writer's visit included a staff house and office building, a machine shop, dry, a machine shop and hoist room, carpenter shop, a blacksmith shop, an assay office, a cookhouse, bunkhouse, and a headframe building. Twenty-eight men, under the direction of F.W. Hales, were employed on the property.

CON MINE

The Con gold mine of Consolidated Mining and Smelting Company of Canada Limited, continues to produce approximately 500 tons of ore a day at Yellowknife. Major production comes from the 103 and 102 zones in the Campbell shear system in a ratio of approximately 2 to 1. Less than 1 per cent of total production is obtained from the 101 zone and the Con shear system.

A description of the mine geology has been given in preceding papers of this series; a brief summary follows¹:

Country rock in the vicinity of the mine is mainly Yellowknife Group massive and pillowed volcanic rocks with minor thin tuffaceous interlayers. The volcanic assemblage strikes approximately N60°E, dips steeply southeast, and faces southeast. A swarm of northerly striking, westerly dipping, gabbroic dykes cut the volcanic rocks and are in turn cut by mineralized shear zones. A set of related transverse faults offsets all previous rock types.

The Con and Campbell shear systems are mainly quartz-chlorite-sericite schist zones containing mineralized gold-bearing lenses as well as horses of unsheared country rock. They strike northerly, dip moderately to steeply west, and are approximately 3,000 feet apart. The Campbell shear system abuts the West Bay fault at a depth of about 2,300 feet. Accordingly it is not exposed on surface.

The original workings were in the Con shear system but active workings are now almost entirely in the Campbell shear system. Access is through the C-1 shaft in the older part of the mine with a

¹ Sources of information are: Henderson and Brown (1948); Lord (1951, pp. 97-108); Baragar (1961, 1962); and personal communication with mine staff.

crosscut on the 2,300-foot level joining the two sets of workings. The B-3 winze services the seven levels developed to date in the Campbell shear system.

Major extensions to underground workings in the last year are as follows: (1) The 3,500-foot level crosscut has been driven west to the hanging-wall of the Campbell shear zone, 1,600 feet from the B-3 winze, and drifts advanced north and south from this point for 1,800 and 1,000 feet respectively. (2) On the 3,300-foot level the southern terminations of drifting have reached a section about 2,070 feet south of the winze. The southern 500 feet of the workings consists of parallel drifts 200 feet apart; one in the foot-wall of the 102 zone and the other between the 101 and 102 zones.

New ore is being sought in two localities within the mine where encouraging drilling results have been obtained. A lens of possible ore is currently being tested by drilling from the north end of the 3,500-foot-level drift. It is in the Campbell shear zone about 550 feet east of the drift. At the south end of the mine, new lenses of the 102 zone are being explored from drifts on the 3,100-foot and 3,300-foot levels. These lenses are south of known orebodies in the 102 zone and on their hanging-wall side. The major new lens to date is between the 3,100-foot and 3,300-foot levels about 1,950 feet south of the B-3 winze.

The B-3 winze is to be deepened to the 3,900-foot level and new levels established at 3,700 and 3,900 feet.

Surface drilling has been conducted from time to time during the year on the Kam and Kamex claims where earlier work had revealed encouraging mineralization in the southern extension of the Campbell shear zone. A number of holes were drilled into the shear zone from Kam Point and from the frozen lake surface to the south.

CONSOLIDATED DISCOVERY YELLOWKNIFE MINES LIMITED

The Discovery gold mine on the west shore of Giauque Lake about 52 miles north-northeast of Yellowknife continued production at a rate of about 140 tons a day throughout the past year. Production figures for the year ending December 31, 1961 (from the firm's annual report for that period) are as follows:

Tons of ore milled	55,163.
Average mill-head grade	1.18 ounces of gold a ton.

Proven ore reserves at this time were reported as 84,923 tons with an average grade of 0.82 ounce of gold a ton.

A summary of the geology follows¹:

The deposits are gold-bearing quartz veins in meta-greywacke and slate of the Yellowknife Group. They are concentrated around the northern apex and west side of a steeply dipping lens of basic volcanic rocks that may form the core of a vertically plunging anticline. Several veins have been worked during the life of the mine but most important are those designated as veins 1, 4, and 16.

No. 1 vein has the form of a tight fold opening south. It plunges steeply north, rakes steeply westward, and is continuous to the lowest level at 3,950 feet. Its attitude closely parallels that of the volcanic nose a few hundred feet to the southwest. The amplitude of the fold ranges from about 200 feet near the surface to about 100 feet at depths greater than 3,000 feet. The vein is rarely longer than 400 feet and it ranges in width from an inch to some 15 feet or more. Commonly it is less than 3 feet wide. The vein appears to pinch out at depth. The deepest ore shoot is on the 25th (3,650-foot) level and is only 39 feet long. The lowest level (3,950-foot) exposes a 25-foot length of vein with an average width of only 2 or 3 inches.

No. 4 vein is an irregular complex of veins, up to about 150 feet long, that strikes generally north to northeasterly, dips steeply west, and rakes southward. It is present between the 6th and 16th levels. The southward rake causes it to shift positions from north of the apex of No. 1 vein fold on the 7th level to southeast of its east limb on the 13th level. An ore shoot between the 20th and 23rd levels in a similar position to No. 4 vein on the 13th level is also designated as No. 4 vein, although it is doubtful if these are continuous.

No. 1 and No. 4 veins are accompanied below the 9th level by a steeply-west-plunging, columnar-like quartz mass lying just east of the No. 1 vein fold. On the upper levels the quartz mass ranges in cross-sectional dimensions from about 150 to 200 feet long by 20 to 50 feet wide, but with depth it decreases in size and gradually disintegrates. On the 27th level its projected position is occupied by a myriad of small drag-folded quartz veinlets, lenses, and stringers. The quartz mass is mainly barren but southward projections of the mass between the 20th and 23rd levels are fringed with ore; the No. 4 vein referred to above is an example.

Several small veins and vein zones associated with the No. 1 vein-quartz mass complex have been worked from time to time. Three of these, No. 11, No. 14, and No. 15 veins, are currently in production. No. 11 vein is a complex of irregular quartz bodies, possibly 30 or 40 feet long, that is found on the 10th level about 200 feet northeast of the apex of No. 1 vein fold and about 100 feet south of the

¹References: Lord (1951, pp. 124-131); Tremblay (1952, pp. 43-53); Wiwchar (1957, pp. 201-209).

shaft. Both No. 13 and No. 14 veins are between the 10th and 13th levels just north of the apex of No. 1 vein fold on the northwest edge of the quartz mass.

No. 16 vein is generally about 600 feet south of No. 1 vein. It strikes N15 to 25°E, dips 75°NW, and at its south end is involved in a set of steeply-north-plunging drag-folds with a westerly rake. The vein is commonly 150 to 200 feet long and from 1 foot to 3 feet wide. It extends from above the 9th level to below the 18th level, but its limits have not yet been defined.

The veins generally contain less than 1 per cent metallic minerals, most notably pyrrhotite and pyrite. Gold is commonly coarse and in many places in the mine has provided spectacular displays.

Workings comprise a three-compartment shaft, which extends to a depth of 4,050 feet, and 27 levels. Except for the 1st (125-foot), 2nd (365-foot), and 4th (500-foot) levels, all level-spacings are 150 feet. No. 1 vein contains workings on all levels and No. 16 vein has workings on the 9th, 10th, 12th, 14th, 16th, and 18th levels. Drifts on each level in No. 16 vein are connected directly with No. 1 vein workings by crosscuts.

Major production this year has come from No. 1, No. 16, and No. 4 veins in an approximate ratio of 7:3:1. However, in the course of the year the proportion of ore contributed by No. 16 vein has increased substantially. Current mining in No. 1 vein is almost entirely in the region between the 19th and 25th levels. In No. 16 vein, mining this year has taken place on all levels but the 9th and 18th. Little or no ore has been found on the 18th level and ore shoots have not been fully developed above the 9th level. Minor production is being obtained from the 11th, 14th, 15th and two other small vein zones.

The major exploration program undertaken during the year was the extension of the 18th level drift in No. 16 vein south-westerly to the volcanic-sedimentary contact and then along the contact for a distance of about 400 feet. The southern termination of this exploration heading is at a point approximately 1,300 feet south and 1,000 feet west of the shaft. The contact on this level strikes about S30°W and dips steeply west. Diamond-drill holes on sections spaced about 100 feet apart tested ground on either side of the contact for about 300 feet. One long drill-hole to the west penetrated the entire volcanic assemblage which at that point was 455 feet thick. The drilling yielded little information of economic significance.

CONTWOYTO LAKE

The Contwoyto Lake area was visited July 25-29 and September 7, 8, 1962. The properties examined during these visits are reported on below. A brief description of the geology south of

Contwoyto Lake, in map-sheets N.T.S. 76 E/11 and 76 E/14 is as follows: A belt of Yellowknife-type meta-greywacke¹ and slate with a generally east-west trend is found south of lat. 65°47'. The southern boundary is not yet defined but is probably at about 65°30'N. The peninsula in Contwoyto Lake, north of this belt, is mainly medium- to coarse-grained muscovite granite with much pegmatite locally. South of the belt are biotite granites and gneisses. Local observations from near the eastern border of the area indicate that the belt may swing southeastward to follow the southwest shore of Contwoyto Lake but its maximum extension in this direction is unknown. The protrusion of granite masses into the sedimentary belt from the north seems to cause local complications in structural trends and, on Canadian Nickel ground, the trends observed were mainly northwest. The sedimentary rocks are all metamorphosed, most, probably of amphibolite facies grade. The meta-greywacke - slates range from knotted schists and phyllites to recognizable greywackes and carbonaceous shales with generally well-developed biotite. Interlayered with the meta-greywacke - slate assemblage are a number of sulphide-bearing amphibolite beds ranging commonly from 50 to 100 feet thick. Locally these contain gold. The sulphides, mainly pyrrhotite, pyrite, and arsenopyrite with very minor chalcopyrite, are irregularly distributed through the amphibolite beds. Commonly they are most concentrated in lenses or layers parallel with the bedding but finely disseminated sulphides, largely pyrrhotite or pyrite, in places are widely distributed through the amphibolite. Accordingly, most amphibolite members are rusty-weathering. Quartz, in irregular veins, lenses, and masses, is generally found in the more highly mineralized parts of the amphibolite members. The sulphide content of amphibolite may range to as high as 30 to 40 volumetric per cent of the rock. Information on the distribution of gold is not available but there is some indication that it occurs preferentially with arsenopyrite.

The origin of the amphibolite beds is uncertain, but they were most probably sediments, possibly tuffaceous. They are typically composed of coarse-grained (3 to 5 mm) amphibole with various amounts of garnet and quartz. Bedding in many places is well defined, with individual beds ranging from less than an inch to 1 foot or 2 feet thick. Some of the beds are highly siliceous, others are almost entirely composed of amphibole or amphibole and garnet. The garnet in a specimen from the Canadian Nickel property was identified as mainly almandine (approximately 80 per cent almandine, 20 per cent spessartite)². Amphibole in thin sections from various parts of the area ranges from dark blue-green hornblende to colourless tremolite-actinolite (?). Commonly the amphibole is zoned from colourless at the centre to deep blue-green at the rim. One specimen contained in addition much fine-grained basaltic hornblende (?). Where quartz is present it is typically fine grained and evenly distributed.

¹Greywacke, as used here, is a general term; it includes subgreywackes and impure quartzites as well as true greywackes.

²R.N. Delabio, X-Ray Diffraction Laboratory, Geological Survey of Canada.

Canadian Nickel

The main block of Canadian Nickel claims comprises 296 claims in the southern part of N.T.S. map-sheet 76 E/14 and in the northern part of 76 E/11. It is an irregular block but is bounded approximately by latitudes $65^{\circ}44'$ and $65^{\circ}49'$ and longitude $111^{\circ}20'$ and the southwest shore of Contwoyto Lake. In addition the company holds a group of 18 claims (Pom group) at approximately $65^{\circ}39'N$ and $111^{\circ}45'W$ and prospecting permit areas 76 E/10, 12, and 15. Only the main block of claims was visited.

The base camp is at the southwest corner of a bay near the northernmost point of the southwest shore of the lake at approximately $65^{\circ}46 \frac{1}{2}'N$ and $111^{\circ}12'W$. It consists of twelve plywood frame buildings and three tents on frames. Included among the buildings are bunkhouses, a cookhouse, a garage, assay office, drafting office, and storage buildings. Equipment used included a helicopter, an otter aircraft, swamp tractors, and three drills. Approximately 25,000 feet of drilling was completed during the field season. Seventy men, under the direction of J. Mullock, were employed on all Canadian Nickel holdings in this area at the time of the writers' visit (July 25-27). Work undertaken by the company included geological mapping, geophysical surveying (mainly magnetometer), and diamond-drilling. Mapping on the main property is at a scale of 1 inch to 50 feet.

The main showing is in what appears to be a tightly folded amphibolite member about 4,000 feet $S45^{\circ}W$ from the base camp. The axial plane of the fold strikes approximately $N15^{\circ}W$, the limbs dip 75 to $80^{\circ}W$, and the fold opens northward. A subsidiary fold near the crest of the main fold plunges about $60^{\circ}NNW$ but the plunge of the main fold could not be measured directly. Elsewhere in this vicinity other folds were seen to plunge vertically. The amplitude of the main fold is not less than 500 or 600 feet.

The amphibolite member in the region of the main fold ranges from 50 feet thick on one limb to about 100 feet thick on the other. Two parallel amphibolite layers appear to be present. On the west limb they are at least 120 feet apart but the outer layer rarely outcrops. On the east limb they may be less widely separated and appear as one band in the sparse outcrop present. The amphibolite member is unevenly mineralized with pyrrhotite, arsenopyrite, and pyrite in approximately that order of abundance. Chalcopyrite is a rare accessory. Finely disseminated pyrrhotite is widespread within the member and generally gives it a rusty appearance on weathered surfaces. Arsenopyrite is present where the sulphide minerals are most concentrated. Commonly the sulphide-rich zones are from 5 to 10 feet wide. Locally arsenopyrite forms coarse, conspicuous subhedral to euhedral crystals as much as 1 cm across. The pyrrhotite is almost invariably fine grained. Sugary, white to light grey quartz in irregular veins, stringers, and masses is commonly present in the mineralized amphibolite. The rock is composed of coarse-grained

amphibole with various amounts of clear red garnet. In places it is well bedded.

A number of trenches have been dug across mineralized parts of the amphibolite. Chip samples taken by the writers from several of the trenches ranged from 0.07 to 0.65 ounce a ton gold, and from 0.04 to 0.24 ounce a ton silver¹. Visible gold was observed in only one trench.

Several amphibolite members were observed elsewhere on the property within a radius of about 1 to 1 1/2 miles from base camp. Some of the observed occurrences are probably repetitions of the member described above but at least two independent members are present. Most of the amphibolite observed is at least partly mineralized with finely disseminated pyrrhotite and/or pyrite, and locally the sulphides may form 10 to 15 per cent by volume of the rock. Arsenopyrite was not recognized in any of these occurrences.

Massive grey muscovite granite outcrops in the north-eastern part of the claims area about 1 mile due north of the main showing.

Falconbridge

Falconbridge Nickel Mines Limited holds under option seven blocks of ground comprising 460 claims. Five of these adjoin the Canadian Nickel property on the northwest, north, northeast, and south, the sixth is on a peninsula of the northeast shore of the lake directly east of the Canadian Nickel camp, and the seventh begins about a mile west of Canadian Nickel ground adjacent to J. E. claims of the Earl-Jack syndicate. All claims were optioned from Conwest Exploration Company Limited about July 1. The Falconbridge base camp is on the north shore of Finger Lake (also called "Conwest Lake") (65°43'N, 111°10'W) on their Fox groups of claims. Geological mapping and prospecting under the direction of Max Good were in progress at the times of the writers' visits. A prospect on the Fox claims was examined on July 28 and on the Box claims on September 8. The Fox and Box claims are contiguous blocks of claims that adjoin Canadian Nickel's property on the south.

The Fox claims are underlain by the same metamorphosed greywacke-shale assemblage as on Canadian Nickel ground, and similarly, amphibolite members interspersed with the greywacke-shales are found in a number of places. Only one locality was visited. Near the southeast corner of claim Fox 139 about 1 1/2 miles northwest of the west end of Finger Lake, three parallel amphibolite members

¹Mineral Sciences Division, Mines Branch, Ottawa.

outcrop on the southwest side of a small lake. They range from 50 to 75 feet thick, are 100 to 300 feet apart, strike approximately east and west, and dip steeply south. The intermittent sulphides present are almost entirely finely disseminated pyrite and pyrrhotite. Arsenopyrite was not recognized but its presence was indicated by the spectroscope. Very minor amounts of gold were obtained by panning and a trace of silver was detected with the spectroscope. Following the writers' visit other prospects were found on the property and at least one of these was drilled.

The main prospect on the Box claim is in an amphibolite member that roughly parallels the eastern boundary of the group within a few hundred feet of Canadian Nickel's 76 E/10 prospecting permit area. The amphibolite has been traced for several thousand feet between two bays of Contwoyto Lake. Drilling commenced at a point (approximately $65^{\circ}42\frac{3}{4}'N$, $111^{\circ}00\frac{1}{4}'W$) where a trench exposed well-mineralized amphibolite said to carry encouraging gold values. Three holes had been drilled into the amphibolite up to the time of the writers' visit. One was frozen in and not completed. One hole was drilled under the trench and the others on sections north and south of the trench.

The amphibolite member in the vicinity of the trench is about 100 feet thick. It strikes generally $N10-15^{\circ}W$ and dips vertically. The trench is 26 feet long and is near the western side of the amphibolite member. Several zones of heavily mineralized amphibolite alternating with lightly mineralized or unmineralized amphibolite are exposed by the trench. These range from 1 foot to 8 feet wide and have an aggregate width of about 16 feet. However, one 5-foot mineralized zone exposed in the north wall of the trench lenses out before it reaches the south wall. The other zones may be similarly discontinuous. An 8-foot-wide, heavily mineralized zone in the eastern section of the trench is not visible in outcrops along its projected strike some 30 or 40 feet north. The heavily mineralized zones are composed of from about 5 to 40 per cent (by volume) sulphide minerals in an amphibolite gangue abundantly penetrated with quartz stringers and masses. Pyrite and arsenopyrite are the main sulphide minerals present. In this deposit, unlike most of the others in the area, pyrrhotite is scarce or absent. Arsenopyrite ranges in occurrence from fine grained and well disseminated to coarse grained and clustered. Near the quartz bodies it seems to be particularly coarse grained (5-10 mm) and more abundant than elsewhere. Some visible gold is said to have been obtained from this trench. Unmineralized or weakly mineralized layers are dark, coarse-grained amphibolites with a varying garnet content. Garnet is generally concentrated in layers parallel with bedding. The magnetite content of the amphibolite is sufficiently high locally to cause significant deflection in the compass. An 8-foot chip sample taken across the heavily mineralized zone at the east end of the trench yielded the following results: Au-0.325 oz/ton; Ag-0.09 oz/ton¹.

¹ Mineral Sciences Division, Mines Branch, Ottawa.

A small pit on the east side of the amphibolite member on the same section as the trench also exposes a well-mineralized zone. The sulphides are predominantly coarse pyrite with lesser arsenopyrite.

A second, shallow, trench 650 feet south of the main trench exposes the amphibolite across a width of 15 feet. The exposed section is heavily mineralized with pyrite and arsenopyrite and includes a 20-inch width of almost massive arsenopyrite. The total width of the amphibolite member at this point is about 35 feet. It strikes north-south and dips 80°E. The mineralized zone can be traced in rusty-weathering outcrops for about 100 feet north of the shallow trench.

Between the two trenches amphibolite outcrops intermittently. Much of it is unmineralized or only lightly mineralized. Rusty patches, presumably indicative of fairly abundant sulphides, appear to be sporadic and discontinuous. However, outcrops are neither plentiful enough nor sufficiently continuous to reveal accurately the probable extent of mineralization. In this distance the amphibolite maintains a nearly constant strike except for a small monoclinal flexure about 150 feet north of the south trench.

Elsewhere on the Box group other amphibolite members have been located but are not, evidently, as well mineralized as the one being drilled. Some of the specimens from one or more of the other amphibolite members are unusually high in graphite. One specimen was almost entirely graphite.

A fluorite-bearing acid sill cuts the meta-greywacke - slate succession at a point about 2,000 feet northwest of the main trench. The sill is composed of a light buff, fine-grained rock with sparsely scattered feldspar phenocrysts 2 to 3 mm long. Purple fluorite in crystals 1 to 5 mm across constitutes up to 1 per cent of the rock. The sill strikes north-south and dips vertically. Minor beryllium as well as fluorine was indicated in a spectroscopic examination of a specimen from the sill and subsequently a quantitative spectrographic analysis yielded .00075 per cent Be¹. According to Coats, Barnett, and Conklin (1962, pp. 963-968) this is well above average for acid igneous rocks. Only about 12 per cent of the 182 acid extrusive rocks of the western United States tested by them contained more than this amount. Moreover, fluorine is a common associate of beryllium in pneumatolytic and hydrothermal deposits and is regarded as an indicator of this metal (Rowe, 1961). Clearly, prospecting for beryllium deposits in this area warrants consideration.

¹ W.F. White, Spectrographic Laboratory, Geological Survey of Canada.

New Athona Mines Limited

New Athona Mines Limited owns the Nat group of 72 claims that adjoins part of the Fox group on the south. Base camps from which work on the Nat and adjoining Bar claims was conducted were located at the southernmost tip of Finger Lake and at the south end of Bar Lake (65°40.4'N, 111°13.6'W).

Number 1 showing is on claim Nat 34 about 300 feet due east of the south tip of Upper Gull Pond. This lake is about 3,500 feet long and its major axis has a northwesterly trend. Four holes aggregating 818 feet were drilled to test the showing following the return of encouraging assays from a surface trench. Very little outcrop occurs in the vicinity of the area drilled and presumably the original discovery was aided by the presence of frost-heaved mineralized slabs.

The trench is roughly north-south and is about 45 feet long. It exposes three narrow mineralized amphibolite members interlayered with unmineralized meta-greywacke and slate. The amphibolite layers are situated at the north end of the trench, and 20 feet and 35 feet from the north end. They are 1 1/2 feet, a minimum of 1 foot (not fully exposed), and 2 feet wide respectively. The 2-foot layer can be correlated with a similar amphibolite layer exposed in an outcrop about 30 feet east of the trench. It strikes N85°E and dips 85°N. Metallic minerals comprise from 1 to 30 per cent by volume of the amphibolite members and include pyrrhotite, arsenopyrite, pyrite, and chalcopryite. Pyrrhotite is finely disseminated and widespread whereas arsenopyrite occurs as coarse crystals, and in company with chalcopryite appears to be most abundant where amphibolite is richly dissected with small quartz masses and stringers.

Number 2 showing is at the south end of Bar Lake near the boundary between Nat 22 and Nat 21 in a region that is generally drift covered. Outcrops and near outcrops are confined to an area measuring about 300 feet long parallel with the strike of the rocks, by 150 feet wide. Approximately 120 feet of the 150-foot width is underlain by garnet amphibolites; the remainder by meta-greywackes, slates, and dark, fine-grained rocks rich in ferromagnesian minerals (volcanic rocks?). The amphibolites range from massive to well-bedded and from fine-grained rocks with or without sheaves or rosettes of acicular amphibole porphyroblasts to coarse-grained, even-textured, hornfelses. Garnets are commonly concentrated in well-marked layers that evidently reflect the original bedding. The bedding strikes approximately S60°E and dips steeply north to vertical. Quartz stringers and lenses from one inch to several inches wide penetrate the amphibolite at many places. Ore minerals, marked at the surface by rusty patches, appear to have a spotty distribution throughout the amphibolite members. Generally the rusty zones do not exceed 2 to 3 feet in width, but at least one mineralized zone 10 feet wide, was intersected in a drill-hole. Most of the amphibolite is very sparsely mineralized or is unmineralized. Sulphide minerals observed, in order of abundance, are pyrrhotite, pyrite, and arsenopyrite. Chalcopryite is said to be a rare

constituent. Pyrrhotite tends to be finely disseminated whereas both pyrite and arsenopyrite tend to occur in coarse crystals or aggregates commonly 2 to 5 mm across. Magnetite is locally abundant in the amphibolite and gives rise to marked magnetic anomalies but it does not necessarily seem to be closely associated with sulphide minerals. Six drill-holes with an aggregate length of 1,060 feet were drilled under the showing. All but one were frozen in and had to be abandoned before completion.

Big Four Syndicate

The Big Four Syndicate (Consolidated Discovery Yellowknife Mines Limited, Consolidated Northland Mines Limited, Rayrock Mines Limited, and Radiore Uranium Mines Limited) owns the Bar group of 90 claims that adjoins part of the Fox group on the south and the Nat group on the northwest.

The main showing is on Bar 3 claim about 3,300 feet on a bearing of N75°W from Nat number 1 showing. A number of mineralized amphibolite outcrops occur within an area that measures roughly 300 feet east-west by 150 feet north-south. The distribution of outcrops and the variation in attitudes suggest that all the amphibolite occurrences are parts of a single folded bed, but outcrops are insufficient to confirm this view. Nevertheless, for purposes of description, this interpretation is adopted in the following account.

The amphibolite bed forms a double fold with axial planes that strike slightly north of east and dip steeply north. Three limbs of the fold are readily recognizable in outcrops. The southern limb strikes N75°W and dips steeply north. It is some 10 to 20 feet thick. The middle limb is about 190 feet long, 35 feet wide, and strikes N75°E and dips 75°N. The northern limb strikes N55°W, dips 85°N, and is about 60 feet wide. It extends from its apex with the middle limb to a point about 200 feet to the northwest and there is succeeded along strike by outcrops of slate. Presumably the amphibolite swings to the north-east again in another fold. At the apex of the middle and northern limbs a smooth curved surface at the margin of the outcrop, presumably a bedding plane, indicates a plunge of about 60°WSW. A large diabase dyke with a southeasterly strike cuts the sedimentary rocks just north of the middle fold crest.

The amphibolite is composed largely of a coarse-grained dark amphibole. Garnet is in minor amounts. Most of the amphibolite is poorly mineralized but lenses, patches, and zones, marked on the surface by rusty stains, contain up to 20 or 30 per cent by volume of sulphide minerals. These seem to have an erratic distribution. The sulphide minerals in order of abundance are pyrrhotite, pyrite, and arsenopyrite. As observed elsewhere in this region, pyrrhotite is finer grained and more widely distributed than either pyrite or arsenopyrite. The latter seems to be present mainly where the content of sulphide minerals is high and occurs characteristically as coarse

crystals ranging up to 1 cm across. Quartz patches or veins are commonly associated with the sulphide-rich lenses. Magnetite is abundant in places and gives rise to marked magnetic anomalies. Layers 1 inch to 2 inches thick that are rich in magnetite are interbedded with the amphibolite and appear to be quite independent of concentrations of sulphide minerals. Surface samples from parts of the mineralized amphibolite are said to have yielded good values in gold.

Prior to freeze-up, two holes with an aggregate length of 262 feet were drilled into the amphibolites. One of the holes, set up to drill northward just south of the south limb of the fold, was preparing to drill at the time of the writers' visit (September 7). This hole is reported to have passed through a narrow amphibolite bed representing the south limb of the fold but failed to intersect the middle and northern limbs of the folded bed even though these appear along the same section on surface. The southward plunge, therefore, must be at a shallower angle than indicated on the surface.

Bay Group

The Bay group of 54 claims, staked by Earl Curry and associates and presently under option to Gunnex Limited, Amalgamated Larder Mines Limited, Rayrock Mines Limited, and Faraday Uranium Mines Limited, adjoins part of the Fox group on the south. It is underlain by the same metamorphosed greywacke-shale sequence as previously described. The main showing found to date is in an amphibolite member on claim Bay 2 on the west side of a small lake just south of the west finger of Finger Lake. The amphibolite can be traced in outcrops for a strike length of only a few hundred feet but within this distance it passes through a succession of four tight folds (or a double pair). The axial planes are parallel and strike approximately N60°W. They are separated by distances of 30 to 50 feet. The fold axes plunge either vertically or at about 85°N. The limbs dip vertically or steeply. The northeast limb of the double pair of folds lies along the shore of the lake and strikes N55°W and dips 75°NE. At this point the amphibolite is a minimum of 25 feet thick. Northward it disappears beneath overburden. The southwest limb of the fold complex thins to a maximum width of about 5 feet or less and disappears beneath overburden a few feet southeast of the adjoining fold crest. An outcrop of heavily mineralized amphibolite is found on the northeast limb of the fold complex adjacent to the shore of the lake. The outcrop is about 45 feet long and a maximum of 6 feet wide. It comprises well-layered garnet-amphibole rock rich in coarse arsenopyrite and finely disseminated pyrrhotite, with minor chalcopyrite and pyrite. Quartz is present in irregular veins, stringer zones, and masses. Samples from this outcrop are reported to assay 1 oz of gold per ton. The spectroscope detected minor amounts of silver, nickel, and copper.

Little work had been done on the property at the time of the writers' visit (July 28) but later six holes aggregating 1,050 feet were drilled under the main showing. Geological mapping of the claims area was carried out and it is understood that other amphibolite occurrences were found.

Other Activity

Other activity in the area is briefly as follows: Giant Yellowknife Mines Limited maintained a prospecting party in the area for the entire field season and ultimately staked 90 claims in two main groups. In addition they optioned the White and Sun claims from the Eskimo Syndicate and mapped and prospected these. At least a few amphibolite occurrences were found on the Judy group south of West Bay of Contwoyto Lake (approximately 65°37'N, 111°03'W) and a mineralized specimen from one of these assayed as follows: Au—0.02 oz/ton; Ag—0.04 oz/ton¹. The Earl-Jack Syndicate carried out mapping, prospecting, and geophysical work on their BL and JE claim groups. The Big Four Syndicate and North Goldcrest, both Byrne-managed companies, conducted mapping and prospecting on their respective properties. Mineralized amphibolites were found on the SP claims of the Big Four Syndicate and considerable trenching followed. Other companies and individuals who staked ground in the area during the past summer were able to accomplish little work on their properties.

DIK CLAIMS, THUBIN LAKES

The DIK group of 36 claims is at the southern end of the middle of the three Thubin Lakes. It was staked this summer by F. Avery and C. LaChance. The property was visited by the writer (Baragar) on September 5 and the following is an account of observations made at that time.

The main showings are on claim DIK 13 along the southeast shore of the lake at approximately 61°33'N, 111°48 1/2'W. The minerals of principal interest are chalcopyrite, sphalerite, galena, and bornite and are present in approximately that order of abundance. The mineralization appears to be confined to a zone of calcareous meta-sediments, 150 to 200 feet wide, that approximately parallels the shore of the lake. On its southeast or landward side the calcareous rocks are structurally underlain by a monotonous sequence of thin-bedded argillaceous sediments. Granite and pegmatite dykes intrude both the calcareous and argillaceous members. Most of the mineralized rock found to date occurs within a strike length of about 200 feet where it is mainly concentrated in lenses paralleling the bedding. These occur at

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Mineral Sciences Division, Mines Branch, Ottawa.

several stratigraphic levels and a number of them have been opened up by trenches, pits, and small blast holes.

The calcareous member strikes N45-50°E and dips vary from 45 to 65°NW. It is composed of alternating layers of lime silicates, crystalline limestone, quartz-rich sediments, and mixtures of these components. Beds rich in lime silicates are the most conspicuous and evidently the most favourable for sulphide deposition. They range from coarse-grained diopside-rich rocks in which individual diopside crystals reach a diameter of 2 1/2 inches, to finely crystalline, pale green tremolite-actinolite rock. Garnet is a minor component. Most layers of one predominant rock type are several feet thick but the quartz-rich sediments and crystalline limestones may show fairly closely spaced bedding planes. Quartz veins and masses are found in the calcareous sediments at many places and locally quartz thoroughly permeates the pre-existing rock.

Two trenches, which taken together cross the exposed width of the calcareous member, have been excavated near the north end of the outcrop area containing most of the known mineralization. The northern trench is about 40 feet long. At its northwestern end, calcareous sediments are in contact with a pegmatite dyke which in turn disappears beneath overburden 20 or 30 feet farther to the northwest. Adjoining the pegmatite is 15 feet of generally well-mineralized diopside-actinolite-carbonate rock containing much quartz in small irregular masses, stringers, and blebs. The best mineralization is in a zone, roughly 7 feet wide, representing the eastern half of this section. The entire 15-foot section may average 2 to 3 per cent copper or better, and at least an equal quantity of zinc. Minerals observed are chalcopyrite with lesser sphalerite, galena, and bornite. Rock in the remainder of the trench is a grey siliceous sediment containing very minor amounts of sulphide minerals. The best mineralized zone, well marked by gossan near the trench, can be traced in outcrops for about 30 feet southwesterly where it either lenses out or no longer leaves a conspicuous gossan on the surface. About 60 feet southwest, approximately on strike with this zone, a shallow pit exposes only minor amounts of chalcopyrite and bornite. Northeastward the zone passes beneath overburden immediately north of the trench. The northwest end of the southern trench is on strike with the southeast end of the northern trench and is separated from it by about 40 feet. The trench is about 70 feet long. Except for about 20 feet of siliceous grey sediments it exposes mainly lime-silicate rock with varying amounts of coarse diopside and tremolite-actinolite. A zone about 3 or 4 feet wide at the southwestern end of the trench is moderately well mineralized with chalcopyrite, sphalerite, and galena, but the grade is lower than the best mineralized zone in the northern trench. Elsewhere in the trench sulphide minerals are sparse.

In addition to the trenches, eight small pits are scattered along and across the calcareous member. In most of them the rock is mineralized, but nowhere strongly. The grade would probably not exceed 1 per cent copper in most cases. One of the pits, about 75 feet

southwest of the eastern end of the south trench, exposes a fault zone containing about 1 foot of nearly massive chalcopyrite with minor bornite. The fault strikes N65°W and dips 70°NE.

Outside of the main mineralized area, sphalerite and galena were observed in two small blast holes in the calcareous member about 600 feet northeast of the northern trench. Little prospecting, however, has been done as yet along the extensions of the calcareous member, beyond the known mineralized zones.

EASTER ISLAND

Exploration, begun last summer by a consortium of Byrne-managed companies on Simpson and Easter Islands in the East Arm of Great Slave Lake, culminated in a drilling, trenching, and sampling program on Easter Island this spring. Properties held by the group formed a continuous strip about 16 miles long. A few of the claims have been held for a number of years but most were staked last summer. Previous work had indicated silver and nickel in encouraging amounts associated with an intermediate to basic dyke, and last summer's staking was undertaken to secure ground along the dyke. Subsequently a property comprising claims Duffy 1 and 2 and Easter 1 to 3 on the north side of Easter Island near the west end of the dyke was optioned by North Goldcrest Mines Limited, one of the participating companies, from Frank Morrison of Yellowknife. Most previous work along the dyke had been done on the Morrison claims, some of it by North Goldcrest under an earlier option. Last summer the exposed length of dyke was mapped and to some extent sampled by an exploration party of the Big Four Syndicate (Consolidated Northland, Consolidated Discovery, Radiore, and Rayrock). Following option of the Morrison property, North Goldcrest began drilling this spring on claim Easter No. 1. The claim was visited by the writers on May 29, 1962, after the first phase of drilling had been completed. A trenching and sampling party of four men was on the property at that time. The following is a brief account of the writers' observations.

The Easter No. 1 claim encloses the western half of a prominent peninsula on the north side of Easter Island (61°44.3'N, 112°51.9'W). The intermediate or basic dyke mentioned above forms the axis of the peninsula but extends very little beyond it to the west. Country rocks on both sides of the dyke are gneisses of granitic composition. All mineralization of any consequence took place either within the dyke or in fractures adjoining it.

The dyke ranges from a dark gabbroic rock to a lighter coloured, probably intermediate rock, containing scattered pink feldspar. In one drill-hole that cuts the full width of the dyke a gradational change from basic to intermediate types was observed from the base of the dyke to the top. A 6-inch-wide band of gabbro pegmatite composed mainly of coarse pink feldspar occurs about 95 feet below the upper

contact. Differentiation is well shown in a set of thin sections taken from the drill core at intervals across the dyke. Specimens from near the base and 13 feet from the base contain 30 to 40 per cent olivine and a few per cent pigeonite. From a point 55 feet above the base of the dyke the rock contains essentially no olivine and the major ferromagnesian mineral is augite. In the nickeliferous sulphide-bearing zone near the upper contact, olivine may reappear. The rock there is highly altered and no primary minerals are present but some specimens are studded with pellet-like forms that may be pseudomorphs of olivine. Potash feldspar is an important constituent throughout the dyke but the proportion of potash feldspar to total feldspar increases upward, most notably in the lower part of the dyke. Biotite and magnetite each form a fairly constant 5 to 10 per cent of the rock throughout. Quartz appears to be absent even in the pegmatitic phase. The dyke rock is probably best classified as a monzonite. In outcrops, differentiation is not readily apparent. In the only section fully exposed at the surface the dyke seems to be of nearly the same composition throughout its width. Some differences in composition may be present along strike. The lower part of the dyke appears to be considerably more basic in the western part of the peninsula than farther east. The boundaries of the dyke are not clearly defined and can rarely be placed, even in drill cores, to within 2 or 3 inches. Hence some intermixing with country rock at the borders of the dyke appears to be indicated. The true thickness of the dyke is about 275 feet. It strikes about N30°E and dips an average of about 50°SE.

Mineralized zones are found locally in the dyke near both the upper and lower contacts. The lower zone, by reason of its better surface exposure, has received most of the attention to date. It commonly ranges from 10 to 15 feet wide but may be as much as 30 feet wide. It has been traced in drill-holes and surface pits for a distance of about 800 feet. Some seven pits expose the foot-wall zone in this distance. Ore minerals comprise weakly disseminated pyrrhotite, pyrite, and minor chalcopyrite in massive dyke rock or, commonly, in association with a quartz-carbonate stringer zone in carbonatized dyke rock. The hanging-wall zone is similar but has not been exposed at the surface and has been intersected in only a few drill-holes. It appears to be of similar thickness. A half-inch-wide vein containing niccolite and antimonian gersdorffite¹ was cut in one drill-hole intersection of the upper zone. A low but persistent amount of nickel with very minor values in copper and silver is found in the foot-wall zone. A 4-foot chip sample taken across part of the foot-wall zone exposed at the south end of trench A, 580 feet from the tip of the peninsula, assayed as follows²: Ni—0.23 per cent, Cu—0.27 per cent, Au—trace, and Ag—0.105 ounce a ton.

¹Identified by R.N. Delabio, X-Ray Diffraction Laboratory, Geological Survey of Canada.

²Analytical Chemistry Subdivision, Mineral Sciences Division, Mines Branch, Ottawa.

Narrow quartz-carbonate veins with niccolite and gersdorffite, that give erratic but in places high assays in silver, are associated with the dyke. Three such veins are exposed at present. One evidently springs from the foot-wall of the dyke at a point approximately 420 feet northeast of the tip of the peninsula. It strikes about N15°E, dips about 80°W and can be traced for about 200 feet through a series of four trenches. Beyond this it appears to swing almost north-east and dwindles to a barren fracture. The vein ranges from a well-defined quartz vein about a foot wide to a quartz-carbonate stringer zone that reaches a maximum width of 3 feet. No metallic minerals were observed in a brief examination of the pits. A second quartz-carbonate stringer zone leaves the foot-wall of the dyke at approximately right angles at a point about 600 feet from the base of the peninsula. It has been traced by a trench for about 40 feet into the adjoining gneiss. Much of the trench is filled but where the vein zone is exposed it is about 8 inches wide and contains considerable massive and pisolitic niccolite. Many specimens of niccolite and associated gersdorffite may be found on the dump. A third quartz-carbonate stringer zone is found at a point approximately 2,800 feet northeast of the tip of the peninsula. It strikes N50°W and dips about 85°SW. The vein zone originates as a largely barren fracture at least 150 feet within the dyke, and can be traced into granite-gneiss adjoining the foot-wall. It is generally 2 or 3 inches wide and appears to contain niccolite and gersdorffite only near the foot-wall of the dyke or in the nearby gneiss. A trench has been dug on the vein at the contact. An additional quartz-carbonate vein of similar type has been reported from trenches near the tip of the peninsula. These are now caved and little can be seen of the vein.

The evaluation program this spring comprised drilling and surface sampling on claim Easter No. 1. Six drill-holes were completed on four sections spaced 200 feet apart between about 300 and 900 feet from the tip of the peninsula. Most of these were designed to intersect both the hanging-wall and foot-wall mineralized zones. Assays obtained are reported to show low but persistent values in nickel (about 0.2 per cent) and almost negligible amounts of silver and copper. At the time of the writers' visit, surface trenching and sampling were being conducted along the foot-wall zone between 900 and 1,200 feet northeast of the tip of the peninsula. No further drilling took place during the summer and the optioned claims were dropped.

F.G. CLAIM, LAC SANS DISANT

The F.G. No. 1 claim on the southwest shore of Lac Sans Disant was staked this summer by prospectors J.E. Sullivan and A.V. Giaque. The claim covers part of the former Patsy-Agnes claims of Burgess-Yellowknife-Kirkland Mines Limited. The company is now defunct. In 1947, while in the possession of the former owner, the main vein was tested with eight drill-holes aggregating 2,009 feet. The results were evidently disappointing and no further work followed.

The property was visited by the writers on September 27, 1962. The following is a brief sketch of the geology in the vicinity of the main vein.

The vein is exposed in two pits about 60 feet apart. The northern pit is about 400 feet due south of a point where a brook empties into a western bay of Lac Sans Disant, 1/2 mile from its southern end. Except in the pits and their immediate vicinity the vein is not exposed.

The vein occurs in quartz-feldspar porphyry interlayered with meta-basalts of the Yellowknife Group. The entire assemblage strikes north and dips 75°W. The porphyry member is light grey, generally fine grained, and commonly is thinly layered. It ranges from 80 to 100 feet thick. The rock is probably a rhyolitic extrusive. The quartz vein occupies a fracture zone that strikes N20-25°E, dips 80°E and thus transects the enclosing quartz-feldspar porphyry member. The vein is generally 6 to 10 inches thick and although it has a known length of only 60 feet it may extend southwest for an additional 80 feet to where a small blast hole along its projected strike reveals the termination of a small quartz vein. Northward the vein passes beneath a wide strip of overburden that borders the lake. Metallic minerals constitute less than 1 per cent of vein matter and comprise in order of abundance, pyrite, pyrrhotite, and chalcopyrite. Minor, finely disseminated pyrrhotite is found in the wall-rock for a few inches on either side of the vein. Visible gold has been reported but was not observed by the writers. Chip samples were taken across 10 and 9 inches of the vein in the north and south trenches respectively. Assay results are as follows¹:

	<u>Au (ounces a ton)</u>	<u>Ag (ounces a ton)</u>
North trench	0.01	0.01
South trench	0.07	0.03

A second quartz vein was observed in outcrops about 60 feet southeast of the south trench. It is 4 to 8 inches wide, is exposed for a length of about 15 feet, and strikes N25°E and dips 40°E. It appears to contain no metallic minerals.

FOX GROUP

The Fox group of seven claims is in the Yellowknife area about a mile due west of Giant Yellowknife Mines Limited's C-shaft. The claims were staked in October 1960, and are owned by Yellowknife prospectors Gunnar Frederickson and Peter Rodstrom. Recent work by the owners has brought to light some fairly rich

¹ Mineral Sciences Division, Mines Branch, Dept. Mines and Technical Surveys, Ottawa.

specimens of visible gold and considerable interest has been generated in the property. The showings have been examined by representatives of several mining companies. A most interesting aspect of this prospect is that it is entirely within granite. The claims were visited by Baragar on July 30, 1962, and the following account records developments to that date.

The claims are underlain by a massive, medium-grained, grey, biotite granite. Gold is found in a number of places, mainly on claims 1, 6, and 7, in altered and slightly mineralized fracture zones that cut the granite. The main showing is 3,700 feet due west of Giant's Brock shaft. It comprises a continuous fracture or fracture zone that strikes generally from N15°E to N30°E and has been traced through six major pits for a strike distance of 240 feet. Dips are steeply west or vertical. The zone ranges from a single fracture with an inch or two of altered and slightly mineralized granite on either side to a belt of closely spaced fractures with attendant alteration for widths of up to 6 feet. In places the zone comprises a single fracture with vaguely delimited alteration extending for as much as 3 or 4 feet into the hanging-wall. Throughout the length exposed the zone may have an average width of 3 to 3 1/2 feet. For the purpose of more detailed description the main pits are numbered consecutively from south to north. Pit 1 on the edge of a bog was filled with water at the time of the writer's visit but reportedly exposed a fracture zone with visible gold. Pit 2, 30 feet to the northeast, cut a 6-foot-wide fracture zone comprising altered granite slightly mineralized with pyrite. A 6-foot chip sample taken across this zone in a shallow pit about 25 feet north of Pit 2 assayed 0.015 ounce a ton gold and 0.025 ounce a ton silver¹. The fracture zone diminishes to a single fracture about 40 feet north-northeast of the pit. In Pits 3, 4, and 5 (95, 140, and 160 feet north-northeast of Pit 2 respectively), the zone consists of light green altered granite sharply delimited on its eastern or foot-wall side by a conspicuous fracture and grading almost imperceptibly into unaltered granite on its western side. The altered zone ranges up to about 4 feet wide and is weakly mineralized with pyrite and very minor amounts of galena. Irregular quartz stringers and masses with indefinite boundaries comprise about 10 per cent of the zone material. Visible gold closely associated with galena was observed in Pit 3 and in specimens from Pits 4 and 5. Some of the specimens selected by the owners contained considerable amounts of gold. A 3 1/2-foot chip sample taken across the zone in the south wall of Pit 4 assayed 0.115 ounce a ton gold and 0.035 ounce a ton silver¹. Pit 5 is about 20 feet long and is oriented in a northwesterly direction. Only its south and north extremities are well exposed. The main zone is exposed in its south wall but a similar altered zone appears at its northern extremity. As the latter is not along the strike of the main zone it is thought to be a parallel zone. Pit 6, about 40 feet north of Pit 5, is about 35 feet long and crosses the strike of the main zone. It exposes a single belt, about 3 feet wide, of closely spaced fractures with attendant alteration and weak pyrite

¹ Analytical Chemistry Subdivision, Mineral Sciences Division, Mines Branch, Ottawa.

mineralization. The fractures strike N10°W and dip 60°W but are on strike with the main zone, as observed in Pits 3, 4, and 5, and are correlated with it. North of Pit 6 the zone passes beneath overburden.

An additional series of pits has been excavated on mineralized fractures and fracture zones in an outcrop area beginning 400 feet S10°W from Pit 1. The intervening distance is bog. The three largest pits form a line that strikes about N10-25°E and indicate a strike length of about 150 feet. No continuous zone, however, can be recognized. Rather each pit contains one or more fractures with an attendant alteration zone of from 1 inch to about a foot on each side. Discontinuous quartz veins up to 1 inch or 2 inches wide fill some of the fractures and locally extend into the walls. The altered zones consist of greenish granite from which biotite has been eliminated and minor pyrite and arsenopyrite (?) added. The fractures have various attitudes. Most common are strikes ranging from N20°W to N10°E and dips of vertical to 60°W, but strikes of N75-90°E and dips of 25-35°S and 70-80°N were also measured. Gold can be panned from much of the fracture-zone material as well as from the rusty mixture of gossan and overburden found in the floor of the two northern pits. A 2-foot chip sample taken across a fracture and associated alteration zone in the northernmost pit assayed 0.03 ounce a ton gold and 0.02 ounce a ton silver¹. Also, a sample of massive unaltered granite chipped at random from the blast rock of the same pit, taken to determine if the granite itself contains any gold, yielded 0.0015 ounce a ton gold and 0.009 ounce a ton silver¹.

A number of small pits have been blasted in other fractures and fracture zones in the vicinity of the main workings. Many of these are said to have yielded gold by panning. Most of those observed by the writer are on fractures or fracture zones with a northerly strike and steep westerly dip.

The fractures and fracture zones evidently predate diabase dykes of the area. One small dyke that crosses a fracture zone forms a series of steps where it crosses from one fracture to the next.

GIANT YELLOWKNIFE MINES LIMITED

Giant mine of Giant Yellowknife Mines Limited is on Yellowknife Bay, Great Slave Lake, approximately 3 miles north of the town of Yellowknife.

The following account describes the principal activities that have taken place between September 30, 1961, and October 31, 1962.

Most of the information was obtained from the mine staff or annual and quarterly reports of the company.

From January 1, 1962, to June 30, 1962, a total of 186,637 tons of ore was milled at an average daily rate of 1,031 tons. During this period 124,531 ounces of gold and 12,208 ounces of silver were recovered¹. The mill heads averaged 0.765 ounce of gold per ton and the overall recovery in 1961 was 82.24 per cent. An unprecedented high of 88.9 per cent recovery was obtained in July 1962². The following table shows an estimate of ore reserves in the mine on December 31, 1961³.

	Tons of Ore (with 10% dilution)	Grade (oz/ton)
Active stopes	1,168,300	0.80
Pillars	89,900	0.78
Other developed ore	<u>1,301,800</u>	<u>0.78</u>
Total ore reserves	2,560,000	0.79

A brief summary of the mine geology is given below:

Gold orebodies are contained in a wide shear zone in volcanic rocks of the Yellowknife Group. In an east-west section the shear zone displays a fold-like configuration consisting of two arches with an intervening trough. The shear zone strikes N30°E and the western and eastern arches plunge gently north and south respectively. The western arch is exposed along Baker Creek valley but the eastern arch is below surface at all places.

During the period under review, major exploration was concentrated on the 750-foot and 2,000-foot levels. A heading on the 750-foot level was driven 2,300 feet northward to intersect the Giant shear zone at a point 5,900 feet north of B shaft on the east limb of the projected North Giant arch. From a crosscut driven through the shear zone at this point, drifts are currently being driven north and south roughly parallel with the shear zone on the foot-wall side. By November 8, drifting had reached points 420 feet north and 330 feet south of the crosscut. Exploratory drilling of the shear zone is being carried out in conjunction with the drifting.

¹ Quarterly Report for 3-month period ended June 30, 1962, Giant Yellowknife Mines Limited.

² Northern Miner, August 16, 1962.

³ Annual Report for 1961, Giant Yellowknife Mines Limited.

Work on the 2,000-foot level during the past year continued to explore the lower parts of the Giant shear zone. Previous work had shown that the shear zone dips steeply eastward from the G.B. (eastern) arch to just below the 2,000-foot level, then flattens abruptly and continues eastward to the sedimentary contact in a succession of undulations. The 2,000-foot level has been driven along the axis of the trough formed by the abrupt flattening of the shear zone. On the section containing the C-shaft the drift overlies the trough of the shear zone but north and south of this point a gentle reversing plunge brings the shear zone to drift level and above. Southward the drift penetrates the shear zone into the subjacent wall-rock. This year the drift was advanced an additional 400 feet southward to a point 1,700 feet south of the C-shaft section and the overlying trough was explored by drilling. At the north end of the 2,000-foot-level workings, between 3,200 and 3,850 feet north of the C-shaft section, a roll in the shear zone on the east limb of the G.B. arch was intermittently explored during the year by drilling from a foot-wall drift. Three vertical drill-holes, 1,000 to 1,600 feet long, explored ground below the 2,000-foot level.

New ore has been indicated in recent development work on the 100-foot level in the North Giant zone.

H.M. GROUP, HIDDEN LAKE

The H.M. group of claims on the east side of Hidden Lake in the Beaulieu River area (62°33.3'N, 113°31'W) was visited briefly on July 23. C. McChesney and an assistant were working on the property at that time. A report on these claims based on a visit to the property on September 8, 1961, was included in last year's paper (Baragar, 1962). The following account is mainly a summary of succeeding developments.

The main working is a shaft inclined to the north at 71 degrees. It was sunk with the purpose of penetrating a shallow east-dipping vein encountered at the surface and in drill-holes. At the time of the writers' last visit the shaft had reached a depth of about 50 feet and the last 10 feet was in quartz. It has now penetrated the quartz vein, and its bottom, at a depth of 69 feet, is about 6 1/2 feet below the vein. On October 1 a drift from the bottom of the shaft was reported to have reached a point about 50 feet to the south. The immediate objective of the drift is a point directly below an old inclined shaft which was said to have encountered rich gold-bearing quartz before it had to be abandoned because of excessive water. The collar of the old shaft is about 60 feet south of the section containing the new shaft.

Careful measurement of the intersections of upper and lower quartz contacts in the west and east walls of the shaft gave the following information on the quartz vein. In the east wall, quartz is continuous from a depth of 39 feet to a depth of 62 1/2 feet. In the west wall it is continuous from 32 feet to 59 feet. All depth measurements

are taken from a platform in the shaft about 6 feet below ground level. The quartz vein is, therefore, 23 1/2 feet thick in the east wall, 27 feet thick in the west wall, and dips east at an average of about 35 degrees. The measured dip on the lower contact is about 25°E.

The quartz is white to light grey and is marked by pronounced vertical ribboning that strikes approximately N35°E. The sulphide content is minor and is mainly pyrite. Ice on the walls and poor lighting make it difficult to observe the quartz in the shaft and sampling is almost impossible. To obtain a sample of the vein as a whole, chips were collected from quartz on the dump following the succession in which the material was brought up from the shaft and dumped. The order of dumping was defined rather closely by Mr. McChesney. The sample assayed Au—0.0275 ounce a ton, and Ag—0.03 ounce a ton¹. A second sample of selected, better mineralized material yielded Au—0.23 ounce a ton, and Ag—0.21 ounce a ton¹.

MEASIN GROUP

The Measin group of twelve claims at Tommie Lake in the Lever Lake area was staked this summer by S. Yanik of Uranium City following the discovery of a number of copper occurrences on the southeast side of the southwestern bay of the lake (65°24 1/2'N, 117°07 3/4'W). The property was visited by Baragar on August 6 shortly after the discovery was made and before much work had been done. The property was later investigated by Gunnar Mining Limited.

The area in which the showings occur is underlain generally by quartz-feldspar porphyries of the type characteristic of the region southeast of Great Bear Lake. Outcrops are scarce in much of this area and the rock type at individual showings cannot in every case, be related satisfactorily to the regional geology. The showings are scattered over a length of about a mile and no correlation between them is possible on the basis of surface evidence. Chalcopyrite is the main sulphide mineral and magnetite is a common associate. Scheelite is an important constituent locally and may be fairly widespread. Some quartz typically accompanies the metallic minerals.

No. 1 and No. 2 showings are in the face of a bluff facing the lake, opposite an island about a mile from the southwestern tip of the lake. No. 1 showing consists of a mineralized fracture which can be traced down the face of the bluff. The fracture strikes north, dips 80°W, and forms a mineralized zone that ranges from a few inches to 4 feet wide but averages about 2 feet wide. Quartz commonly fills the fracture and penetrates into the adjoining walls. Pyrite, the only sulphide observed, is disseminated through the fracture zone. A moderately

¹ Analytical Chemistry Subdivision, Mineral Sciences Division, Mines Branch, Ottawa.

high gold assay was initially obtained from this zone but subsequent samples yielded low returns. No. 2 showing, at the base of the bluff, appears to consist of a fracture with adjoining zones of mineralization in the quartz-feldspar porphyry country rock on either side. The fracture strikes N70°E and dips 80°NW. The hanging-wall mineralized zone is exposed in a pit. It comprises a 2-foot-wide zone of heavily disseminated chalcopyrite with accompanying scheelite, pyrite, magnetite, and minor hematite in a quartz-rich groundmass. An estimated 15 to 20 per cent of the material is chalcopyrite. The foot-wall zone is not exposed in the pit but on the weathered surface does not appear to be more than a few inches wide. The fracture can be traced in outcrops for a length of about 30 feet.

No. 3 showing is a few hundred feet southwest of No. 2 showing. It consists of disseminated chalcopyrite concentrated mainly in a dense, black magnetite-rich layer in fine-grained acid rock. The magnetite-rich member is about 6 feet wide and is thinly layered with minor but ubiquitous seams of lighter-coloured rock. Parallel layering is also faintly evident in the adjoining country rock. The magnetite seam strikes about N80°W and dips 60°S and maintains a constant width and attitude for at least 500 feet westward. Known mineralization is restricted to the vicinity of the showing. There chalcopyrite and pyrite in thin, discontinuous stringers and blobs occur across the width of the magnetite layer and extend locally into the country rock for a maximum width of about 8 feet. The best grade was estimated to be 3 to 4 per cent copper but generally the grade is less.

A set of isolated showings, numbered from 4 to 7 or more, are found over a length of about 1,200 feet northeast from a point approximately 1,500 feet S60°E from the southwest tip of Tommie Lake. Much of the region is covered with boulder drift and the showings occur in separate small patches of outcrop. No attitudes are apparent and attempts to extend the length of individual showings prior to the writer's visit had not been very successful. The country rock is generally quartz-feldspar porphyry but at least one of the showings is associated with black magnetite-rich rock similar to that at No. 3 showing. Ore minerals are predominantly chalcopyrite with minor pyrite and varying amounts of magnetite, and are commonly associated with quartz. Assays are reported to give low (in the order of 0.15 ounce a ton) but persistent values in gold. The maximum width of mineralized rock observed was about 8 feet but the full width was not necessarily apparent in all showings. One small pit exposed a 2-foot width estimated to contain 30 to 40 per cent chalcopyrite by volume. Most of the showings, however, probably contain from 1 to 3 per cent copper.

THE PEARL GROUP

The Pearl group comprising claims Pearl 1-10, Snow 1-3, and Sub 2-5 is owned by F. Diamion of Hay River and is on the south shore of the East Arm of Great Slave Lake about 6 miles north-east of the mouth of La Loche River (61°42.6'N, 112°08.3'W). The claims are along a well-sheltered strip of shoreline screened by small islands in front and protected on the west by a rocky peninsula that juts westward into the lake for about 1 1/2 miles. Three mineralized zones on claims Pearl 1, 6, and 7 were drilled during the summer. The property was visited by the writers on October 2 and the following is a summary of observations made at that time. The numbers assigned to the zones are not necessarily those of the owner.

No. 1 Zone is on claim Pearl 6. It begins a few feet from the southwest corner of the claim and has been traced for about 825 feet to the northeast. The principal mineral of interest is chalcopryrite and it is closely associated with a well-defined fracture or shear zone. The country rock is mainly a highly metamorphosed assemblage of siliceous sediments, largely siltstones and impure sandstones. Some of the beds appear to be meta-arkose or possibly acid volcanic rock. The fracture zone strikes generally N30°E but near its extremities it swings to N45-70°E. Dips range from 65°E to 85°E. Bedding in the surrounding country rock strikes persistently N60-65°E and dips steeply southeast. Possibly the fracture zone then terminates in the bedding at either end. The fracture zone ranges from a narrow gouge-filled zone 1 foot to 1 1/2 feet wide, to a broad zone of widely-spaced, parallel fractures up to 10 or 15 feet wide. Commonly both types are present and in such cases the narrow zone of intense fracturing forms the foot-wall. Swarms of discontinuous stringers of quartz, quartz-carbonate, and carbonate, rarely more than an inch wide, are commonly found within the zone of fracturing and generally subparallel with it.

Sulphide minerals present in order of abundance are pyrite, chalcopryrite, pyrrhotite, and possibly bornite. Malachite and azurite are minor but ubiquitous. One speck of what appears to be cobalt bloom was seen in a trench about 625 feet south of the north end of the zone. The sulphide minerals are preferentially associated with the quartz and carbonate stringers where they may form from 5 to 20 per cent of the vein matter, but they are also lightly and irregularly disseminated through country rock within the fracture zone.

Twenty-one trenches have been excavated along the length of No. 1 Zone and it has been tested by at least two drill-holes. The most encouraging mineralization is in trenches 1 to 3, encompassing a length of about 150 feet, at the north end of the zone. In these trenches chalcopryrite is erratically distributed over widths ranging from 15 to 30 feet but it is doubtful whether grades would exceed 1 to 1 1/2 per cent copper across the full widths of the zone. From trench 3 to trench 14, approximately 500 feet to the south, the width of the mineralized zone ranges from about 4 to 15 feet but probably averages 5 or 6 feet.

Chalcopyrite is erratically distributed through the zone, and grades are difficult to estimate. South of trench 14, chalcopyrite appears to be a minor component of the sulphide minerals present.

No. 2 Zone is a few feet from the shoreline on claim Pearl 7, about 1,000 feet southwest of a large ice house used by a fisheries company. A large trench and two or three small pits have been excavated in what may be a dark, chloritic arkose or grit. The trench exposes a roughly sheared zone that strikes approximately east and dips steeply. The zone is composed of black chloritic material rich in graphite that typically separates into slickensided, kidney-shaped masses. Sulphide minerals appear to be scarce. The writers could see little of economic interest in this zone.

No. 3 Zone is on claim Pearl 1 near the base of the prominent peninsula. A low, drift-filled valley trending about N80°E separates outcrops on the peninsula from those on the mainland. Immediately south of the valley, pink sandstone of the Sosan Formation is dissected by a large quartz stockwork that roughly parallels the valley and appears to be continuous across the 800-foot width of the peninsula. On the east side the stockwork is about 500 feet wide but it narrows to about 250 feet wide a few hundred feet westward. Pockets of sulphide minerals are scattered erratically through the stockwork, particularly near its eastern end. At least 15 pits and trenches have been excavated at various places along and across the stockwork. Chalcopyrite and sphalerite are the main sulphides present and are accompanied by subordinate galena and pyrite. Some of the sphalerite clots are spectacular; single crystals of sphalerite 3 and 4 inches across were seen. Commonly sphalerite is rimmed with a thin irregular shell of galena. At least one hole was drilled into the north side of the stockwork from the valley.

REDSTONE MINES LIMITED

Redstone Mines Limited was formed this spring to follow up the discoveries of the Nahanni Sixty Syndicate in the Redstone River area of Mackenzie District. The company is controlled by substantially the same interests that participated in the syndicate. The original holdings comprised five groups totalling 173 claims. This spring the company was awarded three prospecting permit areas (95 L/10, 95 L/15, and 95 M/2) which contain most of the previously staked claims. During the summer an extensive helicopter-supported exploration program under the field direction of L. T. Jory was carried out on the company's holdings. Three geological, four prospecting and two trenching parties, all two-man parties, were in the field. The operation's base camp is at Dal Lake about 90 miles due west of Fort Wrigley. The property was visited by the writers on August 20-22 while work was in progress.

The company's holdings contain a number of widely scattered showings, mainly mineralized with copper and copper-silver. Four of the more important showings were visited and are described below.

The permit areas are underlain by folded sedimentary strata of lower Palaeozoic and possibly upper Precambrian age. Fold axes trend generally north to northwest in conformity with the trend of local ranges of the Mackenzie Mountains. A brief lithological section is roughly as follows, from the top down:

- Black shale
- Limestone
- Dolomite
- Red quartzite, siltstone, shale, conglomerate; some hematite beds
- Limestone, sandy and silty dolomite
- Red siltstone, includes mineralized beds
- Limestone and dolomite
- Quartzite with shale interlayers.

Thrust faults, facies changes, and the presence of purely local units complicate the stratigraphy.

Munro Showing

Three mineralized beds near the top of the red siltstone sequence about 1 mile east of Little Dal or Plateau Lake (62°44'N, 126°42'W), comprise what is known as the Munro showing. The mineralized beds are exposed in the east face of a ridge and are reported to have been traced along the ridge for a strike distance of about 19,000 feet¹. A point on the showing approximately due east of the northern end of Little Dal Lake was visited and the following description, except where stated, applies to this section. The red siltstones are directly overlain by a carbonate formation and that in turn by red quartzites, as shown in the section. All formations strike approximately north and dip 50°W. The three mineralized beds occur within the upper 110 feet of the red siltstone formation. They are pale green to grey limy beds, partly mineralized mainly with disseminated malachite and chalcocite (?). The mineralized parts of the beds are buff coloured, crystalline, and drusy limestone layers, apparently parallel with the bedding. Contacts of the limy beds and the adjoining siltstone appear to be completely gradational. The upper limy bed is in contact with dolomite of the overlying carbonate formation. It is 15 feet thick but only the upper 2 feet is mineralized. The middle bed is 7 feet thick with about 1 1/2 feet of it mineralized, and the lower bed is 6 feet thick with about 4 1/2 feet mineralized. The beds are

¹ Redstone Mines Limited, Report to Shareholders, November 14, 1962.

separated by distances of 39 1/2 and 42 1/2 feet respectively. Throughout the known strike length the beds are reported to range in thickness as follows: upper bed—2 1/2 to 32 1/2 feet; middle bed—6 to 13 1/2 feet; and lower bed—6 to 25 feet. Thicknesses of mineralization within these beds range up to about 8 feet. The lowest bed is said to contain the highest and most consistent copper content; assays ranging from 2.30 to 3.74 per cent are reported¹. A qualitative spectroscopic examination of a mineralized specimen from the lower member at the point visited indicated the presence of the following elements: Cu, Ca, Mg, Ba, Zn, Li, and a trace of Cd. Other elements were not specifically determined.

Little Dal Lake

A recently-discovered chalcocite showing occurs about 4,500 feet east of Little Dal Lake (Plateau Lake), on a western spur of the same mountain that contains the Munro Showing. The host rocks are red hematitic shales and siltstones. Chalcocite is closely associated with a 4-inch-wide quartz-pyroxene vein that has a traceable length of at least 400 feet. The shales and siltstones for approximately a foot on either side of the vein are bleached to a greenish grey colour and are heavily impregnated with disseminated chalcocite. Farther from the vein chalcocite is erratically distributed. At the locality examined it is sparse or absent beyond the bleached zone but elsewhere it has been found at distances of some tens of feet from the vein. Very little work had been done at this showing at the time of the writers' visit.

Mac Showing

The Mac showing is on the steep northwest slope of a spur approximately 1,000 feet above Warren Creek (62°49 1/2'N, 126°39 1/2'W) at an elevation of about 5,000 feet. Warren Creek is a tributary of Mackenzie Creek which in turn is tributary to Redstone River.

The Mac showing comprises a large lens of coarsely crystalline calcite containing scattered, irregular masses and veins of massive tetrahedrite and chalcopyrite with minor malachite and azurite. Silver is an important associate of the tetrahedrite.

The calcite lens appears as a cancerous growth within the carbonate host rock. It has a length of about 123 feet and a maximum measurable width of about 45 feet, but the upper contact is buried beneath talus. Its strike is approximately east-west, very roughly

¹ Redstone Mines Limited, Report to Shareholders, November 14, 1962.

conformable with the enclosing dolomites, and it appears to dip moderately southward. The lens is thickest at its eastern end where it forms an abrupt jagged contact against dolomite beds of the enclosing formation and it thins westward to a slim wedge that disappears beneath talus. The entire lens is slightly convex upward. At its eastern end, bedding in the adjoining dolomites strikes $N80^{\circ}E$ and dips $15^{\circ}S$; near its western end a tongue of bedded dolomite that projects into the underside of the body strikes $S85^{\circ}E$ and dips $85^{\circ}S$. Thus the calcite lens appears to coincide with a sharp flexure in the bedded country rock. Calcite composing the lens is extremely coarsely crystalline; cleavage faces of up to 3 feet in length were measured and many may be larger, but boundaries of individual crystals are not readily discernible. Tetrahedrite masses with subordinate chalcopryrite range from roughly equidimensional bodies 1 foot to 2 feet across to vein-like masses several feet long. These are embedded in the calcite at irregular intervals. Apart from these the calcite appears barren. Most of the metallic masses are confined to an area within the lens that measures roughly 60 feet by 20 feet. Its western end is about 40 feet from the western extremity of the lens. Spectroscopic examination of massive tetrahedrite from this deposit indicated the presence of Zn, Sb, Ag, Cu, and As. Sn was looked for but not found. Other elements were not specifically determined.

The breccia zone underlying the calcite lens appears as if it may be an intricate veinwork of crystalline carbonate that thoroughly penetrates and closely dissects the dolomite host. Directly beneath the western part of the calcite lens the breccia is mineralized with disseminated tetrahedrite and chalcopryrite for a strike length of about 20 feet and a width that ranges from 1 foot to 3 feet. The zone contains an estimated 3 to 4 per cent of metallic minerals by volume. Only about 25 feet of breccia underlying the calcite body is exposed above the talus slope. However, 75 to 100 feet below the western end of the calcite lens on a bearing of $N30^{\circ}W$, a trench exposes a 70-foot length of breccia which for 20 feet was fairly well mineralized. The trench was caved at the time of the writers' visit and only selected specimens of the mineralized rock were available for examination. They carried mainly tetrahedrite, chalcopryrite, and pyrite. Other trenches still farther down the slope are reported to have exposed only minor mineralization.

Hidden Valley

Hidden Valley is on the southeast side of the same spur that contains the Mac showing and is some 2,000 feet southeast of it. Scattered mineralization has been found in talus and outcrops along the valley slopes for a length of about 1,000 feet on the northwest side of the creek and for about 500 feet on the southeast side. Most of it is sparse and very widely dispersed. Tetrahedrite and minor chalcopryrite are the main metallic minerals. Silver is an important minor constituent. Throughout the area in which mineralization is found the

host rock is a dolomite 'breccia' sealed by crystalline calcite, ankerite, or dolomite. The main showing discovered up to the time of the writers' visit is in the northwest valley slope about 100 feet above the creek at an elevation, estimated from the contour map, of roughly 4,500 feet. It comprises blobs and masses of massive tetrahedrite and minor chalcopryrite ranging from 2 square inches to 2 square feet, irregularly scattered through an apparently barren host rock. One assay of the massive tetrahedrite gave 38 per cent Cu and 52 ounces a ton of Ag (Northern Miner, August 30, 1962). Spectroscopic examination of a specimen of tetrahedrite from this showing indicated the presence of Zn, Cu, and As with traces of Ag and Cd. Other elements were not specifically determined.

Johnson Showing

The Johnson showing (Copper Ridge) is on a ridge divide near the head of one of the western tributaries of Mackenzie Creek (approximately $63^{\circ}05'34''N$, $126^{\circ}51'12''W$). It is at an elevation of approximately 6,000 feet and is in the same carbonate formation that is host to the Mac and Hidden Valley showings. The mineralized zone is exposed in a pit on the ridge divide and has been traced by intermittent appearances of float on the talus slope for about 1,500 feet eastward. Attempts at trenching along the line of strike have been unsuccessful, due to a combination of permafrost and depth of talus. The mineralized zone in the pit strikes $N75^{\circ}E$ and dips vertically. It consists of a layer 18 inches to 2 feet wide of massive sulphides adjoined on the north by a zone, 3 feet wide, of disseminated sulphides in crystalline dolomite. For 2 or 3 feet on either side of the mineralized zone, fine-grained dolomitic country rock is dissected by a veinwork of crystalline dolomite containing disseminated sulphide minerals. A barren quartz vein, 3 inches wide, cuts through the mineralized zone at a low angle from its north to its south wall. The vein strikes $N55^{\circ}E$ and dips $75^{\circ}S$. Bedding in the adjoining country rock strikes $N19^{\circ}E$ and dips $36^{\circ}W$. Ore minerals in the Johnson showing are mainly bornite and chalcopryrite with lesser amounts of the secondary minerals malachite, azurite, and chalcocite. Barite is reported as a gangue mineral. Very minor amounts of silver have been obtained in assays. One sample obtained from this pit is reported to have assayed 13 per cent Cu across 5 feet (Northern Miner, August 30, 1962). Spectroscopic examination of a specimen containing bornite, chalcopryrite, and chalcocite indicated the presence of Zn and Cu but no Ag, Cd, or As. Other elements were not determined.

Other Showings

Showings not visited include the Colwell No. 1 ($63^{\circ}08'12''N$, $126^{\circ}49'W$) and the McBean (35 miles southeast of Little Dal Lake, just south of permit area 95 L/10). The Colwell No. 1

showing (cf. Green and Godwin, in press) is a recent find composed of disseminated knots of tetrahedrite and chalcopyrite in dolomite breccia similar to the Hidden Valley showing. The McBean showing was drilled earlier in the year with 17 drill-holes aggregating 2,080 feet. It comprises a flat mineralized lens about 600 feet long, 200 feet wide, and 100 feet deep. Heavy gossan was prominent on the surface, but in the remainder of the zone no primary minerals were found. Zinc is the principal metal of interest but the mineral responsible is as yet unknown. Although galena is virtually absent in drill-holes, nests of very coarse galena were found in the gossan at the surface. The drill-holes assayed generally between 1 and 2 per cent Zn, with traces of Ag and minor Cu. Fresh dolomite was encountered below the mineralized lens.

THE S GROUP, CAMERON RIVER

The S group of seven claims, owned by C. Vaydik of Yellowknife, lies along the east side of Cameron River approximately 44 miles northeast of Yellowknife (62°50'N, 113°11'W). Some interest has been shown in the property during the past season by two or three mining firms. The writers visited the property on September 28, 1962.

The claims area is underlain by volcanic rocks of the Yellowknife Group. These are mainly basic pillowed lavas but they include some rhyolitic fragmental rocks and lavas. The entire assemblage strikes N20-25°E, dips steeply east, and faces west. A prominent lineal valley with a width of 200 to 250 feet crosses the length of the claim group on an average bearing of N25°E. Rusty-weathering schists richly mineralized with mainly pyrite and pyrrhotite are found at a number of places in the valley floor and sides. The valley probably marks a major shear zone and as it roughly parallels the attitude of the adjoining volcanic rocks, it may be confined to a stratigraphic plane such as a structurally weak member or a bedding contact.

Work to date has been confined to a small area of outcrops on the eastern side of the valley floor just southwest of a pond on claim S 2. It consists of two trenches spaced 20 feet apart excavated in dark to light grey mineralized schists. The schistosity strikes from N20°W to N10°E and dips 75° to 80°W. Both trenches cross the schistosity. The northern trench is about 17 feet long and the southern trench about 11 feet long.

Schists in the southern trench range from dense, cherty, thinly layered rock to quartz-sericite schist. A few quartz stringers and veins parallel the schistosity. Metallic minerals forming 20 to 40 per cent of the rock are predominantly pyrite and pyrrhotite with lesser chalcopyrite, sphalerite, and galena. A chip sample across 10 feet of the schist was taken from this trench with the following

results¹: Au—trace; Ag 0.05 ounce a ton; Cu 0.14 per cent; and Zn 0.87 per cent. The northern trench is just west of the strike extension of the part of the schist cut by the southern trench. It exposes material ranging from massive, light-coloured siliceous rock to quartz sericite schist. The metallic minerals, almost entirely pyrite and pyrrhotite, are well disseminated and constitute about 10-15 per cent of the host rock.

The mineralized schists grade abruptly westward, a few feet west of the trenches, into massive, dark grey, unmineralized quartz-feldspar porphyry. The porphyry continues in outcrops for about 75 feet to the west. On the north it is bounded by rubble and low outcrops of mineralized schists that strike about north, that is toward the outcrop of porphyry, and dip steeply west. About 150 feet north of the north trench the porphyry appears again and can be traced in an outcrop that roughly parallels the valley for another 300 feet north. Mineralized schists outcrop on the west side of the porphyry. The porphyry masses may represent horses of the original rock or possibly they are post-shearing intrusions.

T.A. GROUP

The T.A. group of eight claims is just northwest of Bullmoose Lake (62°20'N, 112°44 1/2'W) in the Beaulieu River area about 52 miles east-southeast of Yellowknife. The property was staked for Consolidated Mining and Smelting Company in 1939 and subsequently considerable work, including a shallow inclined shaft and limited drifting, was carried out by that company. Last year the claims remaining were transferred to W.L. MacDonald of Yellowknife. This spring a small amount of diamond-drilling and trenching was undertaken on a newly found zone of gold-bearing quartz.

The property was visited by Baragar on August 15. Lord (1951, pp. 277-278) has described the principal veins on the property and the following account is limited to the vein zone on which the recent work was performed.

The zone is on claim T.A. 7, approximately 1,300 feet on a bearing of N62°W from the old campsite on the northwest shore of Bullmoose Lake. Country rock in the vicinity of the showing is nodular meta-greywacke and slate. An outcrop measuring about 15 feet by 15 feet contains a complex of subparallel quartz veins and veinlets with a general strike of N15°W and steep easterly dips. The veins are from 1 inch to 8 inches wide but most are in the range 2 to 4 inches. They possess an aggregate width of about 2 1/2 feet in the 15-foot width of outcrops. One vein with a 6- to 8-inch width on the eastern side of the

¹ Mineral Sciences Division, Mines Branch, Dept. Mines and Technical Surveys, Ottawa.

outcrop has been trenched for a length of about 8 feet. The quartz is dark grey and contains less than 1 per cent pyrite. Gold is reported to have been seen in veins at a number of places on the outcrop surface. The vein zone disappears beneath overburden southward. About 30 feet to the north, an outcrop on strike with the vein zone is barren of quartz except for a 20-inch-wide zone of quartz stringers at the projected position of the west side of the main zone. Gold is said to have been panned from these stringers. Bedding is not apparent near the quartz veins but in an outcrop about 50 feet southwest it strikes N40-50°W and dips steeply NE.

Three X-ray drill-holes placed beneath, and just south of the surface showing, each yielded two or more narrow intersections (mostly 2 feet or less) of quartz, some of which contained visible gold.

TAURCANIS MINE

Taurcanis mine is a developing gold property just south of Matthews Lake in the Courageous Lake area (about 64°02'N, 111°11'W). Successive exploration programs undertaken in the last few years with a view to establishing sufficient reserves to justify production, have resulted in an extensive system of underground workings and a developed reserve in excess of 100,000 tons carrying slightly less than 1 ounce of gold a ton, with an additional 80,000 or 90,000 tons of possible ore. Workings are on six levels: four successive levels to the 625-foot level, and the 6th (925-foot) and 8th (1,225-foot) levels. The total length of ground explored by underground workings is slightly more than 3,500 feet. The property is managed by Consolidated Discovery Yellowknife Mines Limited, and participating interests are held by Dickenson Mines Limited, Rayrock Mines Limited, and Radiore Uranium Mines Limited. A final decision on production had not yet been made at the time of writing (November 20, 1962). Descriptions of the property given in the preceding two papers of this series (Baragar, 1961, 1962) provide an outline of the geology and a summary of mine workings and camp facilities. The following is a brief review of the geology and a report on the year's developments.

The gold-bearing deposits are quartz veins associated with a major volcanic-sedimentary contact that passes through the property with a strike of about N15°E. The contact dips 70 to 75°E and volcanic rocks form the foot-wall. Sedimentary rocks are meta-greywacke-slates and volcanic rocks are metamorphosed mafic lavas and tuffs, both of the Yellowknife Group. The main deposit is in the Matthews vein which lies along the contact or in the sediments immediately adjacent to the contact and is continuous for a known length of more than 2,000 feet. Beyond this it is found intermittently along the contact. Several ore shoots have been outlined in the Matthews vein but the main shoot, which appears to be continuous from the surface to the 1,225-foot level, is generally between 250 and 700 feet south of the shaft. The reserves indicated above are entirely in the Matthews vein.

The South Zone comprises a multitude of quartz veins and lenses in volcanic rocks near the contact, about 3,000 feet south of the shaft. These are distributed through an area that measures approximately 500 feet north-south and 300 feet east-west. Last year the South Zone had been entered on the 2nd (325-foot) level by an extension of the south drift in the Matthews vein and explored by crosscuts, a raise to the surface, and diamond-drilling. Although a number of quartz veins of good grade were found in the workings, correlation between the various drill-hole intersections was so uncertain that little estimate could be made of ore potential.

This year's work was primarily aimed at exploration of the South Zone. The 4th (625-foot) and 8th (1,225-foot) level drifts were driven to points in the South Zone, 2,980 feet and 3,050 feet respectively south of the shaft. Both drifts followed the volcanic rock-sediment contact to points about 2,600 feet south of the shaft, then entered the volcanic rocks. The contact, in the succeeding 200 to 300 feet southward, is displaced by faults, and perhaps partly by a change in strike, to a position about 180 to 200 feet east of its projected position. On the 4th level a crosscut was driven from the end of the drift eastward to the contact and a drift about 220 feet long was driven along the contact to explore a quartz vein found there. The remainder of the South Zone area on this level was explored by systematic diamond-drilling. On the 8th level, exploration was entirely by diamond-drilling, and it covered an area approximately 400 feet square.

The main result of this year's exploration work in the South Zone was the discovery and delineation of a quartz vein of substantial size along the contact on both the 4th and 8th levels. On the 4th level it was traced in the drift and drill-holes for a length of at least 300 feet and was exposed above the level in a branching raise. It pinches out southward at a point about 3,185 feet south of the shaft and for part of its length it is doubled by a fault that strikes at a low angle to the vein. A shoot of possible ore with a length of 58.4 feet, an average width of 6.3 feet, and a grade of 0.59 ounce of gold a ton was outlined in the drift. On the 8th level the vein, penetrated by drill-holes only, was traced for about 375 feet. Its maximum width is 4.7 feet, but it is generally less than 2 feet. The grade ranges widely and no part of the vein can as yet be regarded as possible ore. Gold-bearing quartz veins were intersected at a number of other places on both levels in the South Zone but a positive correlation from intersection to intersection cannot be made. Two sets of quartz-vein intersections in drill-holes west of the 8th level drift are in alignment with projected faults and may be related to them. Other possible correlations are more speculative.

In addition to work in the South Zone some raises were extended in the main part of the Matthews vein, and the north end of the 8th level was advanced about 50 feet.

This year's exploration involved a total of 408 feet in new raises and 3,360 feet in new drifts and crosscuts. Whether it has resulted in any new ore in the South Zone is, at present, questionable. Calculations involving both the Matthews vein and South Zone are reported to show total ore potential of 312,000 tons with an average grade of 0.67 ounce of gold a ton (Northern Miner, October 25, 1962). It may not be economically feasible to mine ore of this grade and actual ore reserves could be somewhat lower.

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