



GEOLOGICAL
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DEPARTMENT OF MINES
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PAPER 62-1

MINERAL INDUSTRY OF
DISTRICT OF MACKENZIE
AND PART OF
DISTRICT OF KEEWATIN
1961

W. R. A. Baragar



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MINERAL INDUSTRY OF DISTRICT OF MACKENZIE AND PART OF DISTRICT OF KEEWATIN, 1961

INTRODUCTION

This is the second of the series of preliminary papers on developments in the metal-mining industry of the Northwest Territories. The reports are based on visits by the Resident Geologist at Yellowknife to active mining properties, and for practical reasons must be restricted to such properties as are readily accessible from Yellowknife. Mining developments in parts of the Northwest Territories that are remote or difficult to reach from Yellowknife are not included, except for those cases in which special opportunities for travel presented themselves.

The writer is grateful for the many kindnesses received from the various property owners or their representatives. Thanks are also due to those individuals or companies who have permitted the use of data acquired in their investigations.

TRANSPORTATION

Transportation is a critical factor in the exploitation of mineral deposits, particularly in the Northwest Territories where the prospective developer needs to know, not only unit costs in transportation, but also of the times of year when the various modes of transportation are applicable.

Yellowknife is accessible from Edmonton by an all-weather highway which passes around the west side of Great Slave Lake. The Mackenzie River is crossed near Fort Providence where a ferry is in service during the open-water season and an ice bridge during the winter. (A new Government-owned ferry went into service this summer.) Traffic is suspended for indefinite periods during freeze-up and break-up. Last spring trucking ceased about the middle of April and was resumed on June 1. Bus service was continued for most of this period with the help of a jeep, dog-team, and small boats at the Mackenzie crossing. This autumn the ferry stopped service about October 24 and at the time of writing (November 24) the ice bridge had not yet come into use, although it was expected to be ready by the middle of December. During periods when the traffic on the highway is suspended, all truck and bus freight must come into Yellowknife from Hay River by air.

Yellowknife is serviced daily by a scheduled airline and during the open-water season it receives barge traffic from the rail-head at Waterways, Alberta. The barging season is normally from the middle of June to the end of September. Five charter airline companies provide a wide range of aircraft for servicing outlying points.

A summary of shipping costs from Edmonton to Yellowknife (except where stated) is as follows:

Trucking

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

Classes refer to different types of cargo; perishable goods are class 1, truck-load lots (minimum 10,000 lb) are class 5. During break-up and freeze-up periods, air-freighting costs from Hay River to Yellowknife are additional.

Bus (express rates)

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

Class 5 rate, general cargo (most common), from Waterways to Yellowknife is \$1.75/100 lb. Special rates are probably negotiable on large shipments.

Air Cargo

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

A wider application of trucks to service outlying points during the winter is promised by their successful use last winter in supplying Discovery and Taurcanis mines; previously, these properties were supplied largely by aircraft. Discovery mine is about 54 miles north of Yellowknife and Taurcanis is about 150 miles northeast of Yellowknife. Roads used were, in part, old tractor-roads modified and

improved for the use of trucks. Last winter, trucking of general freight from Yellowknife to Taurcanis cost \$80 a ton, as opposed to air-freighting costs of \$112 a ton, and this winter trucking costs for general freight are expected to be reduced to \$70 a ton.

The trucking season for isolated localities with primitive winter roads is generally from January to March, and sometimes to April.

Construction of a new all-weather pioneer road east of Yellowknife was in progress this summer and about 20 miles of it was completed; with construction of a bridge across Yellowknife River this winter, it will be in use next summer. The road passes south of Prosperous and Prelude Lakes and terminates near the eastern end of the latter.

GENERAL PROSPECTING

Claims recorded between October 31, 1960 and October 31, 1961 totalled 725 in the Yellowknife Mining District and 388 in the Mackenzie Mining District. The largest single block recorded in the Yellowknife Mining District comprised 298 claims, staked for Canadian Nickel Company Limited on the southwest side of Contwoyto Lake (approximately lat. 65°48', long. 111°17') and recorded in September 1961. The largest group recorded in the Mackenzie Mining District comprised 150 claims, staked in three blocks on tributaries of the upper Redstone River and recorded by Fort Reliance Minerals Limited in October 1961. Fort Reliance Minerals Limited manages the exploration work of the Nahanni Sixty Syndicate.

No information has been released on the reasons for staking the Canadian Nickel property and the claims are in an unmapped region. The Redstone River properties of Nahanni Sixty Syndicate are reported¹ to contain 30 individual showings, characterized by occurrences of copper, silver, lead, and zinc. Tetrahedrite is said to be one of the minerals present.

The following is a summary of other activity in the Mackenzie District.

The Dark group of claims in the Gordon Lake area 57 miles northeast of Yellowknife was optioned late last autumn by the Big Four Syndicate (Consolidated Discovery Yellowknife Mines Limited,

¹ Northern Miner, November 9, 1961.

Consolidated Northland Mines Limited, Rayrock Mines Limited, and Radiore Uranium Mines Limited). Drilling was initiated on the Dark claim in February of 1961. Eight holes with an aggregate length of 2,005 feet were drilled to test a gold-bearing quartz vein indicated by previous drilling and to supplement data already obtained on another quartz zone. The option on the property was subsequently dropped.

One vertical drill-hole of 392 feet was completed on the Lou group of claims held by Dominion Explorers Limited on Little Buffalo River about 14 miles south of Great Slave Lake. Further drilling on both the Lou and nearby Easy groups had been planned but was abandoned when no water could be found in the solidly-frozen lakes and swamps of the region.

In March the J.F.J. group of 57 claims was staked over an aeromagnetic anomaly in the Penylan Lake - Firedrake Lake map-area just east of Quinn Lake (lat. 61°06', long. 107°46'). The discovery of the anomaly resulted from an aeromagnetic survey made by the Geological Survey of Canada and was announced in Information Bulletin No. 4 issued March 7, 1961. To the writer's knowledge no work was done on the claims during the summer.

In March and April, Canadian Nickel Company Limited, Dominion Explorers Limited, and Fairmont Prospecting Syndicate recorded a total of 54 claims staked in the Pine Point region. Late in May, Canadian Nickel Company carried out a limited amount of diamond-drilling on their property. The Fairmont Prospecting Syndicate claims, together with 36 claims staked later in approximately the same area by Paramaque Mining Limited, were prospected in the early part of the summer by the Paramaque company.

Consolidated Mining and Smelting Company carried out a drilling program on their XLX claims at Turnback Lake in April. Four holes aggregating 1,364 feet were drilled from the ice of the lake to test an electromagnetic anomaly obtained in a survey the previous spring. The results were evidently not sufficiently favourable to warrant further drilling.

In May and June the Big Four Syndicate resumed diamond-drilling on their Jax group of claims in the Courageous Lake area about 156 miles northeast of Yellowknife. Drilling in September 1960 had secured favourable results but had been interrupted by freeze-up. A total of 4,144 feet of drilling was completed in the spring program. The extensions of the two known gold-bearing zones were tested but the results were less favourable than those previously obtained.

In May, Giant Yellowknife Mines Limited initiated a summer-long program of prospecting and property evaluation in the

Gordon Lake area, with the commencement of mapping on the Myrt and W.T. groups of claims just north of Dome Lake. These are gold properties that comprise most of the former S.D.C. holdings of Dome Mines Limited, and the old trenches were cleaned and resampled in the present program. Later in the summer the G.Y. group on Green Island in Gordon Lake was similarly mapped and a number of quartz veins sampled. In addition, a prospecting party was maintained in the area to prospect unstaked ground.

Two beryl-pegmatite properties were actively explored this summer. Columbia Explorations Limited conducted an intensive evaluation program during May, June and July on their Bill and B.E. claims at Blaisdell Lake, about 33 miles northeast of Yellowknife. Drilling, trenching, and extensive bulk-sampling were carried out on a number of pegmatites in the claim groups. The Casper group of claims on the east side of Sparrow Lake, about 26 miles east of Yellowknife, was prospected during June by a party under M. Bunce of Casper, Wyoming; the claims were later examined by D. Williamson, a consulting geologist from Colorado.

Last autumn, Canadian Nickel Company optioned the F.D. group of claims at Salkeld Lake, about 164 miles southeast of Yellowknife, from F. Lypka of Yellowknife. In June the company mapped the property and drilled three holes on the old Gun showing. The option was subsequently dropped.

In August and September, 72 claims staked on the south side of Simpson Island were recorded by Norman W. Byrne Limited of Yellowknife. During the latter part of the summer a geological party was engaged in mapping the claims.

During the summer and autumn a shaft was sunk to a depth in excess of 50 feet on a gold prospect on the H.M. claims at Hidden Lake about 28 miles east of Yellowknife. The claims are owned by J.M. Herriman of Yellowknife and most of the work was done by Herriman and one or two associates.

Other prospecting activities in the district are as follows: Canadian Nickel continued to explore large tracts of ground in the Canadian Shield with helicopter and fixed-wing aircraft. Claims recorded to date as a result of their summer's work are a large block of 298 claims on the south side of Contwoyto Lake and a smaller group of 8 claims located a few miles southwest of the large block. Consolidated Mining and Smelting Company Limited had one or two prospecting parties in the field during the summer and the Earl-Jack Syndicate had one party out. The Dynamex Syndicate under Leon La Prairie examined a number of properties in the Yellowknife and East Arm areas.

The major exploration program of Giant Yellowknife Mines Limited was conducted on 13 prospecting permits in the Keewatin District between Padlie and Tavani. Prospects located in last year's reconnaissance exploration program were evaluated more thoroughly this summer. Several thousand feet of diamond-drill holes were bored and a number of airborne and ground geophysical surveys were made in favourable locations. The program was supported by a helicopter and a fixed-wing aircraft.

DESCRIPTION OF PROPERTIES

B. E. GROUP

The B.E. group of six claims and a fractional claim forms a block two claims wide that extends north from the northwestern tip of Blaisdell Lake. The property is about 33 miles northeast of Yellowknife. The six B.E. claims were staked in May 1959 by H.H. Cohen and were acquired by their present owners, Columbia Explorations Limited, in December 1961. The B.E. fractional claim, formerly the Beryl claim, was staked in May 1961 by J.R. Woolgar and transferred to Columbia Explorations Limited in June. An evaluation program directed by Franklin Price was in progress at the time of the writer's visit to the property on June 22, 1961.

The property is underlain on the west by granite and on the east by metagreywackes of the Yellowknife Group. The contact strikes N 15°W through the centre of the property and in two places could be seen dipping steeply east. A complex of interconnecting and subparallel pegmatite dykes occurs in the granite near the contact throughout the length of the claims area. The dykes strike from N 25°W to N 65°E but in general trend N 10 to 15°W, roughly parallel with the contact, and dip 60 to 80°W. In the few places where pegmatite dykes were observed to cross the contact into metagreywackes they terminate within a few feet. Beryl has been found in a number of places in the dyke complex and numerous pits and trenches have been excavated at promising localities. More detailed accounts of some of the main occurrences are given below.

The Fraction dykes are a pair of en échelon dykes which, combined, extend from the north to the south boundaries of the B.E. fractional claim. The 'south' dyke passes beneath a sand cover at the south boundary of the B.E. fractional claim, but a dyke considered to be its extension has been found on the other side of the overburden and traced for several hundred feet farther south, where it joins the Main dyke. Northward the 'north' dyke narrows and terminates abruptly at the granite-sedimentary contact. The pegmatite described by Jolliffe

(1944, p. 23)¹, 3/4 mile north of Blaisdell Lake, is presumably the Fraction dyke.

Within the B.E. fractional claim, trenches have been excavated along the two dykes at approximately 50-foot intervals for a total length of 550 feet, and bulk samples have been taken from these for assay.

The 'north' dyke is about 100 feet long and has an average width of 3 or 4 feet. It strikes about N10 to 15°W and dips moderately to steeply west. Several beryl crystals, 4 inches in diameter or larger, are reported to have been observed in the dyke surface before blasting. No beryl was observed in the trenches but beryl fragments were found in the pile of sample rejects from the southern of two trenches that cross the north dyke. The 'north' dyke is a few feet within the granite and pinches out southward, 2 feet from its contact with the metagreywackes.

The 'south' dyke overlaps the 'north' dyke by 40 feet and is 4 to 8 feet west of it. It has an exposed length on the B.E. fractional claim of 490 feet, and within this distance it divides twice—at about 235 feet and 170 feet north of its southernmost exposure. The west limb in each case continues as the most persistent and widest branch. The average width of the dyke north of the first split is about 7 feet; south of it the west branch thereafter has an average width of about 4 to 5 feet. The main part of the dyke strikes generally about N10°W and dips moderately westward. It is entirely within granite, a few feet west of the contact, except for the most northerly of the eastern branches which terminates in metagreywackes. Beryl was observed in most of the trenches or in derived blast-rock but the quantities present were generally small. Four occurrences are notable. A pile of sample rejects from a trench at the southernmost exposure of the dyke on the B.E. fractional claim contained an estimated 5 to 10 per cent of beryl fragments. The surface before blasting is reported to have shown several beryl crystals ranging from 2 to 4 inches in diameter. No beryl was observed in the trench but on the exposed surface 30 feet north of the trench several beryl crystals ranging from 1 1/2 to 6 inches in diameter were observed in a 2-foot zone in the centre of the pegmatite. A trench 250 feet north of the south boundary of the claim contains a number of beryl crystals ranging from 1 inch to 6 inches in diameter, and 5 feet south of the trench a 1-square-foot area on the dyke surface contains 75 per cent beryl in large but poorly defined crystals. The sample-reject pile from this trench contains an estimated 15 to 20 per cent beryl. Four hundred feet north of the south boundary of the claim

¹ Dates or names and dates in parentheses refer to publications listed in the References.

a number of beryl crystals, ranging from 1 inch to 3 inches in diameter, were observed in the walls of a trench and in the derived rock fragments. Fifty feet farther north, broken rock from another trench contains beryl crystals ranging from 1 inch to 7 inches in diameter.

The Main dyke is principally on claims B.E. 2 and 4, some 200 to 300 feet west of the granite-metagreywacke contact. The dyke strikes generally N 10 to 20°W but in detail varies considerably in strike. It is at least several hundred feet long and has been trenched in a number of places. No. 10 trench, 35 feet east and a few feet north of the northwest corner of claim B.E. 2, was the most promising of the trenches observed; most of the others contained little or no beryl. The trench exposes an 8-foot width of the main pegmatite dyke which at this point strikes N 25°W and dips steeply west. Nine beryl crystals, ranging from 1/8 inch to 1 1/2 inches in diameter, were noted during a hurried examination of the trench wall. Much more beryl was observed in broken rock from the trench and some pieces, weighing 40 or 50 pounds, contained an estimated 5 to 10 per cent beryl.

The Western dyke branches from the Main dyke just south of No. 10 trench and continues southward on an average trend of about S 25 to 30°W. Approximately 800 feet southwest of No. 10 trench (on claim B.E. 1), the Western dyke is cut by a series of 10 trenches along a strike length of about 425 feet. In this distance the dyke has an average width of approximately 8 feet, a strike of about N 15 to 25°E, and a steep westerly dip. Beryl crystals, generally less than 1 inch in diameter, are found at a number of places within the trenched distance; but they were not observed in quantities likely to be of commercial interest. The dyke has been mapped for an additional distance of 600 feet to the southwest where it passes beneath swamp at the boundary of the claim group.

BILL GROUP

The Bill group of five claims covers much of the peninsula at the north end of Blaisdell Lake. Four of the claims were staked in July 1960 by J.R. Woolgar and associates and sold in September 1960 to Columbia Explorations Ltd., a subsidiary of Imperial Metals and Power Ltd. The fifth claim was staked for the company by F. Price in June 1961. Mr. W.L. MacDonald, consulting mining engineer of Yellowknife, examined the claims in July 1960, and recommended an evaluation program (MacDonald, 1961). In the autumn of that year trenches were blasted in several of the beryl pegmatites on the property, and in June 1961 a comprehensive evaluation program was undertaken by Columbia Explorations Ltd. The writer visited the property on June 13, 1961 while this program was in progress and again on August 22 after additional work had been undertaken. Nine

men, under the direction of Mr. Franklin Price, were employed on the property at the time of the earlier visit.

The evaluation program comprised bulk-sampling, diamond-drilling (AX and EX core), and mapping. Bulk samples were reduced with a double set of Jones riffles, crushed, and further reduced to sample size with a single set of 3/4-inch Jones riffles. Diamond-drill cores were split and sampled. Samples were sent to Albuquerque, New Mexico, for assay. Drilling and trenching were carried out on Dykes No. 1, No. 2, No. 5, and No. 8 and trenching only on the Van dyke.

Rocks underlying the claims area are metagreywackes of the Yellowknife Group intruded by a granitic plug, about a mile across, and two or three small granitic bodies. The metagreywackes are highly folded but near the granite their attitudes are largely indeterminate. A number of pegmatites are present on the property, most commonly in or immediately adjacent to the granite. Many of the pegmatites are mutually subparallel and strike approximately northwest to west-northwest and dip steeply to moderately southwest. Attention has been confined mainly to eight pegmatites.

Dyke No. 1 is on claim Bill 2 about 500 feet east along the claim line from the southwest corner and about 100 feet north. It is about 240 feet west of the shore of Blaisdell Lake. The dyke strikes about N 60°W for most of its length and dips 35 to 55°SW. At its south end the dyke disappears beneath overburden at approximately the point where a granite-greywacke contact, with a more northerly strike, meets the pegmatite, and it is not found in greywacke outcrops some 40 or 50 feet southeasterly along the projected strike. Granite forms the host rock throughout the exposed length of the dyke. The pegmatite is about 175 feet long with a maximum width of at least 10 feet, but probably averages only 5 or 6 feet wide for most of its length. Overburden obscures its full width in many places. Assuming a dip of 45 degrees, the true average width is probably about 3 to 4 feet. At its north end the pegmatite thins, swings westward, and pinches out.

Beryl is exposed in a number of places along the dyke, most notably as follows: (1) In a trench about 40 feet from the east end, a beryl crystal, 5 inches in diameter, is exposed in the floor and one smaller crystal was observed in the north wall. The trench was not clean and other crystals may have been overlooked. (2) A pit about 30 feet farther west exposes a beryl crystal 11 inches in diameter in its south wall and two crystals, each of 2 inches diameter, in the floor, as well as a number of crystals ranging from 1 inch to 3 inches in diameter along the north wall. (3) A shallow pit an additional 60 feet westward, exposes several beryl crystals ranging from 3 to 6 inches in diameter. A few other beryl crystals were noted in a very cursory examination of

the dyke's surface. Amblygonite and triphylite are additional minor constituents of the pegmatite.

Southwest of the south end of Dyke No. 1 a small pegmatite dyke striking N 60°E and dipping 60°N can be traced for 35 feet. It is presumably a branch of No. 1 but is separated from it by 25 feet of overburden. A small blast pit on the pegmatite at the east end of its exposed length reveals a rich concentration of beryl. Beryl crystals form an estimated 5 to 10 per cent of the dyke and have a preferred orientation with their long axes plunging 60° at S 70°E. The dyke ranges from 9 inches to 1 foot in width.

Dyke No. 2: Two lengths of pegmatite separated by an area of overburden are presumed to be parts of the same dyke and are designated Dyke No. 2 'west' and 'east'. Both parts are on Bill No. 2 claim. The western part is about 150 feet north of a small rounded bay on the west side of the northeastern arm of Blaisdell Lake, about 5/8 mile from its northern tip. The eastern part is along the eastern side of the same bay, about 100 feet from shore. Both parts of the dyke are wholly within granite.

Dyke No. 2 'east' strikes about N 45°W and in one place on the north wall dips 85°W. The dyke is exposed for about 150 feet along strike and in this distance averages possibly 15 feet wide. Three trenches cross the dyke at distances of 20, 75, and 105 feet from the northwestern extremity of the exposed area. Pegmatite in the northwestern trench is 20 feet wide and contains a few beryl crystals up to 1 1/2 inches in diameter near the east wall. The west end of the trench was obscured by blast rock. The second trench exposes a 15-foot-wide pegmatite containing seven or eight beryl crystals near the east end. One of these is 4 inches in diameter and is exposed for a length of 1 foot; the remainder are less than 1/2 inch in diameter. Near the southeastern trench the pegmatite splits into two main branches. In the trench the eastern branch is about 15 feet wide and the western branch is about 10 feet wide, and they are separated by 5 to 7 feet of granite. Sixteen beryl crystals, generally less than 1/2 inch in diameter, were counted in the eastern branch in the trench, mostly within 2 feet of the eastern wall. The western branch of the pegmatite contains a core of massive quartz some 5 feet across. Beryl is concentrated around the margins of the quartz where, in the wall and immediate vicinity of the trench, eighteen crystals with an average diameter of 1 1/2 inches were noted. South of the trench the eastern branch of the pegmatite disappears beneath overburden within a few feet, but the western branch can be traced southward for an additional 45 to 50 feet where, at a width of 2 feet, it passes beneath overburden.

Dyke No. 2 'west' outcrops at a distance of 275 feet on bearing N 40°W from the northwesternmost exposure of Dyke No. 2

'east'. It has an exposed length of about 60 to 70 feet, an average width of about 10 feet, and a trend that swings from west to west-south-west in a westward direction. It pinches out in granite at its west end and is lost under overburden at its east end. A trench in overburden about 25 feet to the southeast exposes a 14-foot width of pegmatite. Three other trenches at 15, 50, and about 55 feet west of the eastern end of the outcrop expose widths of 6, 15, and 4 feet of pegmatite respectively. Beryl crystals are found in all trenches but are most abundant in the second trench from the west end. There, 33 crystals averaging 1/2 to 1 inch in diameter were counted in the east wall. This may constitute about 1 per cent of the pegmatite exposed in the trench. Only a few beryl crystals were observed in the other trenches and the maximum crystal diameter noted was 3 inches.

Dyke No. 3 is on the Bill 2 claim about 170 feet south-west of Dyke No. 2 'east'. It lies along the western side of a peninsula that forms the eastern side of the rounded bay referred to above, and at its southern end it disappears beneath the lake. The dyke strikes generally N 60°E but is irregular in form. It is exposed for a length of about 125 feet and ranges in width up to at least 20 feet. Northward it disappears beneath overburden. Only scattered crystals of beryl were observed in a cursory examination of the dyke.

Dykes No. 4 and 4A are approximately at the centre of Bill 2 claim and about 430 feet due north of the small rounded bay of Blaisdell Lake referred to previously.

Dyke No. 4 is exposed for a length of about 60 feet and disappears beneath overburden at both ends. It strikes approximately N 35°W. The dyke swells abruptly at about the centre of its exposed length—from a width of 2 to 4 feet south of this point to a width of about 15 to 20 feet north of it. A well-developed quartz core, up to 10 feet wide, occurs in the western section of the swollen part. Two concentrations of beryl crystals, each occupying an area of about 10 square feet, were noted on the east side of the quartz core, and a small cluster of beryl crystals ranging up to 3 1/2 inches in diameter is contained within the core itself. Granite is the predominant wall-rock but meta-greywacke adjoins the pegmatite on the east, south of the swollen part.

Dyke No. 4A lies about 100 feet west of Dyke No. 4 and appears to be an independent dyke. It strikes N 50°W, is exposed for a length of about 40 feet, and ranges in width from 5 feet at its southern end to about 2 feet at its northern end. For most of its length the host rock is granite. The dyke abuts a granite-metagreywacke contact at its southern end but apparently does not penetrate it. Probably the contact is a fault. Near its northern end the dyke penetrates a granite-greywacke contact on its east side but is in continuous contact with granite on its west side. Northward the dyke passes beneath overburden.

Clusters of beryl crystals up to 2 inches in diameter, but generally 1 inch or less, are found at the southern and northern extremities of the exposed section of the dyke.

Dyke No. 5 is on Bill 3 claim about 530 feet southwest of Dyke No. 1. It strikes N25°W and dips range from 45 to 60°W. The dyke was traced for about 300 feet but it continues northward for an undetermined distance. In the length of dyke observed, the width on surface ranges from 2 to 12 feet and averages about 6 feet. The host rock is predominantly granite but at its southern end the dyke enters metagreywackes where it thins abruptly and terminates within 20 feet. Scattered crystals of beryl were observed only in the southernmost 60 to 70 feet of the dyke. One crystal measured 3 inches in diameter but the remainder were smaller. At the time of the writer's visit to the property in August 1961, two trenches had been excavated across the dyke at 38 feet and 137 feet from the point near its southern end where the dyke crosses the contact. No beryl was observed in either trench but blast rock from the southern trench does contain some beryl crystals. Pegmatite exposed in the northern trench is largely fine-grained sugary-textured material containing minor black tourmaline.

Dyke No. 6 lies across the boundary between claims Bill 1 and Bill 2, about 500 feet north of the southwest corner of Bill 2. It was not examined.

Dyke No. 8 is in the western part of Bill 2 claim, about 1,000 feet north of the southwest corner. It is an uncommonly large dyke with a reported length of 1,200 to 1,500 feet and a width that generally ranges from 20 to 40 feet. The dyke strikes approximately N45°W, and dips measured on the north wall in three places range from 50 to 70°W. The dyke is largely in granite but near its south end it crosses the contact at a low angle and terminates in metagreywacke. Approximately 300 feet north of its southern termination the dyke splits into two or more branches. The west branch, from 3 to 5 feet wide, strikes about N55°W and was traced for 300 feet north of the split. It is reported to continue for another 500 or 600 feet northward. The easternmost branch strikes about N40°W and is reported to continue for some hundreds of feet northward. About 300 feet north of the split it is 22 feet wide.

Lichen cover and rock powder from blasting obscured the dyke surface and beryl crystals were generally not observed except in trenches and in square areas, 10 feet to a side, especially cleaned for the purpose. Three such test areas, about 75, 180, and 280 feet from the south end of the dyke, are reported to contain one, twelve, and one beryl crystals respectively. Seven trenches, spaced about 50 feet apart, cross the pegmatite from approximately the position of the fork southward. A few beryl crystals were observed in or near trenches

No. 1 and No. 7 (numbered from the north) but a brief examination failed to reveal any in the other trenches. The beryl crystals observed were generally less than 1 inch in diameter. Black tourmaline is a common pegmatite constituent in most of the trenches.

The Van dyke is in the northern part of the property. The eastern end of the dyke is about 1,000 feet west of the shore of Blaisdell Lake at a point about 1/3 mile south of the northeastern tip of the lake. The dyke is wholly within granite and cuts across the northern part of the granite stock forming the peninsula of Blaisdell Lake. At both ends the dyke abuts metagreywackes adjoining the granite but does not penetrate them.

The dyke is about 1,250 feet long and ranges in width from 8 to 22 feet; it is reported to have an average width of 14 feet. The strike is about N65°W and the dip ranges from 55 to 75°S.

The Van dyke is an unzoned beryl-bearing pegmatite. Black tourmaline, red apatite, and a dark brown friable mineral—probably an alteration product of lithiophilite or triphylite—are other minerals present. Parts of the dyke have a sugary or aplitic texture. The aplitic parts are irregular and evidently of random distribution. They are composed predominantly of fine-grained quartz and feldspar but may contain beryl crystals of approximately the same size as in the coarsely crystalline parts of the dyke.

Fourteen trenches, with average spacing of about 100 feet, cross the dyke; some intervals are as much as 190 feet and some as little as 60 feet. The dyke is generally well exposed, but a few patches of overburden covering parts of the western half of the dyke make it uncertain, although highly probable, that all exposures are parts of the same dyke.

Beryl crystals were observed in most trenches or in the derived blast-rock but they were plentiful only in the second trench from the western end and in the easternmost trench. In the former, twenty crystals with an average diameter of 1/2 inch or less were observed in place in the 12-foot dyke-width (surface width); and in the latter, ten crystals ranging from 1 1/2 inches to less than 1/2 inch in diameter were observed in place in a similar width. Most other trenches contain only two or three crystals in place, but in some the beryl was more abundant in the blast rock. Most of the beryl crystals observed were 1/2 inch or less in diameter, with a maximum of 1 1/2 inches.

CASPER GROUP

The Casper group of eight claims, on the east side of Sparrow Lake 26 miles east northeast of Yellowknife, was staked late in

the winter of 1961 by C. Vaydik of Yellowknife. In June the claims were prospected for beryl by a three-man party under the direction of M. Bunce of Casper, Wyoming, and later in the month they were examined by D. Williamson, a consulting geologist from Colorado. The writer visited the property on June 16 during the period of the latter investigation. The following is a brief description of the property based on the writer's observations.

The claims area is underlain on the west side by granites and on the east by metagreywackes of the Yellowknife Group. The contact passes through the property with a trend of approximately N 15°W. Three sets of pegmatites may be distinguished: (1) a northerly trending set in granite with a strike approximately parallel with the granite-greywacke contact and with steep westerly dips; (2) an east- to east-northeast-trending set in granite with steep north or south dips; and (3) giant pegmatites up to 50 feet or more wide and several hundred feet long that occur in metagreywackes and trend in directions roughly subparallel with the contact. The northerly trending set of pegmatites in granite seems to be the most favourable for the occurrence of beryl. Individual pegmatites in this set range from a few inches up to about 20 feet wide, and appear to be most concentrated and widest in a zone adjacent to the contact.

The major prospect in the Casper group is on claim Casper 5 about 640 feet east and 500 feet south of the northwest corner of the claim. It is in a northerly trending pegmatite a few feet west of the granite-greywacke contact. A length of about 300 feet of this pegmatite was examined. North of this section the pegmatite disappears beneath overburden; southward it continues for an unknown distance.

Within the distance examined the pegmatite ranges from 13 to 17 feet wide but commonly its full width is not exposed. It strikes N 25°W and the dip increases progressively from 45°W at the north end of the examined length to 70°W at the south end. A well-marked core zone composed mainly of massive quartz, locally fine-grained granular quartz, and subordinate coarse-grained, dark grey feldspar occupies a medial position which for most of this distance is slightly on the hanging-wall side of the dyke's centre. The core is generally 1 1/2 to 3 feet wide. In the southern part of the area examined a continuous core is absent but the dyke contains instead, scattered patches of massive quartz.

Beryl crystals are most abundant in a narrow zone, rarely more than a foot wide, that adjoins the core. They are most concentrated in a 40-foot length which begins about 40 feet south of the northernmost outcrop of pegmatite and extends southward. For one 10-foot length within this distance, an outcrop surface, roughly parallel

with the core and on the foot-wall side, contains an estimated 25 to 30 per cent beryl by volume. The basal sections of the beryl crystals are exposed and give the rock surface the appearance of a tile mosaic. The thickness of the zone is only a few inches. The hanging-wall side of the core in this length is only intermittently exposed but it also appears to contain a concentration of beryl crystals. Beryl in lesser concentrations may be found along the core zone in intermittent outcrops for an additional 100 to 120 feet southward. South of this the pegmatite appears to contain only scattered clusters of beryl. The average diameter of beryl crystals in this pegmatite appears to be about 1 inch or less, and no crystals larger than 1 1/2 to 2 inches were seen.

CON MINE

The Con gold mine, at Yellowknife, of Consolidated Mining and Smelting Company of Canada Limited, continued production at a rate of approximately 500 tons of ore a day throughout the year. About 80 per cent of production came from the 103-zone and most of the remainder from the 102-zone. Both comprise mineralized lenses in the Campbell shear zone. Very minor production is still being achieved from the Con shear system.

A brief summary of the mine geology is given below¹.

The mine workings are almost entirely in basic volcanic rocks of the Yellowknife Group, comprised predominantly of pillowed and massive flows with minor thin, tuffaceous interlayers. The volcanic assemblage in the vicinity of the mine strikes about N60°E, dips steeply southeast, and faces southeast. It is cut by a swarm of northerly-striking, steeply-west-dipping gabbroic dykes ranging in width from a few inches to 100 feet. Mineralized shear zones up to several hundred feet wide transect both the volcanic and gabbroic dykes and in turn are cut by late diabase dykes. All rock types are offset by an interrelated set of transverse faults of which the West Bay fault, with a left-hand displacement of about 3 miles, is the most notable.

Two major mineralized shear zones—the Con and the Campbell shear systems—have been exploited in the Con mine. Both are essentially zones of chlorite schist containing mineralized lenses and zones in which quartz, sericite, carbonate, and sulphide minerals

¹ Sources of information are: Henderson and Brown (1948); Lord (1951, pp. 99-108); Cominco Staff (1954, pp. 187-195); and G. McVittie (address to the Alberta Northwest Chamber of Mines Annual Convention, Edmonton, February 24, 1961).

are commonly the essential constituents and chlorite is minor. Some of the mineralized zones are sufficiently rich in gold to constitute orebodies. Schistosity in the zones is generally more steeply dipping than the zones themselves and it meets their boundaries at small angles. These are normally gradational. The Con shear system, which is exposed at surface, was responsible for the initial development of the mine and sustained all production until orebodies in the Campbell shear zone were developed about 1950. The shear zone strikes generally N20°E and dips about 60°W. It is reported to average about 50 feet wide but the productive section is a thickened part of the shear zone containing several horses of unsheared country rock. This occurs at a slight deflection in the attitude of the shear zone. The Campbell shear system is about 3,500 feet east of the Con shear system and does not reach surface within the mine area. It is considered to be the faulted extension of the Giant shear zone, and on this premise it was sought and discovered by a skillful analysis of movement on the West Bay fault (Campbell, 1947, pp. 509-526). The Campbell shear system strikes generally north to N20°E and dips mainly from 40 to 60°W. On its eastern side it abuts the steeply-west-dipping West Bay fault at depths ranging from 1,000 to 2,000 feet. The shear system ranges from a few hundred to more than a thousand feet in thickness and comprises schist zones and included horses or tabular masses of unsheared country rock. It has been traced in underground workings for a strike length of some thousands of feet and is known to extend as far south as the Kam Point area, about 3 1/2 miles south of the shaft, where it has been intersected in drill-holes.

Current production is almost entirely derived from the 103- and 102-zones of the Campbell shear system. Both are composite bodies comprised of closely spaced en échelon ore lenses located near the foot-wall of the Campbell shear system. The ore lenses dip at a steeper angle than the shear system and seem to be particularly associated with less steeply inclined parts of it. The zones are at roughly the same elevations and are separated by a strike distance of about 2,000 feet. The 102-zone is on the foot-wall side of a horse of massive rock, near its southern flank. On the hanging-wall side of the horse the Campbell shear zone contains a number of small mineralized quartz veins which collectively constitute the 101-zone. These are characteristically short lense-like veins composed of pink quartz with some carbonate and, unlike the other mineralized zones, minor sulphide minerals. Gold may be coarse and locally abundant.

The mine is composed of two major sets of workings; the original workings from which ore was derived in the Con shear system, and presently active workings in the Campbell shear system. The C-1 shaft which extends to just below the 2,300-foot level was located to service workings in the Con shear system and continued to be

used as the main access opening to the 2,300-foot level after production began in the Campbell shear system. A crosscut on the 2,300-foot level connects the shaft with the B-3 winze in the Campbell shear zone. At present five levels have been developed in the Campbell shear zone to the 3,100-foot level, and work on two deeper levels is under way.

Major extensions to underground workings made in the past year are as follows: (1) The B-3 winze was deepened to just below 3,500 feet and work on the 3,300- and 3,500-foot levels was started. At the time of writing, drifting on the 3,300-foot level had advanced 400 feet south in the shear zone, and on the 3,500-foot level a crosscut was being driven west to the shear zone. (2) The 3,100-foot-level north drift has been advanced to a point about 3,250 feet north of the Rycon-N'Kana boundary. The drift is in the hanging-wall of the Campbell shear system for part of its length but crosses to the foot-wall side at a point where the shear zone swings westerly across its course. Exploration of the shear zone by systematic diamond-drilling is in progress and some intersections of ore-grade material in N'Kana ground have been reported¹. N'Kana claims are owned by Conwest Exploration Company Limited but are held under option by the Consolidated Company. (3) The southern terminations of the 3,100-foot-level workings have been extended to about 450 feet south of the Con-Negus boundary. One drift is on the hanging-wall side of the Campbell shear zone and passes through the 101-zone. A parallel drift on the foot-wall side of the shear zone passes through the 102-zone. Diamond-drilling from these drifts is exploring the shear zone south of the known 102-zone ore lenses and some encouraging mineralized ground has been encountered.

Surface diamond-drilling on the southward extension of the Campbell shear zone on the Kam and Kamex claims near Kam point was continued from time to time during the year. In addition, surface drilling was conducted this autumn on the A.Y.E. claims just south of the Giant mine A shaft with the object of defining the Giant shear zone immediately east of the fault.

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 the rate of about 140 tons of ore per day throughout the past year.

¹ Northern Miner, May 4, 1961.

For the 6-month period ending June 30, 1961¹, 26,409 tons of ore was milled, yielding 33,080 ounces of gold. The average grade of ore milled was 1.265 ounces of gold per ton.

A brief description of the mine workings and geology was given in the previous report of this series (Baragar, 1961). The following account is a record of subsequent developments.

No. 1 vein was exposed in workings on three new levels—the 24th (3,500-foot), the 25th (3,650-foot), and the 27th (3,950-foot). The vein both narrows and shortens with depth. On the 24th level it averages less than 1 foot wide and is confined to the nose and east limb of the fold. An ore shoot, 117 feet long with an average grade of 1.14 ounces of gold per ton across a mining width of 3.5 feet², has been defined on this level. On the 25th level the vein is generally 6 to 9 inches in width and the ore shoot is reduced to a length of 39 feet in which the grade averages 0.45 ounce of gold per ton across a mining width of 3.0 feet³. The ore shoot occurs along the eastern side of the fold crest. On the 27th level the vein averages 2 to 3 inches wide and has been traced for a length of about 25 feet, presumably in the crest region of the fold. It is not considered to be sufficiently well developed on this level to make ore.

A large quartz mass which first appeared on the 10th level just east of No. 1 vein and accompanies it to depth as a steeply-west-plunging column, has gradually disintegrated on the lower levels. 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. On the 24th level it is greatly reduced in size and comprises a main lens and scattered small quartz bodies, and on the 27th level its projected position is taken by a myriad of small drag-folded quartz veinlets, lenses, and stringers. The quartz mass is barren except for marginal strips of ore on the 22nd and 23rd levels but its presence appears to have had a beneficial effect on the neighbouring No. 1 vein.

No. 16 vein, which is generally about 600 feet south and 300 feet west of the shaft, has been fully exposed by development openings on the 9th, 10th, 12th, 14th, and 16th levels, and at the time of writing it was partly exposed by a drift on the 18th level. All levels are

¹ Progress Report, Consolidated Discovery Yellowknife Mines Limited, June 30, 1961.

² Ibid.

³ Northern Miner, October 19, 1961.

connected with the main workings by crosscuts. The vein strikes generally N 15 to 25°E and dips about 75°NW. Its southern end is involved in a complex of steeply-north-plunging drag-folds which, in common with the No. 1 vein, rake eastward. On the 9th, 10th, and 12th levels a parallel vein, presumably a branch of No. 16 vein, is found on the foot-wall side 5 to 10 feet from the main vein and accompanies it for part of its course. No. 16 vein is generally from 1 foot to 3 feet wide and commonly ranges from 150 to 200 feet long. Reported average grades for various levels range from 0.52 to 0.75 ounce of gold per ton across mining widths.

DARK GROUP

The Dark group of claims, comprising claims Dark No. 1 and Egar Nos. 1 to 14, is on the east side of Gordon Lake about 57 miles northeast of Yellowknife (lat. 63°05', long. 113°08'). The claims are owned by J.M. Harriman of Yellowknife but have been held under option by Beneventum Mining Company. Last autumn the Big Four Syndicate—Consolidated Discovery Yellowknife Mines Limited, Consolidated Northland Mines Limited, Rayrock Mines Limited, and Radiore Uranium Mines Limited—optioned the group from Beneventum Mining Company and during the winter carried out a diamond-drilling program on the Dark claim.

The geology of the property was described briefly in a preceding paper (Baragar, 1961). The group is underlain by greywacke and slates of the Yellowknife Group. Three gold-bearing vein-zones are known on or near Northrup Island on the Dark claim. No. 1 vein is at the north end of the island, No. 2 vein is just offshore on its southeastern side, and No. 3 vein is at its southern tip. No. 1 and No. 2 veins were tested in previous drilling programs and a single drill-hole penetrated No. 3 vein, yielding an 80-foot section of quartz containing some visible gold. The Big Four Syndicate confined its attention largely to the No. 3 vein zone. The writer visited the property on March 9 while drilling was in progress.

A total of eight holes with an aggregate length of 2,005 feet were drilled during the program. Six of the drill-holes were placed around the known position of No. 3 vein in an attempt to trace its projections and to sample it further; the two remaining holes were drilled into the No. 2 vein-zone to supplement data obtained from previous drilling. At the completion of drilling the interpretation of the structure of No. 3 vein-zone remained confused and most assays obtained were well below ore grade. The option on the property was subsequently dropped.

F.D. GROUP

The F.D. group of 19 claims is located on the west side of a southeasterly protruding bay that opens into the north part of Salkeld Lake just below the narrows ($61^{\circ}11'N$, $109^{\circ}47'W$). The claims are owned by F. Lypka of Yellowknife but during the past season were held under option by Canadian Nickel Company Limited. Two areas of predominantly copper mineralization are known on the property. Present work is confined to what is known as the 'Gun showing', largely on claim F.D. 15. The other showings, on claims F.D. 11 and 12, were investigated by Giant Yellowknife Gold Mines Limited in 1956. The writer visited the property on June 23, 1961 while Canadian Nickel Company were engaged in mapping, diamond-drilling, and geophysical work around the Gun showing. The following is an account of the writer's observations.

The main zone of the Gun showing is about 550 feet west and 400 feet south of the northeast corner of claim F.D. 15. The zone strikes approximately $N40^{\circ}E$ and has been exposed by four pits along a strike distance of about 80 feet. A fifth pit, about 60 feet northeast of pit No. 4 (pits numbered consecutively from southwest to northeast), is offset a few feet to the northwest from the line of strike of the other pits and appears to have been excavated on a separate mineralized lens. The mineralized zones appear to dip steeply northwest.

Country rock in the vicinity of the main zone is pink silicified meta-arkose with, locally, vaguely defined layering. Near No. 1 pit the layering strikes $N55$ to $60^{\circ}E$ and dips 60 to $70^{\circ}NW$.

The mineralized zone exposed in pits Nos. 1 to 4 ranges in width from about 4 to 6 feet but the boundaries appear to be gradational and the width measured to some extent subjective. In pits No. 1 and No. 2, which furnish the best exposures of rock in place, the heaviest sulphide concentration is in a width of about 2 feet. The sulphide minerals are predominantly bornite and chalcopyrite but some sphalerite and galena are to be found in pit No. 1. Pit No. 4 provides some spectacular specimens of massive bornite with intergrown chalcopyrite. Quartz is commonly associated with the sulphide minerals and in places forms closely spaced subparallel veins that have approximately the same attitude as the zone itself.

Pit No. 5 exposes a mineralized zone, generally confined to about a 4-foot width, that is similar in most respects to that exposed in pits Nos. 1 to 4.

The grade of the deposit as observed in the pits is difficult to estimate as the content of sulphide minerals varies widely from weakly

disseminated to massive; but it may average, within the stated widths, 5 per cent copper or better.

The outcrop or lightly overburdened area in which the zone occurs disappears beneath heavy overburden just south and north of pits No. 1 and No. 5 respectively.

At the time of the writer's visit, two holes had been drilled below the main zone, one between pits No. 2 and No. 3 and one just north of pit No. 5; a third hole was being drilled about 250 feet north of pit No. 5.

Pits No. 6 and No. 7 each expose what appear to be independent mineralized zones. Pit No. 6 is about 400 feet west and 70 feet south of the northwest corner of claim F.D. 15. It exposes an 18-foot section of finely disseminated chalcopryite and possibly bornite in mixed granitic and hornblendic rocks. The sulphide minerals appear to be preferentially associated with the darker rocks. Vaguely defined and discontinuous banding in the country rock strikes about N45°E and dips steeply west. The grade of the zone is estimated as 1 per cent copper or less. Pit No. 7 is on claim F.D. 18 about 400 feet west and 40 feet north of the southwest corner of the claim. It is about 110 feet north of pit No. 6. The pit is caved and the zone is not well exposed. It appears to be about 2 feet wide and is heavily mineralized with sphalerite, galena, and minor chalcopryite and pyrite. Some specimens contain more than 50 per cent sulphides. The country rock is a pink arkose (granite?) striped with subparallel quartz stringers and veins ranging from 1/8 inch to 9 inches wide. These strike about N40°E and dip 75 to 80°NW. They probably reflect the attitude of the zone.

Pits No. 3 and No. 4 on claims F.D. 11 and F.D. 12 respectively were examined briefly. Pit No. 4 is about 550 feet south and 300 feet east of the northwest corner of claim 12. It is about 40 feet long by 30 feet wide and has been excavated in a mixed assemblage of pink granitic rocks (or arkose) and dark biotitic rocks. Finely disseminated bornite and chalcopryite, with little apparent tendency to be concentrated in planar zones, can be found in almost all parts of the pit. On a fresh surface the bornite is not readily apparent and visual estimates of the grade would probably be low. The pit area as a whole may contain between 1 and 2 per cent copper. Pit No. 3 is about 850 feet south and 80 feet west of the northeast corner of claim 11 (northwest corner of claim 12). The area covered by the pit and stripping is about 40 by 25 feet. The country rock is largely pink granitic rock or possibly recrystallized arkose. Two silicified zones weakly mineralized with chalcopryite and bornite intersect in the pit. One is 1 1/2 to 3 feet wide and coincides with a set of closely spaced fractures that strike about N60°W and dip 75°N. The other zone is a maximum of about 2 feet wide and strikes N35°E. Little sulphide mineralization was observed in the country rock.

GIANT YELLOWKNIFE MINES LIMITED

The Giant mine of Giant Yellowknife Mines Limited at Yellowknife was described briefly in the previous paper of this series (Baragar, 1961). The following account records the major developments that have taken place from July 1, 1960 to September 30, 1961. The information was supplied by the mine staff or contained in annual or quarterly reports of the company.

During the period January 1 to June 30, 1961, a total of 177,122 tons¹ of ore was milled, an average daily milling rate of 979 tons. A total of 113,848 ounces of gold and 12,643 ounces of silver was recovered during the period. The mill-heads averaged 0.787 ounce of gold per ton and the overall recovery can be determined to be 81.70%.

At December 31, 1960 the mine contained estimated ore reserves as follows²:

	Tons of Ore (including 10% dilution)	Grade (oz per ton)
Active stopes	1,038,650	.80
Pillars	95,022	.78
Other developed ore	1,416,328	.78
Total ore reserves	2,550,000	0.79

The principal exploration work during the period under review was on the 2,000-foot and 1,650-foot levels. On the 2,000-foot level, drifts were driven north and south along the hanging-wall of the Giant shear zone for approximately 3,200 and 1,300 feet respectively from the main (2,001) crosscut. Two additional crosscuts, driven eastward from the drifts 1,200 feet north and 800 feet south of the 2,001-crosscut, have penetrated the volcanic-sedimentary contact about 800 to 900 feet east of the drifts. On the 1,650-foot level the crosscut from C-shaft was extended to the foot-wall region of the eastern limb of the shear zone about 900 feet east of the shaft and drifts were driven north and south, roughly parallel with the shear zone for approximately 1,600 and 600 feet respectively. Systematic diamond-drilling from the new workings on the two levels has defined the lower part of the shear zone for a considerable strike length and tested its ore potential.

¹ Quarterly Report for the 3 months ended June 30, 1961, Giant Yellowknife Mines Limited.

² Annual Report 1960, Giant Yellowknife Mines Limited.

The shear zone has a fold-like configuration. On the upper levels it forms two arches and an intervening trough. West of the western (A.S.D.) arch the zone flattens just below the surface and continues westward in a series of undulations until it rises above surface level. East of the eastern (G.B.) arch the shear zone dips steeply east and extends downward to about the 2,000-foot level, there it flattens and continues to the east in a series of gentle undulations. In a longitudinal section the trough formed by the abrupt change in dip at about the 2,000-foot level shows a gentle reversal in plunge. Thus at the southern limit of drifting, 1,300 feet south of the 2,001-crosscut, the upper contact of the shear zone is 180 feet above drift level. It passes below drift level just south of the crosscut, reaches a maximum depth 2,200 feet north of it, and rises to drift level again about 3,000 feet north of the crosscut. The centre of the depression is approximately in the same cross-sectional plane as the centre of a similar depression formed by the axis of the main trough that lies between the A.S.D. and G.B. arches. The eastern limit of the shear zone on the 2,000-foot level appears to be the steeply-west-dipping volcanic-sedimentary contact. Preliminary work indicates that the shear zone spreads out along the contact above and below the level, but its possible extension in this plane has not been fully investigated.

On the 1,500-foot level, drifts have been driven along the axial region of the main trough to points about 1,550 feet north and 550 feet south of a section through C-shaft. At December 31, 1960, about 180,000 tons of new ore had been outlined north of the shaft and substantial additional ore indicated in the trough of the shear zone¹.

EXPLORATION IN KEEWATIN DISTRICT BY GIANT YELLOWKNIFE MINES LIMITED

During the field seasons of 1960 and 1961 the exploration division of Giant Yellowknife Mines Limited conducted extensive helicopter-supported explorations in Keewatin District. Three groups of claims were staked as a result of the first season's work and these were explored in greater detail during the past summer. The following reports are based on the writer's visit to the properties in the latter part of July 1961.

The total exploration program originally embraced an area bounded as follows: from lat. 62°30', long. 97°00', east on the parallel to long. 93°00', then south on the meridian to lat. 62°00', then west to long. 93°30', then south to lat. 61°45', then west to long. 96°00',

¹ Annual Report 1960, Giant Yellowknife Mines Limited.

then south to lat. $61^{\circ}30'$, then west to long. $97^{\circ}00'$, and then north to the origin. During the past summer, work was confined to the following thirteen permit areas granted under the new Canada Mining Regulations, the previous spring: (N.T.S.) 55 F/13, 55 K/4, 55 K/3, 55 L/8, 55 L/7, 55 L/6, 55 L/5, 55 L/3, 55 E/14, 55 E/13, 55 L/4, 65 I/1, and 65 H/16. Forty-two men were employed in the district and the operation was continuously supported by a helicopter and a fixed-wing aircraft. Supplies were obtained from Churchill. Crews were in the field from late March until late August.

Peter Group

The Peter group of 108 claims is in permit area 55 L/7 between the two northeasterly arms of Kaminak Lake (approximately $62^{\circ}20'N$, $94^{\circ}44'W$).

A large belt of mineralized schist, more than 2 miles long and with a maximum width of about a mile, has been the main object of interest on the property. It trends approximately east-northeast parallel with adjoining and intercalated volcanic rocks. Schistosity strikes consistently about $N45^{\circ}E$ and dips steeply east and is therefore at a moderate angle to the regional trend. Felsitic volcanic rocks predominate north and west of the schist zone, whereas basic volcanic rocks are intercalated with the schists and underlie the region south of the zone. All volcanic members dip vertically to steeply south or south-east. At its west end the schist zone and adjoining volcanic rocks swing sharply southward and pinch out. At its east end the zone fingers out in felsite except for a few narrow zones that continue eastward.

The schist is a light buff to grey, talcose, sericite schist, locally containing lenses of little-altered felsite. In places it is speckled with deep-blue metacrysts of chloritoid about 1 mm in diameter. It is probably a schistose acid volcanic rock. Finely disseminated pyrite is widespread and generally gives the schist a rusty appearance on weathered surfaces. Commonly quartz-carbonate stringers and veins accompany the schist. Only rarely does the rock outcrop, but not uncommonly it appears on the surface in patches of loose rusty-weathering flakes. Sampling of pits and trenches in the pyritized schist last year is reported to have yielded encouraging assays in gold. Accordingly, a drilling program was carried out this summer. Six holes were drilled on a north-south profile, 3,500 feet long, that crossed the schist zone, and six other holes were drilled on mineralized sections elsewhere in the zone. A total of 5,200 feet of drilling was completed. Assay returns were disappointingly low and plans for further work on the property were abandoned.

Dee Group

The Dee group of 64 claims is in permit area 55 L/4 in the vicinity of Spi Lake, about a mile west of Carr Lake (approximately 62°04'N, 95°53'W).

The claims are underlain by a northwesterly striking succession of acidic lavas, fragmental rocks, and tuffs interbedded with intermediate to basic volcanic rocks. On the east side of Spi Lake, just northeast of the claims, the volcanic assemblage is intruded by a small granite plug some 2 to 3 miles in diameter. Diabase dykes ranging from a few feet to more than 100 feet wide are particularly numerous and intrude all other rocks. The thicker dykes contain sparsely scattered feldspar phenocrysts ranging generally from 1/2 inch to 3 inches long. Two dyke attitudes predominate; one north-northeasterly with steep easterly dips, and the other southeasterly with westerly dips. The latter approximately parallels the attitude of the volcanic succession. Shear zones with a north-northeasterly strike are prominent in a number of places on or adjacent to the claim group, particularly southeast of Spi Lake.

Most of the mineralization discovered to date is on the easterly of two arrow-shaped peninsulas that project into Spi Lake from the northwest. Outcrops occur at the tip of the peninsula and at its base about 2,000 feet to the northwest. The area between is covered with overburden

On the east side of the tip of the peninsula, patchy gossan zones are found over a length of about 300 feet and a width of 60 or 70 feet. The largest continuous gossan is about 50 feet long and 20 to 30 feet wide. It is heavily mineralized with sphalerite, chalcopyrite, pyrite, and pyrrhotite, and contains some galena. Other gossans in the vicinity contain massive pyrrhotite and chalcopyrite and disseminated pyrite and sphalerite. The host rock is a coarse breccia containing closely packed angular fragments, up to 3 feet across, of massive rhyolite and acidic tuffs in a light greenish grey dacitic matrix. The rock is unshered and the mineralized zones do not appear to have any marked trend. Diabase dykes cut and terminate some of the gossan zones. On the west side of the tip of the peninsula are three notable gossan zones. One extends along the shoreline for about 120 feet before disappearing southward into the lake. On the north it is cut off by a thick north-northeast-trending diabase dyke. The zone has a maximum exposed width above water-level of about 20 feet and is underlain on the east by a diabase sill that springs from the large dyke to the north. The host rock is bedded acidic tuff with a strike of N55°W and a dip of 60 to 70° SW. The mineralization comprises disseminated pyrite and sphalerite and is spottily distributed along the zone. About 75 feet east and a few feet south of this zone a second gossan zone outcrops for a strike distance of about 25 feet and a width of about 10 feet. It disappears beneath

overburden at both ends and on the west side, and it is underlain on the east side by another diabase sill. The host rock appears to be an acidic tuff with an attitude similar to that in the other zone. The mineralization is largely disseminated pyrrhotite and chalcopyrite. At the northern end of the outcrop area, about 100 feet from the western shore, a zone of massive pyrite abuts the hanging-wall of the thick north-northeasterly-trending dyke referred to above. The zone is exposed in a shallow pit and small outcrop area. Its projected extension on the northwest side of the dyke is below water-level

On the west side of the outcrop area at the base of the peninsula, weakly mineralized acidic tuffs are exposed over a strike length of about 300 feet and a maximum width of about 40 feet. The zone disappears beneath overburden on both ends and on its west side. Underlying it on the east is a thick assemblage of greenish grey intermediate or basic volcanic rock containing sparse irregular masses of rhyolite. The zone strikes about N30°W and dips moderately to steeply west. It is approximately on strike with and about 2,200 feet north of mineralized bedded tuffs on the west side of the tip of the peninsula. Sulphides consist mainly of finely disseminated pyrite and sphalerite distributed in patches along the zone.

About 6,700 feet of diamond-drilling had been completed on the Dee group at the time of the writer's visit.

Torin Group

62° The Torin group of 81 claims is in permit area 55 K/3 on lower Ferguson River, about 9 1/2 miles west-northwest of Tavani (approximately 61°06'N, 93°22'W). The claims were staked in 1960 to cover two mineralized zones discovered a few hundred feet north of Ferguson River, at a point about 4 1/2 miles above its mouth in Neville Bay.

The mineralized zones are near the contact of a volcanic assemblage of basalts, intermediate volcanic rocks, pyroclastic rocks, and subordinate rhyolites on the north, and an intrusive complex of anorthositic gabbros and gabbros on the south. The volcanic rocks range in strike from N50°E to N70°E and dip steeply north. The contact is not exposed but evidently trends approximately parallel with the volcanic assemblage.

The most westerly of the mineralized zones is in a band of chlorite-carbonate schist¹ at the base of a south-facing volcanic bluff, and at the southern fringe of an outcrop area. The nearest exposures to the south, a few hundred feet distant, are of white anorthosites and anorthositic gabbros. The chlorite-carbonate schist strikes about N70°E and dips about 80°N. It can be traced for about 300 feet along the edge of the outcrop and in this distance has a maximum exposed width of about 65 feet. It disappears beneath overburden westward and pinches out in volcanic rocks eastward. Drilling has indicated that the chlorite-carbonate schist is associated with and is probably altered from, a serpentine lens that extends southward. The mineralized zone can be traced from the eastern extremity of the chlorite-carbonate schist lens for about 40 feet westward to the edge of the outcrop. A pit excavated on the zone near the edge of the outcrop exposes a 7 1/2-foot width of heavily disseminated pyrrhotite and chalcopyrite. A chip sample taken by the writer across the full width of the sulphide zone in the pit gave the following assay results: Ni—0.86%, Cu—0.37%, Au—0.005 oz/ton, and Ag—0.11 oz/ton².

About 350 feet east of the pit, approximately along the strike of the chlorite-carbonate schist zone and at the southern fringe of the outcrop area, is a second serpentine lens with accompanying chlorite-carbonate schist which can be traced for an additional 375 feet eastward. Thus the contact area between the volcanic rocks and the anorthositic gabbros appears to be a loci of serpentine intrusion and a zone of structural weakness. Severe shearing is found around the margins of the ultrabasic lenses and extends into the country rock beyond their terminations.

The eastern mineralized zone begins about 1,200 feet east of the western zone and is approximately on strike with it. It is in volcanic rocks, but is in a shear zone that springs from the borders of the eastern serpentine lens. The zone is about 250 feet long and has a maximum width of about 8 feet. It strikes generally N65 to 75°E and appears to dip about 75°N. Five pits have been excavated along it.

¹ This rock has the appearance and feel of a talc-carbonate schist, but in thin section the predominant micaceous mineral has the following properties: colourless, optically positive, small 2V, birefringence about .010, Z and Y index approximately = 1.580; hence the mineral is not talc but has the properties of a chlorite.

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

The mineralization is largely disseminated pyrite and chalcopyrite. A grab sample taken by the writer from the fourth pit from the west end gave the following assay results: Ni—none detected, Cu—0.89%, and Co—0.02%¹.

H.M. GROUP

The H.M. group of three claims is a gold prospect staked in June 1959 by J. Herriman of Yellowknife. The claims are on the east side of Hidden Lake in the Beaulieu River area (62°33.3'N, 113°31'W), about 28 miles east-northeast of Yellowknife. Shaft sinking was undertaken on the property during the past summer in response to favourable drilling results, and at the time of the writer's visit on September 8, 1961, the shaft had reached a depth of about 50 feet. Most of the work has been done by C. McChesney and J. Herriman. The shaft is approximately 500 feet south and 230 feet west of the northeast corner of claim H.M. 2 and about 675 feet east-northeast of the shore of Hidden Lake, at the base of a conspicuous narrow peninsula near the southeastern end of the lake. It is an 8-by-8-foot steeply inclined shaft, over which a small head-frame has been erected. The following is a description of the geology and workings in the vicinity of the shaft.

Thin-bedded greywackes and slates of the Yellowknife Group form the country rock. The bedding ranges in strike from N 15°W to N 5°W and dips 25 to 35°E. A few of the greywacke beds contain metamorphic nodules, so that the prospect is within the metamorphic aureole surrounding the Hidden Lake granite.

The gold-bearing quartz vein encountered in drill-holes and in the shaft is not presently exposed at the surface, but a series of three caved pits aligned parallel with the bedding and lying about 40 feet west of the shaft were presumably excavated on its surface exposures. The pits range over a strike distance of about 150 feet, with the northern pit directly west of the shaft. The central pit is about 60 feet long parallel with the bedding and is reported to have been the site of an inclined shaft lying in the vein. A series of seven holes drilled along a line about 50 or 60 feet east of and parallel with the row of pits, are reported to have cut a quartz vein over a strike length of at least 110 feet.

In the shaft the vein material is a complex of quartz veins, and includes actinolitic country rock. Quartz is first encountered at a depth of about 40 feet and extends to the base of the shaft at about 50

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

feet. Most of the individual quartz veins, and the vein assemblage in general, are conformable with bedding in the enclosing greywackes and shales, but locally veins and irregular quartz bodies crosscut bedding planes. The vein assemblage in the shaft is at the crest of a small open fold or roll that plunges N45°E from the southwestern to the northeastern corners of the shaft at an angle of 30 to 40°. Bedding in adjoining greywackes changes from N80°W with a dip of 70°N at the northwest corner of the shaft, to N8°E with a dip of 40°E at the southeast corner. The true width of the vein in the shaft is at least 10 feet and the foot-wall was not exposed. Because of the folding however, the vein thickness may be considerably greater in the shaft area than elsewhere.

Vein material comprises bluish grey to whitish quartz, commonly well-ribboned, and it contains numerous inclusions of green actinolitic country rock. Metallic minerals, largely pyrite and some pyrrhotite, form less than 1 per cent of the vein matter. Galena is reported as a constituent where gold values are high. Visible gold was not observed in place but one drill-hole is said to have encountered spectacular amounts. Tourmaline is a rare vein-constituent.

A second quartz vein is exposed in two old pits about 20 feet apart, located some 300 feet N20°W of the shaft. In the southern pit the vein is about 15 feet wide and appears to be conformable with adjoining greywackes which strike N35°W and dip 35°E. The northern pit is flooded, but visible parts of the vein indicate that it is also a bedding vein about 2 feet thick. Considerable excavation has taken place in the northern pit; it is now about 25 feet long, 15 feet wide, and may average 4 or 5 feet deep. Overburden covers the rock in the vicinity of the pits so that the extensions of the vein are obscured. However, it is unlikely that this vein is a continuation of the one observed in the shaft.

JAX GROUP

The Jax group of 27 claims is in the Courageous Lake area about 156 miles northeast of Yellowknife (lat. 64°18', long. 111°27'). The claims were staked in 1960 by Norman W. Byrne Limited of Yellowknife for the Big Four Syndicate (Consolidated Discovery Yellowknife Mines Limited, Consolidated Northland Mines Limited, Rayrock Mines Limited, and Radiore Uranium Mines Limited).

In the late summer of 1960 the property was mapped and two gold-bearing vein-zones—known as 'No. 1' and 'No. 2' zones, on claims Jax 11 and 14 respectively—were drilled. The results were encouraging but drilling was interrupted by freeze-up. Drilling was resumed in May and June of this year and an additional 4,144 feet of drill-hole was completed. The geology of the property and a report on the work performed in 1960 were described in the previous paper of this

series (Baragar, 1961). Below is a brief résumé of the geology in the vicinity of No. 1 and No. 2 zones and an account of work performed this year.

No. 1 and No. 2 zones are in metavolcanic rocks of the Yellowknife Group, some 600 to 800 feet west of the contact with meta-greywackes and slates of the same group. The rocks strike approximately north and dip steeply east to vertical. The vein zones are roughly conformable with the enclosing rocks. No. 1 zone extends northward from a point just north of a small bay at the southwestern tip of Jax Lake. No. 2 zone is about 300 feet east of the projected strike of No. 1 zone and extends southward from the south shore of the same bay. Drilling last year tested No. 1 zone along a strike length of 250 feet and No. 2 zone along a strike length of 200 feet. Within these lengths the grade for No. 1 zone was reported to average 0.40 ounce of gold per ton across a width of 3 feet, and for No. 2 zone, 1.16 ounces of gold per ton across a similar width.

The drilling program this year was designed to test the northward extensions of both zones. Five holes drilled beneath the bay of Jax Lake extended the known length of No. 2 zone an additional 200 feet. Near its north end the zone is offset about 50 feet westward, presumably along two northwesterly striking faults whose presence was already suspected. No positive evidence was found that No. 1 and No. 2 zones are faulted parts of a single zone as suggested by field mapping. No. 1 zone was traced by seven drill-holes for an additional length of 500 feet. It too is offset to the west about 100 feet by a previously postulated northwest-striking fault that cuts the zone about 500 feet north of its southern termination.

Drilling last year showed that No. 2 zone terminated abruptly along its projected strike southward and may have been offset by a fault. Accordingly, stripping was carried out this year across the projected extension of the zone. However, neither the vein nor positive evidence of faulting could be found.

The results of this year's drilling was disappointing, compared with last year's results. Although the vein-zone in the newly drilled sections is similar in width to that tested previously and is well mineralized, the assay results were generally low. Only scattered intersections of ore-grade material were found.

J.F.J. GROUP, QUINN LAKE

The J.F.J. group of 57 claims was staked in March 1961, following an announcement of the discovery of a major magnetic anomaly in the Quinn Lake area by a Geological Survey aeromagnetic survey

(GSC Information Circular No. 4). The magnetic anomaly (GSC Map 1027G) trends approximately north and is at least 12 miles long. It has two major culminations along strike and the beginning of a third at the north end of the mapped area. The southern culmination is about 3 miles long and has a maximum value of 10,200 gammas, the highest in the anomaly. The J.F.J. claim group covers most of the southern culmination. The group is about 6 miles east-northeast of Quinn Lake in the southwest corner of the Penylan Lake - Firedrake Lake map-area. The claims are owned by James A. Hanna of Whitehorse.

The writer visited the claims on August 28, 1961, and the following is an account of observations made.

The anomaly area is generally heavily covered with a coarse boulder drift. Outcrops are scarce and not visible from the air. No evidence of work was observed and a traverse was run consequently across the highest part of the anomaly.

Most of the section covered by the traverse is underlain by pink biotite granite-gneiss containing augen-like porphyroblasts of feldspar up to 1 1/2 inches long. Rarely the gneiss contains discontinuous thin layers rich in amphibole or pyroxene, and biotite. Gneissosity is generally N 30° E and dips steeply northwest. In the vicinity of the magnetic high, two small areas of outcrop were found about 1,500 feet apart along the strike of the anomaly. Both were composed of a medium-grained, dark, quartz-pyroxene-amphibole hornfels, rich in finely disseminated magnetite. The southern outcrop is on claim J.F.J. No. 4 about 300 feet west and 100 feet north of the southeast corner and the northern outcrop area, just north of the southern boundary of claim J.F.J. No. 3 about 1,200 feet east of the southwest corner.

The northern outcrop area comprises two small outcrops of the magnetite-bearing rock, about 100 feet apart across strike, with an intervening outcrop of granite. Hence the magnetic hornfels appears to interfinger with the granitic gneiss. Magnetic interference with the compass was obtained for a width of about 500 feet across the region in which the magnetic hornfels outcrops.

A thin section of a specimen from the southern outcrop contains approximately 37 per cent hypersthene and blue-green hornblende, 40 per cent quartz, and 23 per cent magnetite by volume. The grain size of the rock ranges largely between 0.2 and 2 mm with an

average of about 1 mm. A semi-quantitative spectrographic analysis of the same specimen yielded the following results¹:

<u>Element</u>	<u>Range of Concentration</u>
Si	major
Fe	major
Mg	minor
Al	0.1 - 1.0 per cent
Ti	0.01 - 0.1 per cent
Ca	0.01 - 0.1 per cent
Ba }	less than 0.01 per cent
Cr }	
Mn }	
Cu }	

LEN GROUP

The Len Group of 27 claims is in the Yellowknife greenstone belt on the east and south sides of Walsh Lake. It is held by Fred Lypka and Len Peckham. The property was visited on September 1, 1961.

Most of the claims area is underlain by felsitic volcanic rocks of the middle division of the Yellowknife Group. The rocks strike generally N20 to 30°E and dip vertically or steeply. A number of quartz veins and mineralized zones have been found on the property and many have been trenched. Most are old trenches. The following account applies only to mineralized zones currently being investigated.

A belt of isolated mineralized patches in felsitic tuff parallels the east boundary of claims Len 26 and 27 and is 100 to 200 feet west of it. The belt is in excess of 1,000 feet long and is largely on claim Len 26. Individual mineralized patches are rarely more than 3 or 4 feet wide and 20 to 30 feet long, and may be widely separated from one another. Mineralized patches are difficult to trace in outcrops but it is doubtful if an appreciable length of continuously mineralized rock will be found within the belt. The owners have exposed the mineralized material at several places with shallow blast-holes. The mineralized patches comprise quartz-sericite schist containing finely disseminated arsenopyrite, pyrite, and pyrrhotite. Galena and sphalerite are conspicuous constituents in one or two places near the south end of the belt. Low gold values are reported.

¹ Spectrographic Laboratory, Geological Survey of Canada.

A quartz vein has been exposed by two trenches near the north boundary of claim Len 25 just west of the north tip of a small lake. The vein strikes about N 15°W and dips vertically, in conformity with the enclosing mixed acid and basic tuffs. The trenches are 20 feet apart along the strike of the vein. In the north trench the vein is 4 feet wide and is composed of massive grey quartz containing less than 1 per cent of arsenopyrite, pyrite, and rare galena. In the south trench the vein is represented by a 4-foot-wide zone of closely spaced quartz veins and stringers. No trace of the vein is found in outcrop along the projected strike of the vein at distances of 20 feet south and 45 feet north of the south and north trenches respectively. As fairly high values are reported from selected samples of this vein, a chip sample was taken across the 4-foot vein-width in the north trench. This assayed: Au—0.025 ounce per ton, and Ag—0.155 ounce per ton¹.

LOU AND EASY GROUPS

The Lou and Easy groups, of twenty claims each, are located near Little Buffalo River, respectively about 14 and 20 miles south of its outlet at Great Slave Lake. The Lou group straddles Little Buffalo River and the Easy group is about 2 to 4 miles west of it. Both groups were staked for Dominion Explorers Limited in June and July of 1960.

The claim groups are underlain by flat-lying Palaeozoic sedimentary rocks, but because of the low swampy nature of the terrain, outcrops of bedrock are scarce or absent. The claim groups were located almost wholly on the basis of results from geochemical soil-sampling.

A drilling program, initiated in January 1961, had to be terminated after one hole was drilled because of the absence of water in the solidly-frozen shallow lakes and swamps characteristic of the area.

The writer visited the Dominion Explorers Limited camp on March 3, 1961 and inspected core from the one hole drilled. This is a vertical drill-hole on the Lou group of claims on the west bank of Little Buffalo River. The following is the writer's log:

<u>Footage</u>	<u>Description</u>
0 - 19	Overburden

¹ Analytical Chemistry Section, Mineral Sciences Division, Mines Branch, Ottawa

<u>Footage</u>	<u>Description</u>	
19 - 95.6	Buff to grey limestone containing crinoid stems and brachiopods.	Pine Point Formation (?)
95.6 - 96.2	Thinly banded anhydrite.	Fitzgerald Formation (?)
96.2 - 110.5	Buff, mottled, silty dolomite, varying to dark irregularly banded and vuggy layers; the latter appear to be bituminous.	
110.5 - 116	Core missing. At this point a high-pressure gas pocket was encountered in drilling.	
116 - 136	Well but irregularly banded, light buff and white anhydrite.	
136 - 252	Alternating layers of white or light grey and dark resinous-appearing anhydrite; layers are up to 1 inch thick and commonly parted into discrete lensoidal fragments.	
252 - 301	Mainly dark anhydrite. Banding is less conspicuous than in section above.	
301 - 362	Buff, faintly to distinctly banded anhydrite and dolomite with a number of shale layers 4 inches to 1 foot thick.	
362 - 374	Anhydrite-dolomite breccia cemented with dolomite or anhydrite.	

<u>Footage</u>	<u>Description</u>
374 - 392	Interlayered breccia and dolomite-anhydrite. Breccia consists of dolomite, anhydrite, and mudstone fragments in a grey mudstone matrix. A few of the fragments are reddish mudstones. The breccia is very friable.
392	End of hole.

MYRT AND W.T. GROUPS

The Myrt group of twenty-seven claims and the W.T. group of two claims are owned respectively by Sam Otto and Walter Ternawski of Yellowknife. The groups form a block of claims located from 1 mile to 2 1/2 miles north of Dome Lake, about 42 miles north-east of Yellowknife (lat. 62°48', long. 113°15'). Giant Yellowknife Mines Limited optioned the claims last winter and during May, June, and July mapped the property and sampled the principal showings. The claims encompass much of the former S.D.C. property of Dome Mines Limited and have been described under that name by Lord (1951, pp. 257-258). Earlier, the main showing on the property was described by Henderson and Jolliffe (1939, pp. 328-330) who also provided a sketch-map of the deposit.

The writer visited the claims on June 12 when a three-man party under the direction of J.A. Kelly was on the property.

The main deposit (No. 1 showing), now on claims W.T. 1 and 2, has been adequately described in the references given above. Briefly, the deposit is an elongate quartz mass with associated quartz stock-work and stringer zones. It strikes northwest to north-northwest, is about 200 feet long, and has a maximum width of 40 or 50 feet. The enclosing greywackes and slates of the Yellowknife Group form an S-shaped drag-fold plunging steeply southeast and the quartz body lies mainly along the faulted middle limb of this fold. The fault is readily observed in the sedimentary rock, where it disrupts continuity between opposite elements of the double fold, but it cannot be traced through the quartz. The quartz body is generally well mineralized with patches of pyrite, pyrrhotite, arsenopyrite, sphalerite, galena, and chalcopyrite.

Former owners completed seventeen trenches on the main quartz body and an additional nine trenches on a subsidiary quartz

zone a short distance to the west. Most of the trenches in the main quartz body were resampled during this summer's investigations. The quartz body was calculated to contain 559 tons per vertical foot and the average grade from all trenches sampled was calculated as 0.25 ounce of gold per ton across an average width of 33.2 feet¹.

No. 2 showing on claim W.T. 2 comprises a belt of quartz stringer zones and stock-works ranging over a length of about 500 feet. It begins about 100 to 200 feet east of No. 1 showing and in general has an easterly strike. In detail the quartz bodies are irregular. They range from well-defined stringers or veins to irregular quartz bodies and are both conformable and crosscutting with relation to the enclosing greywackes. At least fourteen trenches were excavated along this belt by the former owners of the property. Resampling of these trenches this summer returned very low assay results.

No. 3 showing also called the 'Muir zone', is close to the north boundary of claim Myrt 19 and begins some 300 to 400 feet west of No. 1 post. It is about 1,200 feet west-southwest of the westernmost tip of an S-shaped lake on the property. The zone contains a number of subparallel quartz veins and stock-works distributed across a width of 75 to 100 feet and trenced over a length of about 300 feet. Individual veins range in width from a few inches to 13 feet but are generally a foot or less. Vein material is white to light grey, glossy or sugary quartz with minor sulphide minerals. Veins strike about N55°W on the eastern end of the zone and N15°E on the western end. Bedding in the enclosing greywackes and slates near the western end of the zones strikes N80°E and dips 80°S. A number of trenches have been excavated along the zone and these were cleaned and sampled during the evaluation program this summer. Assay results were all low.

PAT GROUP

The Pat group of nine claims on the south shore of the east arm of Great Slave Lake, directly south of Union Island (61°49.6'N, 112°05'W), was staked in August 1960 by its present owner, Gus Weyrowitz of Yellowknife. The claims have been visited this past season by representatives of one or more mining companies. The writer visited the claims on August 18, 1961.

The showings are all on claim Pat No. 2 and the only mineral of economic significance observed is chalcopyrite.

¹ Figures from Giant Yellowknife Mines Limited report on the Myrt and W.T. claims kindly supplied by W. Ternawski.

Claim Pat No. 2 is bounded on its north side by an arm of Great Slave Lake and on its south side by a northeasterly trending lineal depression containing a small elongate lake. Red shales, siltstones, and white quartzites of the Kahochella Formation (Henderson, 1939) outcrop along the shore of Great Slave Lake and inland for about 200 feet. The remainder of the claim is underlain by a highly altered assemblage of sedimentary rocks, probably largely metagreywackes and meta-arkoses. Both groups of rocks strike N45°E. The red shales dip steeply northwest and face southeast; the metasedimentary assemblage dips generally southeast.

Three sets of pits have been blasted on mineralized zones in a thick conglomeratic meta-arkose layer near the southern boundary of the claim.

One set of three pits is located approximately 325 feet north and 330 feet west (parallel with the claim lines) of No. 2 post, Pat No. 2 claim. The main pit exposes a lens of heavily disseminated to massive chalcopyrite that strikes west and dips 65°N. The lens is 18 inches wide in the west wall of the pit but pinches out in the east wall. Westward it can be traced for 6 feet before disappearing beneath overburden, and eastward a barren fracture marks the projected extension of the lens. Isolated patches, blebs, and stringers of chalcopyrite are found in the country rock on the foot-wall side for a distance of 6 feet from the lens. Additional pits have been located about 30 feet northeast and 65 feet west of the main pit. The eastern pit exposes an 8-inch-thick carbonate vein that strikes about N70°E and dips 60°N. Minor chalcopyrite occurs along its hanging-wall. The western pit exposes a few subparallel carbonate stringers containing minor chalcopyrite. It appears to be a few feet south of the projected strike of the main chalcopyrite lens.

A second showing is exposed in a set of pits and in outcrops about 750 feet west of the southeast corner of the claim and about 150 to 200 feet north of the elongate lake that lies along the southern boundary of the claim. The mineralization is associated with a pronounced gouge-filled fracture and is exposed mainly in a south-facing bluff that descends in a series of steps to the lake. The fracture strikes N75°W and dips 40 to 50°NE where it is exposed in the bluff face. Massive to heavily disseminated chalcopyrite replaces country rock in irregular pods on the foot-wall side of and adjacent to the fracture. The mineralization is mainly confined to a strike length of about 50 feet; and the best pod within this distance has a length of about 20 feet and a maximum width of about 7 feet. Some chalcopyrite can be found within the 4 or 5 inches of gouge lining the fracture and in small 1- to 2-inch carbonate and quartz-carbonate veins that strike across the fracture. The main fracture can be traced intermittently northwestward through patchy overburden for a strike length of about 120 feet where it swings

southwestward parallel with the enclosing country rock and dies out. Southeastward it passes beneath overburden but cannot be found in outcrops along its projected strike 45 feet farther on. Possibly it swings northeastward, again parallel with the host rocks, and may therefore be an S-shaped fracture.

A third showing is just west of the line between claims Pat No. 1 and No. 2 and about 315 feet north of the southeast corner of Pat No. 2. Two trenches 45 feet apart expose a fracture with a strike of N 85° E and a dip of 60° N. A seam 8 to 10 inches thick, of heavily disseminated to massive chalcopyrite, is associated with the fracture in the eastern trench but pinches out about 15 feet westward. Minor mineralization is found in the western trench. Eastward the chalcopyrite lens terminates abruptly.

TAURCANIS MINE

Taurcanis mine is just south of Matthews Lake in the Courageous Lake area, about 150 miles northeast of Yellowknife (approximately lat. 64° 02', long 111° 11'). It is a developing gold property that in recent years has been vigorously explored by extensive underground workings, with the result that reserves estimated to be 200,000 tons, grading an average of 1 ounce of gold per ton, have been developed to the 1,225-foot level. At the time of writing, a decision on production was pending. The operation 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 description of the property was given in the preceding paper of this series (Baragar, 1961) and the following report is mainly confined to current developments.

Two gold-bearing deposits are under investigation: the Matthews vein which lies along or immediately adjacent to a northerly trending contact between basic volcanic rocks on the west and greywackes and shales on the east, and the South zone which comprises a multitude of quartz lenses and veins within volcanic rocks near the contact farther south. The Matthews vein dips generally from 65 to 75° E and, if not actually along the contact, is in sedimentary rocks within a few feet of it. A shaft on the east shore of Bulldog Lake services underground levels on the Matthews vein and is connected by a drift on the 2nd (325-foot) level with the South zone some 3,000 feet to the south.

During the past year the shaft was deepened from the 625-foot level (4th) to just below the 1,225-foot level (8th), and workings on the 6th (925-foot) and the 8th levels were developed. The 6th-level drift extends from about 100 feet north to about 600 feet south of the shaft, and the 8th-level drift from 180 feet north to 1,600 feet south of the shaft.

Several raises designed to test ore between levels, have been completed in the newly-developed section.

Exposures of the Matthews vein on the 6th and 8th levels are similar to its exposures on the upper levels. The vein is generally composed of dark glassy quartz mottled or ribboned with quartz of a lighter colour. Partings coated with sericite and chlorite commonly parallel the walls of the vein and are a favoured locality for the occurrence of visible gold. Metallic minerals form less than 1 per cent of vein matter and are mainly arsenopyrite, pyrrhotite, pyrite, and chalcopyrite. The vein is not continuous throughout the drift length. In places it is absent, in others it is represented by intermittent stringer zones or widely scattered lenses or masses of quartz. It ranges in width from a few inches to about 4 feet but is commonly 1 foot to 3 feet. Within the vein, gold is concentrated in shoots which, in all other respects resemble non-ore-vein material.

The 6th- and 8th-level drifts both intersected the steeply raking main ore shoot a short distance south of the shaft. It appears to be continuous from the surface to the 8th level, with only modest changes in dimensions. Other known ore shoots in the mine are less continuous but have a similar steep to vertical rake.

Considerable exploration work has been done in the South zone during the year. A raise was completed from the 2nd level to the surface and crosscuts were driven east and west from the main drift to provide a broad drilling base. The east crosscut reached the sedimentary contact at about 170 feet, and drifts were driven north and south along the contact. From the west crosscut a subsidiary drift was driven north for about 145 feet to trace out a vein encountered in the crosscut. This autumn, the South zone between 2,600 and 3,100 feet south of the shaft was explored by fifteen drill-holes, aggregating 4,366 feet, and an additional number of short pack-sack drill-holes. As a result of this work numerous quartz-vein intersections are known but few can be correlated with confidence from one hole to another and an estimate of ore potential in the zone is as yet difficult.

Additions to the camp this year include a two-story warehouse measuring 60 by 28 feet and a two-story bunkhouse measuring 96 by 48 feet.

TIN GROUP

The Tin group comprising six claims is at the north end of Walsh Lake. It is owned by Fred Lypka of Yellowknife. The group was visited on September 2, 1961.

The claims are underlain by greywacke and slate of the middle division of the Yellowknife Group. Bedding strikes generally north to slightly west of north and dips vertically to steeply in either direction. A number of old pits expose quartz veins and, in one or two places, seams of massive arsenopyrite¹. One of the old trenches has been extended by the present owner. The following is a brief description.

The trench is about 330 feet south of the north boundary of claim Tin No. 1 and about 1,200 feet north of the north tip of Walsh Lake. It is within 100 or 200 feet of the shore of Upper Walsh Lake. The trench exposes a 3-foot-wide vein of blue-grey quartz containing little or no sulphide mineral. The wall-rocks are slates and greywackes with a conspicuous parting (and probably bedding) that strikes N20°W and dips vertically. The quartz vein is approximately conformable with partings in the host rock. Adjacent to the quartz vein on its east side is a 4-foot-wide zone of closely spaced quartz veinlets, lenses, and stringers containing pods of massive, coarse arsenopyrite. No outcrops appear on either side of the trench but about 30 or 40 feet to the south a shallow ditch, evidently the result of stripping, crosses the projected strike of the vein. It is now caved. Samples were chipped across the 3-foot vein and the adjoining 4-foot stringer zone. The assay results of the quartz vein and stringer zone are as follows: quartz vein—Au, 0.0025 ounce per ton, Ag, 0.03 ounce per ton; stringer zone—Au, 0.01 ounce per ton, Ag, 0.045 ounce per ton².

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