



GEOLOGICAL
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DEPARTMENT OF ENERGY,
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THE MINERAL INDUSTRY OF YUKON TERRITORY AND
SOUTHWESTERN DISTRICT OF MACKENZIE, 1966

D. C. Findlay



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ABSTRACT

This report summarizes developments in the mineral industry of Yukon Territory and southwestern District of Mackenzie, Northwest Territories, during 1966. With a few exceptions, lode and placer properties described in this review were being actively worked or explored during 1966.

The value of Yukon mineral production has declined from about \$15.2 million in 1964, to \$11.3 million (preliminary figure) in 1966, but in 1967 this trend should be arrested due to the introduction of a new copper producer (New Imperial Mines Limited, Little Chief mine) and an asbestos mine (Cassiar Asbestos Corporation Limited, Clinton Creek mine) into the economy. In addition, production plans have been announced for a major base metal deposit in the Anvil Range area near Ross River (Anvil Mining Corporation Limited, Faro deposit). In 1966, as in past years, most Yukon production came from the silver-lead-zinc mines of United Keno Hill Mines Limited at Elsa and Calumet; however, production from these operations may be curtailed in 1967.

In lode exploration, most attention remained focused on the Anvil Range area in which a major staking rush was precipitated in 1965 and early 1966 following discovery of the Faro lead-zinc deposit. Elsewhere in the Territory surface and underground exploration continued on a number of previously-known showings.

Placer gold production decreased by about 2,500 crude ounces from 1965. This was partly due to mining difficulties experienced by smaller operators due to the extremely dry 1966 season. The Yukon Consolidated Gold Corporation terminated its dredging operations in the Klondike area in late 1966, bringing to a close over 45 years of operations in the once-productive Klondike gold fields.

MINERAL INDUSTRY OF YUKON TERRITORY AND SOUTHWESTERN DISTRICT OF MACKENZIE, 1966

INTRODUCTION

This is the seventh in a series of annual reviews of the mineral industry of Yukon Territory and southwest District of Mackenzie published by the Geological Survey since 1961. The format of this report is essentially the same as in previous years, except that a section dealing with work carried out by the Geological Survey during 1966 has been introduced. As in previous reviews, the bulk of the report concerns descriptions of lode and placer mining and exploration operations, which, with a few exceptions, were being actively worked or explored during 1966.

For general references to past developments in Yukon mineral industry, readers are referred to Annual and Summary Reports of the Geological Survey from 1898 through 1933. Although most of these earlier reports are now out of print, many pertinent publications have been collected in a single volume (Bostock, 1957) which is available. Yukon mineral industry records for the period 1934 to 1940 are contained in reports by Bostock (1935, 1936b, 1937, 1938, 1939 and 1941). Reports in the present series were compiled by Skinner (1961, 1962); Green and Godwin (1963, 1964) and Green (1965, 1966).

The information in this report was obtained from visits to properties, from discussion and correspondence with individuals and companies, from releases in various newspapers and trade journals, and from reports of the Department of Indian Affairs and Northern Development Mining Recorders at Dawson, Mayo, Watson Lake, and Whitehorse.

Acknowledgments are extended to individuals and companies engaged in mining and mineral exploration in the Yukon Territory and to members of the Department of Indian Affairs and Northern Development. Their cooperation in providing information has greatly facilitated the preparation of this report

TRANSPORTATION FACILITIES

The capital city of Whitehorse is the principal distribution centre in the Yukon Territory and is supplied mainly by ship and rail from Vancouver via Skagway (White Pass and Yukon Route) and by truck and air from Vancouver and Edmonton. Scheduled commercial air flights provide daily connections with Vancouver and Edmonton (Canadian Pacific

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Airlines) and with Alaska (Wien Air Alaska Airlines). Thrice-weekly to daily bus schedules (Canadian Coachways Limited) operate within the Yukon Territory and connect to Edmonton and Vancouver via Dawson Creek, B.C.

The principal Yukon municipalities - Watson Lake, Whitehorse, Mayo, and Dawson - are linked by all weather secondary roads that provide the basic transportation framework. The system includes three principal routes; the Alaska Highway (Watson Lake-Whitehorse-Alaska), the Whitehorse-Mayo-Keno road, and the Stewart Crossing-Dawson road. An alternate route, connecting Watson Lake with the Whitehorse-Mayo road at Carmacks, via the settlement of Ross River, is under construction. Various lesser access roads link the main traffic network with smaller settlements and mining centres. Both the Federal Government and Territorial Government participate in construction costs of access roads for mining, forestry and agriculture purposes.

Fixed-wing aircraft are available for charter at Whitehorse, Watson Lake, Dawson, and (intermittently) Mayo and Ross River. Helicopters, increasingly important in northern exploration transport, are based in Whitehorse, Ross River (summer) and at nearby Atlin, B.C. In 1967 they will also be available at Watson Lake. During the 1965 and 1966 field seasons most helicopters were engaged in contract work and were seldom available for casual, short-term charter.

In Table I, comparative transportation costs are listed for facilities available in the Territory.

MINERAL PRODUCTION OF YUKON

In 1966, as in past years, the mineral industry formed the backbone of Yukon's economy. Table II lists production figures for 1964 to 1966 inclusive, as well as cumulative values to the end of 1966. The data of Table II show that the trend of declining mineral production, which commenced during the 1964-65 period, continued into 1966, with total values decreasing from about \$15.2 million in 1964 to \$11.3 million (preliminary figure) in 1966.

The decrease in Yukon mineral production largely reflects falling production from the Keno and Galena Hills silver-lead mines of United Keno Hill Mines Limited, for many years Yukon's only large-scale lode mining operation. Value of production from these mines has declined from \$14.6 million in 1964 to about \$8.8 million in 1966, and the company has announced that production from the mines will be sharply curtailed in 1967. The Yukon Coal Company Limited, an affiliate of United Keno Hill Mines Limited, produced about 6,000 tons of coal from its Tantalus Butte mine at Carmacks.

TABLE I

Representative Transportation Costs for Yukon Territory, 1966

RAIL AND BOAT (container ship every 2 weeks)

Ore and concentrates - Whitehorse to North Vancouver
Commodity rate on 30,000 lb. carloads

Lead or zinc concentrates.....\$16.00 per ton
Asbestos fibre..... 17.00 per ton

Mining equipment and associated supplies - North Vancouver
to Whitehorse - Commodity rate on 10,000 lb. carloads

Machinery.....\$ 2.75
Petroleum products..... 3.15
Drilling mud, building materials..... 2.90

TRUCK

Basic rates, Whitehorse from Edmonton and Vancouver

Pounds.....	100	5,000	10,000
From Edmonton			
(dollars per 100 lb.).....	6.90	5.50	5.35
From Vancouver			
(dollars per 100 lb.).....	7.71	6.70	6.30

(Commodity rates in effect for many items)
(Backhaul rates considerably less)

BUS - (3 times per week, daily in the summer)

Express rates, Whitehorse from Edmonton and Vancouver

Pounds.....	1-2	2-10	10-20	40-50	90-100
From Edmonton					
dollars.....	2.05	2.55	3.40	6.40	11.35
From Vancouver					
dollars.....	2.65	2.85	4.00	7.85	14.20

AIR - (daily)

Air express and air freight, Whitehorse from Edmonton and Vancouver

	Edmonton to Whitehorse	Vancouver to Whitehorse
Air express		
minimum.....	\$4.00	\$4.00
dollars per pound.....	.43	.49
Air freight		
minimum.....	5.25	5.25
dollars per pound.....	.21	.21
dollars per 100 pounds	18.00	18.00

TABLE I (cont.)

CHARTER AIRCRAFT

Type	Rate per Hour	Rate per Mile
Fixed wing		
Cessna.....	\$ 65.00	\$ 0.55
Beaver.....	80.00	0.80
Helicopter		
Bell 47G-2.....	110.00 (fuel and oil included)	
Bell 47GB-31.....	135.00 (fuel and oil included)	
Hiller 12E.....	135.00 (fuel and oil included)	
	(rate per mile not applicable)	

Placer gold remained the other principal source of mining revenue in 1966, although production from this segment of the industry also declined slightly, from a value of about \$1.7 million in 1965 to \$1.5 million (preliminary figure) in 1966. As in former years, the bulk of 1966 production came from the Yukon Consolidated Gold Corporation's extensive dredging operations in the Klondike area (41,903 ounces of crude gold); the balance (11,020 ounces) was won by about 22 smaller operators and individuals mining in the Dawson, Mayo and Whitehorse districts. The Yukon Consolidated Gold Corporation terminated its placer operations in 1966, marking the passing of an era that began in 1896 with the discovery of the Klondike Gold Fields.

The current declining trend of Yukon mineral production should be arrested in 1967 by the introduction of two new operations - the Clinton Creek asbestos mine of Cassiar Asbestos Corporation Limited and the Little Chief open-pit copper mine of New Imperial Mines Limited. The latter began production in April, 1967 and the former will commence open-pit operations in mid-1967. Additional optimism was generated for the future of Yukon mineral industry when Anvil Mining Corporation Limited announced in March 1967 that it planned to bring its large-tonnage Faro lead-zinc deposit into production early in 1969.

PLACER MINING AND EXPLORATION - YUKON

Yukon placer gold production for 1966 with comparative figures is summarized in Table III. The total 1966 production was about 2,500 ounces less than in 1965. This decrease mainly reflects mining difficulties encountered by the smaller operators due to the extremely dry 1966 season, which resulted in low water conditions in many of the smaller creeks. Low water problems were particularly severe in the Dawson area where virtually no rain fell all summer. Some operators were forced to abandon mining completely, and spent

TABLE II

Mineral Production of Yukon Territory¹

Mineral		1964	1965	1966 ²	Cumulative Total (1886 to 1966 inclusive)
Gold	fine oz.	57,844	45,031	40,035	11,092,739
	⌘	2,183,611	1,698,975	1,509,320	261,284,240
Silver	fine oz.	5,638,712	4,615,995	4,078,223	146,038,397
	⌘	7,894,196	6,462,393	5,705,434	121,383,841
Lead	lb.	20,418,415	17,851,309	16,373,000	481,900,893
	⌘	2,744,235	2,766,953	2,446,126	53,242,828
Zinc	lb.	13,094,653	13,247,653	9,086,000	238,248,489
	⌘	1,855,512	2,000,396	1,371,986	32,007,226
Cadmium	lb.	132,222	138,918	105,824	2,623,833
	⌘	428,399	386,192	253,978	5,078,950
Copper	lb.				14,372,285
	⌘				3,101,783
Tungsten	lb. (WO ₃)				32,169
	⌘				27,499
Platinum	fine oz.				19 ³
	⌘				1,553
Coal	tons	7,229	8,801	6,000	277,155
	⌘	98,150	85,626	60,000	2,564,951
Totals		15,204,103	13,400,535	11,346,844	478,692,871

¹Figures from Dominion Bureau of Statistics (1957; and later releases).

²Preliminary figures.

³Produced in 1960.

the season preparing ground for next year. The larger operators generally fared slightly better as most are mining on main creeks and larger tributaries where water shortages were not so critical.

The principal development on the Yukon placer mining scene was the termination of the Yukon Consolidated Gold Corporation's Klondike operations on 20 November, 1966 and by the end of the year the company's Bear Creek headquarters 8 miles east of Dawson was virtually closed. In its last year of operation the company produced 34,031 ounces of fine gold and 7,675 ounces of silver for a total value of \$1,197,511.

TABLE III

Yukon Placer Gold Production, 1966 and 1965

District	Area	Number of Operators*	Approximate production of Crude Gold (ounces)	
			1966	1965
Dawson	Klondike: Y.C.G.C.**	1	41,903	40,593
	Other	13	8,637	9,530
	Sixtymile River	1		149
	Kirkman Creek and Stewart River	2	677	1,280
Mayo	Haggart Creek and Dublin Gulch	2	1,017	1,639
	Hight Creek and Johnson Creek	2	1,100	1,328
Whitehorse	Kluane Lake	2	322***	696
Miscellaneous Production (various areas)			297	228
Totals		23	52,953	55,443

* - With production greater than 30 ounces.

** - Yukon Consolidated Gold Corporation.

*** - Records incomplete.

Little exploration work for new placer deposits was carried out in 1966. The Yukon Consolidated Gold Corporation dropped 84 of its remaining 379 placer claim holdings, and undoubtedly some of this ground will be taken up by other operators. A new company - Consolidated Mines (Yukon) Limited was formed by G.D. Franklin and L.M. Ross to develop claims

leased from Yukon Consolidated Gold Corporation on Upper Bonanza and Gold Run Creeks in the Klondike area. In the Mayo district, Spruce Creek Placers Limited has optioned exploration rights on part of its Haggart Creek holdings to the W.S. Moore Company of Reno, Nevada. The latter organization began a churn-drilling program late in the 1966 season to test new ground.

LODE MINERAL EXPLORATION IN YUKON

The accelerated pace of 1965 Yukon exploration activity, triggered by the discovery of major base metal deposits in the Anvil Range area, Whitehorse Mining District, continued through 1966 with numerous individual prospectors, syndicates and small and large exploration companies active in various parts of the Territory. As in 1965, major efforts were focused on the Anvil Range lead-zinc belt, and as of the end of 1966 over 70 companies and individuals held a total of about 10,000 mineral claims in this area. Major programs were carried out by Kerr Addison Mines Limited which continued to explore its Swim Lakes orebody through drilling, and by Anvil Mining Corporation Limited which completed drilling out its Faro No. 1 deposit and in the fall of 1966 began an adit into the core of the orebody to obtain bulk samples for milling and metallurgical testing, prior to a production decision. In March 1967, the company announced that the property would be brought into production by the winter of 1969. Fifty miles to the northwest, in the Detour Lakes area, exploration programs along the geological extension of the Anvil belt were carried out by several companies, notably Conwest Exploration Company Limited and Glenlyon Mines Limited.

In the Dawson Mining District, Cassiar Asbestos Corporation Limited completed preproduction stripping of its Clinton Creek asbestos deposit in preparation for the start of open pit mining in the summer of 1967. The company also continued a helicopter-supported prospecting program along the ultramafic intrusion belt extending through Clinton Creek into the adjacent Eagle area of Alaska.

In the Mayo Mining District, United Keno Hill Mines Limited continued helicopter-supported prospecting and geochemical survey programs in the Mount Hinton area, as well as detailed overburden drilling operations on Galena and Keno Hills. Elsewhere in the district, two new silver-lead discoveries were made; one on the Homestake property on Bunker Hill, and one on the Stand-To Hill property of Foley Silver Mines Limited.

The Whitehorse Mining District continued busy, with, in addition to the Anvil area, activity concentrated in Dawson Range, Kluane, Whitehorse Copper Belt and Carcross-Wheaton River areas. In the Dawson Range area, Casino Silver Mines

Limited continued surface exploration programs and limited diamond drilling, on its Casino-Canadian Creek property, and Canex Aerial Exploration Limited continued work on its copper-molybdenum prospect at Granite Mountain. In the Carmacks area, Anvil Mining Corporation Limited carried out a surface trenching operation on coal leases adjacent to the old Tantalus mine and was successful in uncovering a significant new coal seam. Quill Creek Copper Mines Limited began surface exploration on interesting new copper discoveries in Triassic basalts of the Kluane Range, near Quill Creek. Numerous other individuals and companies were active in the general Kluane Range area, amongst them Cominco Limited, Mastadon-Highland Bell Mines, Atlas Explorations Limited and Canadian Baranca Mines Limited. Principal exploration targets are nickel and nickel-copper occurrences associated with mafic and ultramafic intrusions cutting late Palaeozoic-early Mesozoic volcanic and sedimentary assemblages. In the Whitehorse Copper Belt, New Imperial Mines Limited completed preproduction work on its Little Chief open-pit mine and the mill commenced operation at the end of April, 1967. Near Wheaton River, Yukon Antimony Corporation Limited found, and did initial exploration on, a new disseminated copper occurrence in Coast Intrusion granitic rocks. Arctic Mining and Exploration Company Limited continued underground development work on its Arctic Caribou (Big Thing) gold-silver property south of Carcross, and production plans for the deposit are being considered. On Windy Arm of Tagish Lake, Venus Mines Limited carried out an underground exploration program on the Venus vein system of the old Conrad gold-silver camp.

Exploration activity in the Watson Lake Mining District centred mainly in the Cassiar Mountains, Ketzka River, Pelly Lakes, and Frances Lake areas. In the Cassiar Mountains, Pure Silver Mines Limited (formerly Logjam Silver Mines Limited) continued development work on its Logjam Creek silver-lead prospect. Silver Key Mines Limited continued drilling and surface explorations on its numerous silver-lead showings in the Ketzka River area and late in the 1966 season, a geochemical program carried out in conjunction with adjacent Stump Mines Limited resulted in an interesting new find on the property. Southeast of Ketzka River, along Tintina Trench, Northlake Mines Limited carried out an extensive exploration program, including airborne geophysical surveys, ground geophysics, geochemistry and some diamond drilling, on a large block of ground lying between Pelly River and Hoole River. Further southeast along the Trench, Atlas Explorations Limited drilled its copper prospect at Fyre Lake, and the company carried out airborne and ground exploration programs over its extensive holdings in the area lying roughly between Fyre Lake and Pelly Lakes. Several new finds were made as a result of this program, the most notable being the Pike Group silver-copper-lead-zinc occurrence west of Traffic Mountain. The company also did further work on the old silver-lead-zinc occurrences of the Frances River Syndicate property southeast of Simpson Lake, in

the Watson Lake area. In the Tyers River area, Norquest Joint Venture continued surface exploration and drilling on lead-zinc showings lying west of the Canada Tungsten road. On East Arm, Frances Lake, Matt Berry Mines Limited carried out a diamond drilling program on a silver-lead-zinc prospect near the mouth of Thompson Creek.

TABLE IV

Mineral Claims Recorded, Yukon Territory
(Figures supplied by Department of Indian Affairs and Northern Development)

Mining District	1962	1963	1964	1965	1966
Dawson	135	283	48	441	738
Mayo	1269	347	607	1026	706
Watson Lake	758	1046	349	690	4828
Whitehorse	1002	1052	1819	5456	11666
Total	3164	2728	2823	7613	17938

MINERAL PRODUCTION AND EXPLORATION
NAHANNI MINING DISTRICT, DISTRICT OF MACKENZIE

Canada Tungsten Mining Corporation Limited continued to operate its open-cut tungsten-copper mine in Flat River area during 1966. During the year 102,000 tons were mined and 115,568 tons averaging 2.4 per cent WO₃ were milled (in part stockpiled ore). A total of 318,121 pounds of copper was also produced. Late in 1966, a serious fire on the property destroyed the mill and concentrator plants. Reconstruction of the units began early in 1967.

During 1966, 344 mineral claims were recorded in the Nahanni Mining District, an increase from 48 in 1965. The Mining Recorder's office for the district is in Watson Lake, Yukon.

WORK BY THE GEOLOGICAL SURVEY DURING 1966
YUKON AND SOUTHWEST DISTRICT OF MACKENZIE

During the 1966 field season, the Geological Survey continued its program of reconnaissance geological mapping for

publication on a scale of 1 inch to 4 miles, as well as carrying out various studies of a more specialized nature. The brief descriptions of this work given in the following sections are summarized, in part from Geological Survey of Canada, Paper 67-1.

WATSON LAKE AREA (105 A)

H. Gabrielse completed reconnaissance geological mapping of the Watson Lake map-area. The work has shown that the area is underlain chiefly by Palaeozoic sedimentary sequences ranging from Cambrian to (?) Mississippian in age. Lithological varieties include fossiliferous limestones, calcareous phyllites and phyllites (Cambrian); calcareous phyllites and platy siltstones (Ordovician and (?) Silurian); and, quartzites, pebble conglomerates, and phyllitic argillaceous rocks (Late Devonian and (?) Mississippian). The strata are locally intensely deformed and sub-Devono-Mississippian rocks have been tightly folded about northerly-trending axes. The Tom Lake lead-zinc showings, located about 33 miles north-northwest of Watson Lake (Green, 1964, pp. 44-45; this paper p. 65) lie within strata involved in a structural culmination in this area.

SEKWI MOUNTAIN (105 P), NAHANNI (105 I) and FRANCES LAKE (105 A) AREAS

(Yukon Territory and District of Mackenzie)

S.L. Blusson completed mapping in Frances Lake and Nahanni map-areas and continued work in Sekwi Mountain map-area. A preliminary map of the Frances Lake area was published in late 1966 (Blusson, 1966).

Blusson notes (Blusson, 1967) that Proterozoic rocks (shales, slates, phyllites, quartzitic schists) of Frances Lake area (unit 1) have similarities to rocks of unit 7, Tay River area (Green and Roddick, 1961a) in which the lead-zinc deposits of the Anvil Range area occur, and suggests the possibility that the two sequences may be partly correlative, differing mainly in metamorphic grade. Similarly, base metal occurrences of Frances Lake area may have features in common with those of the Anvil area. A distinctive aeromagnetic anomaly¹ lying southeast of Frances Lake (about 61°10'N, 129°05'W) is thought due to unaltered, possibly Tertiary, gabbroic rock.

In Nahanni map-area (Green and Roddick, 1961b), much of the black shale assemblage, originally considered

¹See Frances Lake, Geol. Surv. Can. Geophysics Paper 7007G (1963).

Ordovician and Silurian in age (unit 9) is now known to be Devono-Mississippian. Other rocks of the area are correlated with similar units in adjacent Glacier Lake (Gabrielse, et al, 1965), Sekwi Mountain, and Frances Lake map-areas.

In Sekwi Mountain map-area a thick (minimum of 7,000 feet) Proterozoic sequence of shales, siltstones, and fine-grained quartzites, exposed in the southwest between Intga River and the headwaters of Tsichu River, is tentatively correlated in part with the Rapitan Formation of the Mackenzie Mountains.

AISHIHIK LAKE AREA (115 H)

O.L. Hughes commenced mapping of surficial deposits and began studies of Pleistocene stratigraphy in the Aishihik Lake map-area. Evidence indicating three stages of ice advance through the area is recognized; a youngest McConnell advance; an older and more extensive Reid advance; and a still-earlier glaciation possibly equivalent to the Klaza and/or Nansen advance defined by Bostock (1966). Direction of ice movement was, in all cases, from southeast to northwest.

Well-preserved shorelines, as well as other evidence, indicates that valleys now occupied by Sekulman and Aishihik Lakes formerly contained a higher-level lake that emptied northward into present Nisling River following the retreat of the McConnell ice. At the north end of Aishihik Lake the abandoned shorelines are tilted up to the south at about 12 feet per mile at the south end of the lake (aneroid determinations, subject to correction). Smaller lakes were impounded by ice in valleys, and between ice lobes on the plateau east of Aishihik Lake.

SNAG-KLUANE LAKE AREAS (115 J and K E $\frac{1}{2}$, 115 G and F E $\frac{1}{2}$)

V.N. Rampton continued field work in parts of these areas in studies designed to establish a Pleistocene chronology and a system for quantitative description of glacial moraines. A technique that involves slope measurements in moraine areas was applied for determining the extent of successive ice advances, for approximating the ages of moraines that are older than the limits of radiocarbon dating, and for correlating moraines from different montane areas. Neoglacial moraines adjacent to the snouts of Klutlan and Natazhat glaciers were studied to assess various methods for dating the moraines. Organic materials for radiocarbon dating were collected from localities where Neoglacial till overlies strata containing volcanic ash dated at 1400 years B.P. (before present).

DAM SITE INVESTIGATIONS

E.B. Owen carried out engineering geology studies to assess possible sites for hydroelectric power supply for the Anvil-Ross River area. Two sites have been tentatively selected - Five Finger Rapids on Yukon River, and Granite Canyon on Pelly River. The Five Finger site is judged superior because of better water supply, but its construction would be costly due to the necessity of relocating the village of Carmacks, the bridge over Yukon River, and part of the Whitehorse-Dawson Road.

Two potential storage-dam sites on Lapie River (Upper and Lower Lapie Canyon sites) and one on Ross River (Prevost Canyon site) were investigated. The Lapie River sites are unsuitable because intensely-deformed shale and phyllite forming the walls of the canyon provide poor abutment and foundation footing. The Prevost Canyon site is underlain by massive sandstone and quartzite which is considered satisfactory footing for dam construction.

GEOCHEMICAL SAMPLING TESTS ON THE VOLCANIC ASH LAYER ANVIL AREA*

(contributed by J.A.C. Fortescue)

During a brief visit to the Anvil Mining Corporation Limited Faro property in the Anvil Range area in August 1966, 15 samples each of volcanic ash and B-horizon material were collected from each of two sets of soil pits, one located over the Faro No. 1 orebody and the other over the Faro No. 3 zone. In the Ottawa laboratory, the samples were oven-dried, sieved in a stainless steel sieve, and the minus-80 mesh material analyzed for total zinc, lead, copper, and nickel. A hot HF/HCl O₄ extraction process was used to remove metals from the samples. Copper, lead and zinc were determined by the method described by Gilbert (1959) and nickel by a method given by Stanton and Coope (1958).

The analytical results are listed in Table VI. The results for nickel and copper are not as significant as those for lead and zinc. Metal values for samples collected from the ash layer are generally lower than those of the underlying B-horizon, but from a prospecting viewpoint, anomalous values show up well in both types of samples. For this reason it is believed that in the vicinity of the Faro No. 1 and No. 3 zones either the volcanic ash or the B-horizon of the soil will give positive results. The advantages of sampling the ash layer include: its easy recognition by unskilled samplers; the fact

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that sample pits need not be as deep as those required for the collection of B-horizon samples; and, the character of ash samples, which provide a relatively uniform matrix for spectrochemical analysis methods.

STUDY OF ULTRAMAFIC ROCKS, YUKON TERRITORY

D.C. Findlay commenced reconnaissance studies of Yukon ultramafic rock occurrences, as a part of the continuing study of ultramafic rocks of Canada. The objectives of this work are to assemble sufficient data to allow petrographic and chemical classification of Yukon ultramafic rocks and to provide a basis for positioning them within the geological and tectonic framework of the Territory. Initial emphasis is placed on intrusions that contain, or have associated with them, known economic mineral occurrences.

During the 1966 field season, several Yukon ultramafic occurrences were briefly examined and reference sample suites collected. Areas visited included: Haines Junction (115 A - Dezadeash); Quill Creek and White River (115 G and F E₂ -Kluane); Clinton Creek (116 C - Dawson); and, Dunite Mountain and Tower Peak (105 F - Quiet Lake). Most intrusions examined are sill- or lens-like alpine-type serpentinized peridotites with minor associated feldspathic rocks. Near Haines Junction, moderately serpentinized dunite is exposed on the property of Golden Gate Explorations Limited. The Dunite Mountain body has few features in common with the alpine-type peridotites noted above. It underlies an area of about 15 square miles, is roughly oval-shaped in plan, and contains mainly dun-weathering, partly serpentinized dunite, exposed over a vertical distance of 1,500 feet. Inward dipping walls suggest a lopolithic form to the mass. Chromite is ubiquitous in small lenses and pods and rare chromite layering occurs. No economic amounts of the material were noted. At higher elevations within the intrusion, thin, wispy clinopyroxene bands are rarely present.

NOTES ON NICKEL-COPPER MINERALIZATION ASSOCIATED WITH ULTRAMAFIC INTRUSIONS OF THE KLUANE AREA, YUKON TERRITORY

D.C. Findlay

Nickel-copper sulphides associated with ultramafic intrusions of the Kluane area (Muller, 1958, 1967) in southwest Yukon have been investigated by various companies since the early 1950's. The two principal occurrences, the old Canalask Nickel Mines Limited property on White River, and the Wellgreen property of Hudson-Yukon Mining Company near Quill Creek, were investigated through drilling and underground exploration, but did not prove economic at the time. Following these discoveries, numerous exploration companies, including

TABLE V

Total Metal Content of Samples, Faro No. 1 and No. 3 Zones

Faro No. 1 - Line 80 W.

Station	Zinc (ppm)		Copper (ppm)		Lead (ppm)		Nickel (ppm)	
	A	B	A	B	A	B	A	B
21-N	70	110	32	36	5	15	5	10
20-N	70	120	28	36	5	5	5	30
19-N	60	170	4	16	5	35	5	25
*18-N (approx)	70	230	28	24	5	90	5	50
*17-N (approx)	170	340	28	20	140	140	10	55
15-N	180	260	24	20	50	140	20	60
14-N	580	460	48	28	100	230	55	40
13-N	170	260	32	20	65	140	25	50
12-N	220	220	28	28	60	50	35	40
11-N	70	170	32	24	5	40	10	15
10-N	70	270	28	32	5	70	5	80
9-N	40	140	28	8	5	20	5	25
8-N	120	240	28	32	55	55	5	75
7-N	220	240	52	40	120	100	50	10
6-N	170	180	68	36	45	45	70	10

Faro No. 3 - Line 36 W.

19-N	130	130	52	32	45	35	40	40
17-N	160	130	36	36	40	30	15	35
15-N	120	170	48	32	35	25	30	40
13-N	130	180	48	56	40	50	40	60
11-N	170	170	48	44	50	90	35	35
9-N	180	180	44	44	120	140	35	35
8-N	180	240	44	72	240	700	35	45
7-N	260	460	52	48	240	200	40	40
5-N	280	270	52	48	280	220	30	45
3-N	340	290	48	40	270	180	35	40
2-N	440	600	64	68	460	220	45	40
1-N	260	3400	52	120	70	45	10	30
1-S	60	170	16	20	5	30	5	40
3-S	70	150	12	20	5	20	5	40
5-S	40	180	24	24	15	80	5	35

A- Sample from ash layer

B- Sample from B-horizon

*These samples are from an area disturbed by stripping during road-building. Some samples were collected several feet from picket-line stations.

Prospectors Airways Company Limited, Conwest Exploration Company Limited and Teck Exploration Company Limited prospected many of the ultramafic-mafic intrusions of the area, but no economic deposits were discovered. Recently, interest has been revived in the general area, due in part to the current world-wide increase in nickel consumption and prices and partly stimulated by recent Geological Survey aeromagnetic maps released for parts of Kluane area and Dezadeash area to the southeast.

Brief descriptions of the Canalask (now Micro Group claims) and Wellgreen properties are contained elsewhere in this report, and a detailed comparison of these two deposits has been given by Campbell (1960). The intention of this section is to point out a few features concerning the deposits that may possibly bear on the search for additional occurrences in similar geologic environments.

The ultramafic intrusions of the Canalask and Wellgreen properties are generally similar in lithology and composition, and features of their several rock types point to their ultimate origin as differentiated sills. The occurrence of interstitial plagioclase (now commonly altered to secondary minerals) in the ultramafic rocks seems particularly significant in that it provides a compositional link with the spatially-associated gabbroic rocks, and suggests that the ultramafic and gabbroic parts were probably originally derived from a common parent magma. The widespread occurrence of nickeliferous sulphides with ultramafic intrusions containing associated feldspathic rocks is well known; thus in prospecting ultramafic belts particular attention should probably be paid to the presence or absence of feldspar in the ultramafic rocks themselves. Feldspathic ultramafic rocks are, in general, less susceptible to serpentinization than their non-feldspathic equivalents and usually form more prominent, resistant outcrops.

Ultramafic bodies, which are essentially serpentinized peridotite or dunite lenses probably brought to their present positions through incremental movement along fault zones, appear to rarely have significant associated sulphides. Serpentinite or serpentinized peridotite lenses are common in Yukon, and most of the known asbestos occurrences are associated with this type; an example being the Cassiar Asbestos Corporation Limited Clinton Creek orebody west of Dawson. Intrusions such as those at the Wellgreen and Canalask properties in Kluane area contain parts that are similar if not identical to the serpentinite lenses and it seems possible that the latter represent detached slices of originally differentiated sills, and that these detached parts have moved upward in the crust along fracture zones, thereby becoming separated from their feldspar-bearing parent rocks. This process of structural dislocation and detachment probably is aided by the relative ease of serpentinization of the olivine-rich pyroxene and feldspar-poor rocks.

Another feature pointed up by a comparison of the Wellgreen and Canalask properties is that the sulphides occupy different positions with respect to the ultramafic intrusions, although both occurrences probably have the same origin. At Wellgreen, the sulphides are commonly massive, and lie adjacent to the intrusion near the contact between ultramafic rocks and diorite or gabbro. At the Canalask property, the sulphides are essentially disseminated and occur up to several hundred feet away from the intrusion. These relations suggest that the disseminated nature of the Canalask sulphides, relative to the massive nature of those at Wellgreen is partly a function of transport distance. The transport distance probably was, in turn, controlled by the nature of the country rocks. At Wellgreen, much of the surrounding assemblage contains soft, argillaceous rocks - rocks that would deform plastically with little tendency to behave as competent strata and allow formation of fracture channelways for ore access. Also, the thin feldspathic band (diorite or gabbro) and its bordering hornfels immediately adjacent to the Wellgreen ultramafic intrusion comprise a dense, hard zone that probably formed an efficient barrier against dispersal of sulphides and promoted their deposition, as massive lenses along the contact. On the other hand, on the Canalask property the ultramafic intrusion is contained within a wide zone of dense, fine-grained "silicified" volcanic rocks. Deformation of these competent rocks would probably result in the development of a strong fracture network thus providing relative ease of access for sulphides dispersing from a source. The Canalask property thus may illustrate the supposition that sulphides related at source to an ultramafic intrusion may not always occur immediately adjacent to the intrusion, although it seems probable that the more massive deposits are likely to be found close to the intrusive contacts.

AEROMAGNETIC SURVEYS

Systematic aeromagnetic coverage of Yukon Territory south of latitude 64°30'N began in 1961 and in 1962 and 1963 the first series of maps on a scale of 1 inch to 1 mile were published for sheets 105 D, E_{1/2}* (Whitehorse), 105 E, E₂ (Laberge), 105 C (Teslin), 105 B (Wolfe Lake), 105 A (Watson Lake), 105 H (Frances Lake), 105 G (Finlayson Lake) and 105 F (Quiet Lake). During 1964-65, surveys were completed over sheets 105 D, W_{1/2} (Whitehorse), 115 A (Dezadeash), 115 H (Aishihik), 105 E, W₂ (Laberge), 105 L (Glenlyon), 115 I (Carmacks), 115 P (McQueen) and parts of 116 A (Larsen Creek), 106 D (Nash Creek) and 105 M (Mayo). These sheets have now been published, mainly during 1966.

*Refers to National Topographic Series index system. Each numbered and lettered sheet (e.g. 105 D) comprises 16, 1 mile to 1 inch maps.

In early 1966, a block bounded by longitude 137° on the east, the Yukon-Alaska border on the west, and extending from approximately Kluane Lake and Upper White River on the south to Fortymile River on the north, was surveyed. The sheets of this block, including, 115 F and G (Kluane) (parts of) 115 J and K, E $\frac{1}{2}$ (Snag), 115 O and N, E $\frac{1}{2}$ (Stewart River), 116 A (Larsen Creek, south part) and 116 C, E $\frac{1}{2}$ and 116 B S.W. part (Dawson) were published in late 1966 and early 1967.

In April and May 1967 surveys were carried out over the Sheldon Lake (105 J), Tay River (105 K) and Lansing (105 N) areas.

In addition to the 1 inch to 1 mile coverage noted above, compilation maps on a scale of 1 inch to 4 miles are available for parts of the Territory. Published sheets are 105 A (Watson Lake), 105 B (Wolfe Lake), 105 C (Teslin), 105 D (Whitehorse), 105 E (Laberge), 105 F (Quiet Lake), 105 G (Finlayson Lake), 105 H (Frances Lake), 106 D (Nash Creek), 115 A (Dezadeash), 115 H (Aishihik), 115 I (Carmacks), 115 P (McQuesten) and 116 A (Larsen Creek).

LODE MINING AND EXPLORATION

MAYO MINING DISTRICT

GALENA AND KENO HILL AND ADJACENT AREAS

F 3707c

United Keno Hill Mines Limited (about 63°55'N, 135°29'W)
(Silver-Lead-Zinc)

Selected References: Boyle (1956, 1957, 1965); Green and McTaggart (1960); McTaggart (1960); United Keno Hill Mines Limited (1961); Kindle (1962); Skinner (1961, pp. 21-25; 1962, pp. 22-27); Green and Godwin (1963, pp. 5-8; 1964, pp. 7-12); Green (1965, pp. 7-12; 1966, pp. 10-17); Gleeson, C.F. (1965, 1966).

United Keno Hill Mines Limited continued the only large-scale lode mining operation in Yukon in 1966. The gross value of concentrates sold in the year ending December 31, 1966 was \$8,777,558, down from \$10,400,117 in 1965. For the past few years the mine operations have suffered from an increasingly serious shortage of skilled labour and rising overhead costs. These factors, coupled with decreasing ore reserves in some of the producing mines and disappointing results from exploration programs, have resulted in a decision possibly to curtail mining in the near future, probably by mid-1967 or early 1968.

The Keno-Galena Hill district has had a long history of intensive exploration and development, and the history of the camp encompasses a large part of the history of lode mining in Yukon. The first silver-lead discovery was made on the Silver King property in 1906, but mining did not begin until 1913. In 1919 discovery of the rich No. 9 vein on Keno Hill triggered extensive prospecting in the district, resulting in new discoveries. During the following twenty years about ten properties were developed to various stages of production, largely under the direction of the Treadwell Yukon Corporation Limited. Since 1919 the district has been in almost continuous production, with a few exceptions, notably between 1942 and 1946.

Keno Hill Mining Company Limited was formed in 1945 to consolidate a number of properties in the area, including those of the Treadwell Yukon Corporation Limited. In 1948 the company was reorganized as United Keno Hill Mines Limited and in 1960 control was acquired by Ventures Limited. Since 1962, when Ventures Limited was absorbed by Falconbridge Nickel Mines Limited, ownership of the present company has rested with Falconbridge.

From 1947 to December 31, 1966, total production was 2,747,863 tons of ore, from which 100,639,167 ounces of silver,

367,011,222 pounds of lead, 274,004,266 pounds of zinc and 3,599,179 pounds of cadmium were recovered. At the end of 1966 the company held a total of 1077 claims in the district, 350 of these covering exploration targets outside the immediate Keno Hill-Galena Hill area. Employees in the fall of 1966 totalled about 530, but by January 1967 the figure had decreased to less than 400.

The Keno Hill-Galena Hill silver-lead ores occur in erratic shoots and lenses lying in vein faults that cut fine-bedded to massive quartzites, intercalated greenstone sills and lenses, and various schistose rocks of uncertain age. The vein faults typically occur in parallel to sub-parallel series, trending generally northeast and dipping vertically to moderately southeast. Cutting, and in part displacing, the ore-bearing vein faults is a system of northwest-trending, southwest-dipping younger faults. Orebodies are best developed where vein faults cut the more massive quartzite members of the sedimentary sequence. They commonly plunge to the west, are irregular in shape, and may be distributed as isolated lenses down the dip-plane of a vein-fault.

During 1966, production came mainly from the Hector-Calumet, Keno, and Elsa mines. Development ore was won from the No-Cash mine which was rehabilitated following an underground fire in late June, 1966. Development exploration continued in this mine until October, 1966 when the curtailment program was implemented. Under a continuing leasing agreement with Comstock Keno Mines Limited, the company continued to mine small tonnages from the Comstock Keno property during 1966. The Hector-Calumet mine which has the greatest vertical development (about 1,000 feet) in the camp provided the bulk (51 per cent) of ore treated in the mill in 1966. Most production came from between the 600 and 1,100 levels, and in the latter part of the year a program of salvage mining was initiated. A total of 1,391 feet of development drifting and crosscutting was carried out in this mine, only 38 feet of which was in ore grading 38.4 ounces per ton silver over 5.9 feet (United Keno Hill Mines Limited, Annual Report for 1966). At the Elsa mine, most production came from the No. 17 vein system. A total of 796 feet of development drifting was carried out, 37 feet of which was in ore grading 22.5 ounces per ton silver over 5 feet (op. cit.). In the Keno mine, production continued from the No. 9 vein, mainly from workings at the 700 level and from stopes between the 800 and 900 level. Development work totalled 1,383 feet of which 30 feet of drifting was in ore grading 51.4 ounces per ton silver over 5 feet (op. cit.).

The following summary of operating results for 1966 and previous years, is from information provided by the company:

	15-Month Period		12-Month Period	
	Ended 31 December 1964	Ended 31 December 1965	Ended 31 December 1966	Ended 31 December 1966
Dry tons milled	227,845	146,850		120,374
Daily average, tons	497.5	402.3		329.8
Mill Heads:				
Silver (oz./ton)	33.37	33.25		36.56
Lead (%)	6.38	7.06		7.60
Zinc (%)	4.92	6.22		5.61
Metal production				
Silver (oz.)	7,270,911	4,701,820		4,235,678
Lead (lb.)	26,304,902	18,753,650		16,647,849
Zinc (lb.)	19,995,295	16,700,565		11,999,953
Cadmium (lb.)	245,543	198,140		144,914
*Metal Sales	\$14,609,549	\$10,400,117		\$ 8,777,558
Source of ore treated in mill				
Hector-Calumet mine (%)	53.81	53.0		51.0
Elsa mine (%)	13.00	10.9		11.2
Keno mine (%)	19.85	24.4		27.5
Silver King mine (%)	10.45	5.1		-
Galkeno mine (%)	0.25	0.4		-
No Cash mine (%)		0.8		2.3
Onek mine (%)	0.48	2.8		-
Comstock Keno mine (%)	2.07	2.6		4.3
Ore dumps				3.7
**Ore Reserves				
Tons	459,000	385,780		129,260
Silver (oz./ton)	34.1	32.2		37.2
Lead (%)	6.9	6.4		8.9
Zinc (%)	6.2	6.5		6.5

*Without deductions for smelter charges, freight, and marketing.

**Additional reserves not presently economic for various reasons total 111,790 tons averaging 39.2 ounces per ton silver, 7.7 per cent lead and 6.4 per cent zinc.

United Keno Hill Mines Limited continued its extensive surface exploration programs in 1966, both inside and outside the immediate Keno Hill-Galena Hill district. The detailed soil sampling program covering Galena and Keno Hills, begun in 1963, was completed, and selected geochemical targets were further investigated through an overburden drilling program using an Atlas-Copco 4-inch air-driven percussion drill. A total of 213 angle-holes (about 20,000 feet) were drilled to test various vein structure extensions traced by geochemical work and trenching in areas of known mineralization. This drilling was concentrated mainly in the Birmingham mine area (118 holes), Black Cap showing area (35 holes), Elsa mine grid (33 holes), and No-Cash mine area (19 holes). Since its inception in 1963, this mine-area surface exploration program has involved 3,311 overburden holes for a total of 231,154 feet, 89 diamond drill holes totalling 21,109 feet, and 47,523 soil samples. It is anticipated that the program will continue in 1967 and following years.

Outside the mine district, exploration was concentrated mainly in the Mount Hinton area, southeast of Keno Hill (about 63°52'N, 135°04'W), where the company holds a total of 277 claims, many of which were staked following publication of geochemical information by the Geological Survey in 1965 (Gleeson, 1965). Work in 1966 included helicopter-supported prospecting, geochemical, and geological mapping programs and some surface trenching.

As part of a joint exploration program with Canadian Superior Oil Company Limited, the company carried out trenching and other surface work on a geochemical survey follow-up basis, on the former company's 24-claim group located southeast of Mount Patterson (about 63°58'N, 134°36'W).

F 40

Keno Hill

Cro-Mur Mining Company Limited (about 63°57'N, 135°18'W)
(Silver-Lead)

Cro-Mur Mining Company Limited holds 24 claims west of and downslope from the old Wernecke mine property on Keno Hill. The property is reached by a short access road leading off the Keno City-Wernecke mine road.

During 1966, R. Murdock, working alone with a D-6 bulldozer with ripper attachment opened six deep trenches across a northeast-striking, steeply north-dipping vein break in fine-bedded quartzites and graphitic quartz-mica schists. The main break is about 18 inches wide and, based on the trenching results, has a strike continuity of at least 300 to 400 feet. The vein carries erratic galena and freibergite (?) mineralization.

F41

Bunker Hill

Homestake Property (63°54.5'N, 135°12.5'W)
(Silver-Lead)

References: Cockfield (1930, p. 10A; 1931, p. 9A; in Bostock, 1957, pp. 604; 614); Bostock (1939, p. 14); Boyle (1965, pp. 52-53); Green (1965, pp. 14-15).

The Homestake Group of 19 claims and 5 fractions is owned by R.G. Lee and J. Bonner Junze. The property is reached by a rough road about 2 miles long which leaves the road to the Mount Keno property and fords Lightning Creek near the mouth of Thunder Gulch. The showings are at an elevation of about 4,500 feet on the north slope of Bunker Hill.

The property is an old one that has been investigated in past years by two short shafts and a number of open cuts (Cockfield, 1930, 1931). In recent years, the present owners have carried out extensive trenching operations along a vein fault trending N 55° E and carrying rusty quartz-siderite vein material with scattered sulphides, including jamesonite, arsenopyrite, sphalerite, and galena. Green (1965, p. 16) reported a grab sample assay from this cut as: 1.30 ounces per ton gold, 25.2 ounces per ton silver, 39.7 per cent lead, 1.5 per cent zinc, and 4.4 per cent antimony. Host rocks of the vein fault are foliated greenstone, various phyllites, quartzite and minor limestone. Green (1965, p. 16) observed that the best mineralization along the vein fault occurs where one or both walls are in greenstone.

Early in the 1966 season, bulldozer stripping operations about 300 feet northwest of, and downslope from the previous work, uncovered a new surface showing massive sulphide mineralization. The new showing is about 100 feet northeast of an old shaft, sunk in past years. When visited in mid-August, stripping had exposed a lensoid oxidized zone about 100 feet long and up to 20 feet wide containing disseminated to massive galena carrying some tetrahedrite. The zone strikes slightly north of east and probably lies along the extension of the vein break investigated below surface by the old shaft. Host rocks are fine-bedded quartzite and graphitic quartzite containing massive quartz layers, striking about west and dipping about 35° S. A chip sample, part of which was probably disturbed rubble, over 25 feet across the widest part of the zone assayed*: 0.01 ounces per ton gold, 33.0 ounces per ton silver, 2.2 per cent lead, 0.5 per cent zinc, and trace copper. A grab sample of massive galena from near the east end of the exposure assayed*: 0.01 ounces per ton gold, 138.0 ounces per ton silver, 70.1 per cent lead, trace zinc, and 0.03 per cent copper. Samples of tetrahedrite-rich material taken by company personnel from the surface showing reportedly assayed up to 1, 510.0 ounces per ton silver. Late in the 1966 season, the property was optioned by Hecla Mining Company of Canada

*Assayed by G. Spalding, Whitehorse, Y.T.

Limited which carried out an underground exploration program totalling 996 feet of crosscutting and drifting in late 1966 and early 1967. An adit (crosscut) collared about 150 feet vertically below and north of the surface showing was driven southwesterly for about 350 feet to intersect the surface structure at depth. A narrow southwest-trending vein structure carrying minor sulphide mineralization was intersected and followed by drifting to the west for about 470 feet. The vein proved disappointing, and after some test diamond drilling (4 holes totalling 669 feet) and slashing, the underground program was terminated in March, 1967. Additional surface exploration work is planned for 1967.

F35

Mount Haldane

Mount Haldane Property (Mount Haldane Silver Mines Limited)
(Silver-Lead) (about 63°52'N, 135°53'W)

References: Cockfield (1919, pp. 4B-6B; 1920, pp. 5B-6B; in Bostock 1957, pp. 464-466; pp. 486-487); Boyle (1965, pp. 79-82); Green (1965, pp. 16-18; 1966, p. 19).

Mount Haldane Silver Mines Limited holds a total of 54 claims (including fractions) covering old silver-lead showings in the Bighorn Gulch area of Mount Haldane (Lookout Mountain), about 12 miles west of Elsa. The property is reached by a 13.5-mile access road that leaves the Mayo-Elsa road near Black Lake at about mile 262.

Late in the 1966 season the company carried out an overburden drilling program (10 holes) along the north side of Bighorn Gulch at an elevation of about 3,800 feet. The drilling outlined a mineralized zone carrying silver and manganese values and an underground exploration program was initiated to investigate the zone. Between mid-October 1966, and mid-January 1967 a 900-foot adit was driven on a general heading of N 10° W into the northeast wall of the gulch. The new adit is located about 390 feet vertically below an old tunnel driven to investigate a steeply west-dipping vein structure carrying silver-lead mineralization and exposed at surface on the shoulder of the northeast slope of Bighorn Gulch. In the 1966-67 adit, only sparse mineralization was encountered and after a short underground diamond drilling program, the project was terminated. Subsequently, the company transferred its operations to the south side of Bighorn Gulch where further old workings were investigated with only limited success.

The 1966-67 operations were conducted from a winter camp established at an elevation of about 3,500 feet in Bighorn Gulch. A crew of up to 10 men was employed.

The Mount Haldane showings consist of mineralized vein breaks in quartzite and quartz-mica schist with intercalated greenstone lenses. The rocks are generally well-bedded and strike about N 40° W and dip about 20 degrees southwest. Mineralization, including galena, limonite and pyrolusite occurs with quartz along gougy, locally brecciated fracture zones in the quartzite. Massive sulphides are irregularly distributed along the breaks in small pods and lenses. Cockfield (1919) reported assays ranging from 4.5 to 62.85 ounces per ton silver and 1.09 to 30.14 per cent lead from the old tunnels on the west side of Bighorn Gulch.

South McQuesten River Valley

F36

Shanghai Property (Silver Titan Mines Limited) (63°56'N, 135°
(Silver-Lead-Zinc) 39'W)

References: Bostock (1947); Green and Godwin (1963, p. 9; 1964, p. 16); Green (1965, pp. 19-20; 1966, p. 19).

Silver Titan Mines Limited holds 101 claims (including fractions) on the north slope of South McQuesten River Valley about 6 miles west of Elsa. The property is reached by a 3.5 mile access road that leaves the Haggart Creek road about 4.2 miles past the former Proctor sawmill site.

Work on the Shanghai property has been mainly concentrated on two sub-parallel vein breaks cutting quartzite, quartz-sericite schist and chloritic and graphitic phyllite. The vein zones strike about N 50° E, dips 70°NW to vertical, and appear to converge toward their southwest extremities. Sphalerite, pyrite, and galena occur in irregular pods with quartz and calcite in sheared and locally brecciated quartzite along the vein breaks.

Since 1964, when an underground exploration program was initiated by Peso Silver Mines Limited under agreement with the owners (Green, 1966, p. 19) a total of 2,700 feet of drifting and crosscutting, 160 feet of raising and about 1,700 feet of underground drilling has been completed. An adit (crosscut) collared at an elevation of 2,250 feet intersected a vein zone about 330 feet from the portal. Subsequent drifting to the northeast followed the North and South breaks for distances of about 350 and 360 feet respectively. At this point the South drift was turned north to avoid badly broken rock, and then was continued for about 850 feet on a heading parallel to and on the footwall of the south vein zone. A sub-drift was driven north for about 175 feet from this point to intersect the extension of the North break but only minor

mineralization was encountered. The drift was then swung back to a southeast heading and continued for a total distance of about 230 feet, when the South break extension was again intersected. A cave-in occurred at this point and the underground program was suspended in mid-June, 1966. The total underground work completed in 1966 included about 800 feet of drifting.

In addition to work on the Shanghai property in early 1966, the company carried out an extensive overburden drilling program on McQuesten flats northwest of Galena Hill, during July and August, 1966. A total of 42,000 feet of drilling was completed.

DAVIDSON RANGE AREA

Stand To Hill

Foley Silver Mines Limited (64°02'N, 135°10'W)
(Silver-Lead)

References: Cockfield (1922, p. 4A; in Bostock, 1957, pp. 479-498); Green and Roddick (1962, p. 19).

Foley Silver Mines Limited was incorporated in late 1966 to explore a 46-claim silver-lead prospect on Stand To Hill in Davidson Range, about 7 miles north of Keno Hill. The property is reached by an 8-mile tote-road, built in 1966, that leaves the McQuesten-Hanson Lakes road 9.4 miles from its junction with the Elsa-Keno road.

Silver-lead occurrences have been known in the Davidson Range since the early nineteen hundreds. One of the first to be investigated was on Rambler Hill, about 4 miles northwest of Stand To Hill. A showing on the north slope of Stand To Hill, above the headwaters of Homestead Creek, was explored by a short adit in 1920. A vein up to 2 feet wide lying along a fault fissure carried galena with calcite, siderite, cerussite, limonite, manganite, chalcopyrite, and quartz. Cockfield (1922, p. 498) reports an assay taken across 14 inches on the working face of the tunnel as: trace gold; 17.60 ounces per ton silver, 19.36 per cent lead.

Following the initial work, the property was apparently idle until 1961 when J. Foley staked the present claims. The property was optioned in 1962 by Yukon Consolidated Gold Corporation Limited which carried out surface exploration in the area. During 1963 and 1964 the claims were further prospected by the owner, J. Foley, and in early 1966 a private company, Foley Yukon Silver Mines Limited was formed to do additional work on the claims. In the course of bulldozer trenching operations during the 1966 season, a new discovery was made just above Homestead Creek, and about 300 feet east and 200 feet north of the old adit. The new discovery was

visited in late August, 1966, and at that time consisted of a partly-stripped vein break cutting massive greenstone intercalated with fine-bedded quartzite and quartz-mica schist (unit 17, Green and Roddick, 1962). The break is up to 12 feet wide and is bounded by two strong, sub-parallel shears trending about N 15° W and dipping vertically or steeply east. Between the shear zones is highly fractured, locally gougy, reddish-brown limonite-stained material carrying sub-parallel lenses and veins of quartz-siderite with disseminated to massive galena, sphalerite, and minor chalcopyrite. Because of the great deal of disturbed rubble left by the bulldozer, the actual extent of mineralization was difficult to assess, but individual veins appeared to contain pods of massive ore up to 2 to 2½ feet in width. A chip sample across 12 feet near the up-slope (south) end of the zone assayed*: 0.005 ounces per ton gold, 3.52 ounces per ton silver, 5.2 per cent lead, 1.0 per cent zinc, and 0.07 per cent copper. A grab sample from a massive lens assayed*: 0.005 ounces per ton gold, 61.5 ounces per ton silver, 77.3 per cent lead, trace zinc, and 0.06 per cent copper.

Late in the 1966 season, blasting and trenching of the showing is reported to have confirmed a width of 10 to 12 feet to the break, and it was followed for a strike length of 300 feet (Prospectus, Foley Silver Mines Limited, 1966). Assays averaging 25 ounces per ton silver and 26 per cent lead are reported (op. cit.). In April 1967, the company began moving equipment into the property in preparation for an underground exploration program.

*Assayed by G. Spalding, Whitehorse, Y.T.

SNAKE RIVER AREA

Crest Exploration Limited (about 65°15'N, 133°00'W)
(Iron)

References: Bamber et al. (1963); Green and Godwin (1963, pp. 15-18; 1964, pp. 16-17); Green (1965, pp. 22-23; 1966, p. 21).

No work was done on the property in 1966.

BEAR RIVER AREA

Pacific Giant Steel Ores Limited (about 64°50'N, 134°15'W)
(Iron)

References: Green and Roddick (1962); Green (1966, pp. 21-23).

Pacific Giant Steel Ores Limited owns 16 claims covering a hematite showing staked by A. Jellinek and P. Runer in 1962. Representation work, including trenching and geophysical surveys, has been done on the showing, and an initial 5,000-foot diamond drilling program is planned for the 1967 season. For a description of the property see Green (1966, pp. 21-23).

Recently, the company has been engaged in marketing and transportation studies to assess the feasibility of further development of the property. Early in 1967, it was announced that an agreement had been signed with C. Itoh and Company Limited of Japan for marketing of lump high-grade iron-ore products if a production decision is made on the property.

BEAVER RIVER AREA

Arivaca Explorations Limited (about 64°05'N, 134°15'W)
(Silver-Lead)

Arivaca Explorations Limited holds three separate claim groups east of Patterson Range along the north and south sides of Beaver River Valley, and a fourth group bordering the south shore of Mayo Lake along Edmonton Creek. The total holdings comprise 97 claims. Early in 1966 geophysical surveys were carried out over parts of the claim groups and during the 1966 season some trenching was done across electromagnetic anomalies outlined. Reconnaissance geochemical work was also carried out. None of these properties was visited.

DAWSON MINING DISTRICT

F23

FORTYMILE AREA

Clinton Creek Mine (Cassiar Asbestos Corporation Limited)
(Asbestos) (64°27'N, 140°42'W)

References: Green and Roddick (1962); Green and Godwin (1964, pp. 19-21); Green (1965, pp. 25-27; 1966, pp. 25-26); Christian (1966).

During 1966, Cassiar Asbestos Corporation Limited continued preparations for bringing its Clinton Creek open-pit asbestos mine into production. The deposit, near Clinton Creek about 48 miles northwest of Dawson, was discovered in 1957 and initially explored during 1957 and 1958. In 1963 and subsequent years exploration was intensified and early in 1965 a production decision was announced.

The property is reached by a 26-mile mine access road that leaves the Sixtymile road near mile 33 and crosses Fortymile River by a new bridge near the mouth of Clinton Creek.

Work during 1966 consisted of about 1 million tons of pre-production stripping from the orebody, about 5,000 feet of diamond drilling to delineate the west extension of the orebody, and construction of various parts of the mine-mill complex. The mine and crusher, located on Porcupine Hill south of Clinton Creek, will be connected via an aerial tramway to the mill on Trace Hill across Clinton Creek valley. The tramline will transport crushed ore about one mile and elevate it about 500 vertical feet to the mill on Trace Hill. Using 3,300-pound buckets, the transport capacity of the tramline system will be about 300 tons per hour. By late 1966, construction of the crusher site and tramline terminal on Porcupine Hill, and erection of the mill complex on Trace Hill was proceeding on schedule with most foundation work completed and sheeting-in of mill, service, and office buildings in progress. Construction of a townsite for a population of 600 to 700 was begun near Fortymile River, about 5 miles from the mine.

Initially, the Clinton Creek mine will produce 60,000 tons of asbestos fibre annually, mainly of Canadian Group 4 category for use in cement products. Production plans call for tonnage to be increased to 80,000 tons by the third year of operation. The asbestos fibre will be shipped by truck to Whitehorse, thence by rail and ship to Vancouver via Skagway. Open-pit mining will begin during the summer of 1967, with full production from the mill scheduled for late 1967 or early 1968. About 200 men will be employed in the operation.

The Clinton Creek orebody is contained within the western part of an irregularly lensoid serpentinite body about 4,500 feet long and up to 1,000 feet wide. The intrusion is one of a cluster of six or more ultramafic bodies exposed within a radius of 3 miles of the mine site. Low grade asbestos occurs in other bodies but no mineable deposits have been found. The ultramafic lenses have been emplaced in a mixed volcanic and sedimentary assemblage of uncertain age, tentatively dated as Palaeozoic (Green and Roddick, 1962). The assemblage includes argillite, quartz-sericite-muscovite schists, carbonaceous limestone and chloritic schists derived from volcanic rocks. The Clinton Creek ultramafic lens strikes about west and dips 45-55 degrees north. The principal rock type is aphanitic serpentinite, probably formed from dunite or pyroxene dunite. Along its north margin a brown-weathering quartz-carbonate alteration zone up to 400 feet wide is present. Similar alteration material is visible in an exploration adit driven through the south contact of the body at an elevation of 1,400 feet. There, asbestos stringers in serpentinite have been transformed in-situ to quartz-carbonate assemblages, retaining their original fibrous morphology and indicating that the quartz-carbonate alteration was a late-stage post-serpentine, post-asbestos process.

As of late 1966, proven ore reserves were 14,325,000 tons with an estimated value of \$14.25 per ton and a waste to

ore ratio of 3.3:1. An additional 9,529,000 tons of indicated ore with a value of \$12.40 per ton and a waste to ore ratio of 6.5:1 are estimated (Northern Miner, December 15, 1966).

SIXTYMILE AREA

F26

Mosquito Creek

GCL Group (Sixtymile Mining Company Limited) (63°50'N, 140°48'W)
(Silver-Lead)

References: Cockfield (1921); Green (1966, p. 28).

This property, originally staked by M. Chefkoi and J.R. Lerner and subsequently optioned by A.H. Moisey, is now held by Sixtymile Mining Company Limited of Edmonton. The company presently holds 52 claims in the area which is reported to contain a number of galena showings (Green, 1966, p. 28). During 1966 some bulldozer trenching was carried out by the present company. The property was not visited.

WHITEHORSE MINING DISTRICT

DAWSON RANGE AREA

F49

Freegold Mountain

Laforma Property (Discovery Mines Limited) (61°16'N, 137°06'W)
(Gold)

Reference: Green (1966, pp. 29-31).

Operations at Discovery Mines Limited Laforma mine, located on the south slope of Freegold Mountain about 30 miles west of Carmacks, were terminated February 28, 1966. The mine commenced production, in June, 1965 and during its operating period about 1,610 ounces of fine gold and 570 ounces of silver were produced (Green, 1966, p. 30). Reasons for closure were increasing operating costs, poor recovery of gold from the ores, and lower grades than originally calculated.

F51

Granite Mountain

March Group (Canex Aerial Exploration Limited) (62°12'N, 136°58')
(Copper-Molybdenum)

Reference: Green (1966, pp. 33-34)

Canex Aerial Exploration Limited continued surface exploration during 1966 on its 92-claim March group on Granite Mountain, about 28 miles northwest of Carmacks. The property

includes an old showing investigated briefly by Conwest Exploration Company Limited in 1959. Access is by means of an 11-mile tote road that leaves the Carmacks-Laforma road near mile 33.

During 1966 a two-hole, 900-foot churn drilling program was carried out to follow up geochemical surveys completed in 1965. Up to 10 men were employed in the operation. The property was not visited.

F 53

Nansen Creek

Mount Nansen Mines Limited

Brown McDade Mines Limited (about 62°03'N, 137°07'W to 137°10'W)
(Silver-Gold)

References: Bostock (1936a); Green and Godwin (1963, pp. 23-24; 1964, pp. 26-28); Green (1965, pp. 32-34; 1966, pp. 34-38); Campbell (1965; 1966).

Mount Nansen Mines Limited and adjacent Brown-McDade Mines Limited hold 299 and 70 claims respectively covering gold-silver properties in the Mount Nansen area, about 30 miles west of Carmacks. Access to the properties is by a 19-mile gravel road that leaves the Carmacks-Laforma road near mile 32. Both properties are controlled by Peso Silver Mines Limited, which holds 66 per cent of Mount Nansen Mines Limited, and 49.2 per cent of Brown-McDade Mines Limited. Peso Silver Mines Limited is, in turn, jointly controlled (54.3 per cent) by Moneta Porcupine Mines Limited and Charter Oil Company Limited.

During 1966, Mount Nansen Mines Limited carried out about 2,500 feet of drifting as well as considerable underground drilling on its holdings, and on the adjacent Brown-McDade property. Up to 40 men were employed in the operation. Total underground exploration work since commencement of operations in December, 1964 is 6,192 feet of drifting, cross-cutting and raising, and 7,300 feet of drilling (Peso Silver Mines Limited, Annual Report for 1966). Operations at the properties were suspended in the spring of 1966, and subsequent efforts have been directed toward financing arrangements for production plans based on a 200-ton-per-day mill. Total ore reserves are estimated at 173,315 tons averaging 0.484 ounces per ton gold and 19.49 ounces per ton silver for the Mount Nansen properties, and 110,000 tons averaging 0.61 ounces per ton gold and 5.4 ounces per ton silver for the Brown-McDade property (op.cit.).

The Mount Nansen Mines Limited holdings comprise the Webber and Heustis properties. They contain sulphide-bearing quartz veins, lenses, and stockworks cutting highly altered quartz-feldspar porphyry (unit 13, Bostock, 1936a) and quartz-biotite schists and gneisses, probably members of the Yukon Group assemblage (unit 1, op. cit.). The vein structures range

from broken, altered zones up to several feet wide containing irregular discontinuous lenses and stringers of dark grey quartz with fine sulphides, to more competent zones carrying thin quartz veins up to 3 to 4 inches thick. The principal metallic minerals are arsenopyrite, pyrite, galena and sphalerite. Various silver-bearing minerals, including freieslebenite, acanthite, native silver, andosite, and argentiferous tetrahedrite have been identified in the ores (Green, 1966, p. 36).

On the Webber property (62°03½'N, 137°10'W), the two principal veins, No. 1 and No. 2, have been explored by drifting from an adit collared in the valley of Webber Creek at an elevation of 4,280 feet, and by drilling from the adit level. The No. 1 vein strikes about N 35° W, and the No. 2 vein about N 60° W. Both dip steeply southwest. The No. 1 vein has been drifted for a strike length of about 830 feet, the No. 2 vein for 825 feet, and the combined vein beyond their junction points for an additional 320 feet. Work during 1966 consisted of about 400 feet of drifting, mainly along the No. 2 vein, as well as some test drilling. As of 1 December, 1966, ore reserves of the Webber property were estimated to total 85,280 tons proven and probable ore, with an average grade of 0.40 ounces per ton gold and 21.5 ounces per ton silver (Peso Silver Mines Limited, Annual Report for 1966).

On the Heustis property (62°03'N, 137°09'W) underground exploration has been concentrated on the No. 12 and No. 13 veins, striking north to N 45°W and about N 35° W respectively, and dipping 60 to 70 degrees east. The veins have been followed from an adit collared at an elevation of 4,295 feet, with about 1,350 feet of drifting completed on the No. 12 vein and about 600 feet on the No. 13 vein, as well as considerable drilling from the drift level. One deep hole intersected good ore in the No. 12 vein at a depth of 360 feet below the adit level (Campbell, 1966). Proven, probable and possible (drill-indicated) ore reserves of the Heustis property are 88,035 tons averaging 0.63 ounces per ton gold and 15.88 ounces per ton silver (op. cit.).

The Brown-McDade property (62°03'N, 137°07'W) contains a strong shear zone trending about N 20° W and dipping 50 to 70 degrees west cutting granodiorite (unit 10, Bostock, 1936a). Gold and silver values occur in irregular grey quartz lenses containing variable amounts of pyrite and arsenopyrite (Green, 1966, p. 38). Old workings completed in 1946 and 1947 consisted of a 680-foot crosscut and a total of 1,150 feet of drifting along the shear zone to the north and south of the crosscut-shear intersection. During 1966, the present company drilled 40 short holes from the adit level to test the lateral extensions of mineralization (Campbell, 1966). Proven and probable ore reserves of this property are 32,190 tons averaging 0.61 ounces per ton gold and 5.4 ounces per ton silver, with an additional indicated (drill) tonnage of 77,945 tons (Green, 1966, p. 38).

F46

Casino Creek

Casino Silver Mines Limited (62°43'N, 138°49'W)
(Casino and Canadian Creek Properties)
(Silver-Lead)

References: Cockfield (1928b, pp. 11A-13A; in Bostock, 1957, pp. 576-578); Green and Godwin (1964, pp. 22-24); Green (1965, pp. 34-35; 1966, pp. 39-42).

Casino Silver Mines Limited, formed in 1965, holds a total of 250 claims covering several silver-lead showings located near the headwaters of Casino and Canadian Creeks about 70 miles northeast of Snag Junction and about 190 miles northwest of Whitehorse. The company maintains a gravel airstrip on the property, suitable for use by twin-engined aircraft. During the winter of 1965-66 a 140-mile winter access road was constructed to the property from Burwash Landing on the Alaska Highway and initial mining equipment, fuel, and supplies were moved in via this road prior to break-up in 1966.

The initial exploration work, done during 1965 and early 1966, was concentrated mainly on the Bomber showing located at an elevation of about 4,000 feet near a small tributary of Casino Creek. The Bomber showing consists of a northwest-trending zone about 150 feet wide that contains several strong shears cutting altered and crumbly granodiorite or quartz monzonite and carrying several sub-parallel, steep-dipping sulphide-bearing veins. Four principal veins, No. 1, 2, 3, and 4 have been investigated through surface trenching and by an underground exploration program consisting of 1,200 feet of drifting carried out from an adit located at an elevation of about 3,940 feet southwest of the surface exposures of the No. 1 vein. For a detailed description of the underground workings see Green (1966, pp. 40-41). The Bomber veins consist of lenses of quartz and barite carrying variable amounts of massive sulphides, principally galena. Sphalerite, pyrite and chalcopyrite are subordinate. The No. 1 vein is up to 8 feet wide in places and locally carries lenses of massive sulphides up to 2 feet wide. The other veins of the system are generally 4 feet or less in width. During the trenching operations carried out in the 1965 season, a total of 48.42 tons of ore averaging 161.1 ounces per ton silver and 68.0 per cent lead were hand sorted from the 4 principal veins, and shipped out for smelter testing. In the 1966 season, ground electromagnetic surveys carried out over the Bomber showing area outlined two main conductors; one approximately coincident with the trend of the No. 1 vein, and a second 1,000-foot long feature lying 150 feet southwest of the No. 1 zone and extending to the northwest of it. An inclined NQ-wireline diamond drill-hole was located to intersect both conductors and drilled to a depth of 736.5 feet. The hole penetrated hornblende-biotite-granodiorite containing frequent chloritized shear zones,

foliated and altered granodiorite, and a few thin feldspar porphyry zones, probably representing dyke rocks. Narrow fracture zones containing pyrite and galena in varying amounts were intersected at several places, but significant massive sulphides were not encountered.

The other principal showing on the property, the Helicopter vein located 3,400 feet southwest of the Bomber showing, was investigated by surface trenching in 1966. It consists of a strong shear zone in altered, deep-weathered granodiorite. The zone strikes about N 30° W and dips 65 to 70 degrees west. Ground electromagnetic surveys in this area have traced a strong linear conductor associated with the break for a total strike distance of 4,600 feet. Bulldozer trenching across the northern end of the break has exposed several parallel fracture zones totalling about 12 feet in width and containing a 4-inch band of massive galena with quartz as well as some disseminated sulphides. A chip sample across a 3-foot zone containing the massive sulphide band assayed*: 0.01 ounces per ton gold; 4.87 ounces per ton silver; 18.6 per cent lead, and 0.1 per cent zinc. A grab sample from the massive sulphide band assayed*: 0.01 ounces per ton gold; 16.4 ounces per ton silver; 55.8 per cent lead, and, 0.1 per cent zinc.

About 4,000 feet southeast of the main Helicopter showing, further bulldozer trenching across the strike of the electromagnetic anomaly has exposed a strong fracture zone similar to the Helicopter north break. The break contains a 1-foot seam of highly decomposed, yellowish-green oxidation material (scorodite?), but no visible sulphide mineralization is present.

Elsewhere on the property, the company investigated several other anomalies outlined by ground geophysical and geochemical surveys carried out in 1966. About 150 feet west of the Helicopter vein, a subparallel, 1,000 foot long electromagnetic anomaly ('H' anomaly) was investigated by bulldozer trenching. A strong break similar to the Helicopter structure was exposed, containing much rusty oxidation staining, but no visible sulphide mineralization. This structure will be further investigated by diamond drilling. The 3,000-foot long, east-west trending 'A' anomaly lying about ½ mile south of the southern extremity of the Helicopter anomaly was investigated by trenching and diamond drilling. A 442-foot inclined NQ drill-hole, located south of the anomaly axis penetrated a 150-foot thick zone of gougy, dark grey graphite-rich argillaceous material, the probable cause of the anomaly. Due to excessive caving a second hole in this area was abandoned at a depth of 128 feet in rusty, foliated granodiorite.

In the northern part of the property, geochemical

*Assayed by G. Spalding, Whitehorse, Y.T.

and geophysical surveys outlined several anomalous areas east of Patton Gulch near the headwaters of Casino Creek. Particular emphasis was placed on the area of the 'C' anomalies, located near a small tributary of Casino Creek. The area is marked by a pronounced gossan zone occurring in strongly fractured and altered granodiorite exposed along the banks of the creek. Soil and stream sampling outlined strong copper-zinc anomalies downstream toward Casino Creek. Bulldozer trenching, carried out late in the 1966 season exposed sulphide mineralization (mainly galena, with minor chalcopyrite) occurring in oxidized shear zones in granitic rocks, along two of the conductor areas. The source of the strong copper-zinc anomaly has not yet been determined. Character assays from the 'C' anomaly trenches have reportedly yielded values ranging from trace silver and lead to 50 ounces per ton silver and 74.6 per cent lead. Additional work is planned in this area for the 1967 season.

In the extreme western part of the property, a strong linear magnetic anomaly ('B' anomaly) was found to be associated with a dyke-like body of biotite-hornblende pyroxenite, apparently cutting granodiorite.

MACMILLAN RIVER AREA

Conwest Exploration Company Limited (62°45'N to 62°52'N, 134°55'W to 135°20'W)
(Copper)

Midway through the 1966 field season, Conwest Exploration Company Limited staked a total of 516 claims in an area lying northwest of Detour Lakes and extending from Pelly River on the southeast nearly to MacMillan River on the northwest. The claims lie adjacent to and north of Tintina Trench and occurrences of copper mineralization have been reported from this general area in the past. The company initiated a general exploration program on the property, working from a base camp at Earn Lake about 20 miles to the east, and late in the 1966 season some diamond drilling was carried out. The property was not visited.

GLENLYON RANGE AREA

F54

Detour Lakes

Glenlyon Mines Limited (about 62°40'N, 134°45'W)
(Copper-Lead-Zinc)

Glenlyon Mines Limited holds a total of 311 claims in the Detour Lakes area, approximately 85 miles northwest of Ross River. The area lies in Tintina Valley and is partly underlain by Mississippian or later sedimentary and volcanic rocks (units 19,20; Campbell and Wheeler, 1960) that may be, in

part correlative with unit 7 rocks of adjacent Tay River area, which host the lead-zinc deposits of the Anvil district. The general Detour Lakes area is marked by a distinct northwest-trending linear magnetic high paralleling Tintina Trench¹.

Copper-bearing float has been reported from the area in the past, but no significant mineral finds have been recorded. Following discovery of lead-zinc deposits in the Anvil district, attention was focussed on Detour Lakes and similar areas lying adjacent to Tintina Trench and containing rock types similar to those of the Anvil district, as likely exploration targets. During the 1966 season the company carried out airborne electromagnetic and magnetic surveys over the property and followed up a number of anomalies with reconnaissance soil sampling and geological mapping programs. A detailed geochemical survey was carried out over a significant anomaly lying south of Detour Lake. A crew of up to 12 men were employed on the operation. The property was not visited.

¹Geol. Surv. Can. Geophysics Paper 7209, Glenlyon, 1966.

General Enterprises Limited (H. Johannes) (about 62°43'N, 134°
(Copper-Lead-Zinc) 45'W)

This company owns 128 claims in the Detour Lakes area, immediately north of the Glenlyon Mines Limited property. Late in the 1966 season, ground magnetic and electromagnetic surveys were conducted over parts of the property. Up to 5 men were employed. In April 1967, construction of a 71-mile access road from Pelly Crossing to the property was begun. The property was not visited.

ANVIL RANGE AREA

(ROSS RIVER-VANGORDA AREA)

(Lead-Zinc)

General Description

References: Chisholm (1957, pp. 269-277); Roddick and Green (1961); Green and Godwin (1964, pp. 31-32); Green (1965, pp. 36-37; 1966, pp. 47-50); Aho (1966, pp. 127-149); Roddick (1967).

Since the discovery of the Faro lead-zinc deposit by Dynasty Explorations Limited in 1965, the Anvil-Vangorda district, 130 miles northeast of Whitehorse, has been the most active exploration region in Yukon. At the end of 1966 some 70 companies and individuals held a total of nearly 10,000

claims in the area lying north of Tintina Trench (Pelly River) and extending from Ross River at the southeast to Anvil Creek, 55 miles to the northwest. The announcement in March, 1967 that the Faro deposit will be brought into production will undoubtedly spur continued extensive exploration activity in the area.

The Anvil area first attracted serious attention in 1953 when Prospectors Airways Company Limited optioned the original Vangorda Creek sulphide discovery (Green and Godwin, 1964, p. 31) from A. Kulan and associates. In 1955, Vangorda Mines Limited was formed, with controlling interest held by Prospectors Airways Limited, and by that year an extensive drilling program had indicated an orebody of 9,400,000 tons averaging 3.16 per cent lead, 4.96 per cent zinc, 0.27 per cent copper, 1.06 ounces per ton silver, and 0.02 ounces per ton gold. Two smaller sulphide bodies, the Champ and Firth were also discovered during the program. Following these initial discoveries, interest in the area declined until 1961-1962 when Kerr Addison Mines Limited, having absorbed Prospectors Airways Limited, began working in the Swim Lakes area, southeast of the original Vangorda Creek discovery.

In 1964, Dynasty Explorations Limited began an extensive exploration program in the vicinity of the original Vangorda deposit, and in adjacent areas. In 1965 the company entered into a joint venture with Cyprus Mines Corporation, and an overburden drilling program was commenced to test magnetic, electromagnetic, and geochemical anomalies outlined during the initial exploration program. Early in the 1965 season, drilling of an electromagnetically and geochemically anomalous area near Rose Creek, about 10 miles northwest of the Vangorda deposit, resulted in discovery of the Faro No. 2 zone, containing encouraging sulphides. Subsequent drilling intersected the main Faro No. 1 deposit, now known to contain 40 million tons of ore averaging 10 per cent combined lead and zinc with over 1 ounce per ton of silver. Following the discovery, the partners in the joint venture formed Anvil Mining Corporation Limited, as the operating agency for the Faro and other properties in the area. Ownership of the company rests 60 per cent with Cyprus Mines Corporation and 40 per cent with Dynasty Explorations Limited.

Elsewhere in the Anvil area, Kerr Addison Mines Limited carried out an extensive drilling program during 1965 and 1966 on its Swim Lakes property, six miles southeast of the Vangorda deposit. This program has outlined a zone containing an indicated 5,000,000 tons of ore averaging about 9.5 per cent combined lead and zinc and 1.5 ounces per ton silver. Numerous other companies were active in the district during 1966; most being occupied with line cutting, airborne and ground geophysical surveys, and geochemical surveys. Several companies, amongst them Jaye Explorations Limited, Silver Arrow Explorations Limited, Kamloops Copper Limited and Cominco Limited

carried out reconnaissance drilling programs.

The geology of the Anvil district consists essentially of sequences of folded and metamorphosed volcanic and sedimentary rocks of probable Mississippian or younger age that have been intruded by granitic rocks (granodiorite, quartz monzonite) of the Cretaceous (?) Anvil batholith (Roddick and Green, 1961). Smaller, locally porphyritic granitic to dioritic stocks may be equivalent to or younger than the Anvil intrusions. Serpentinized ultramafic rocks occur locally within metavolcanic members. The Anvil belt lies adjacent to, and directly northwest of Tintina Trench, marked in this area by Pelly River valley. Tintina Trench is a major fault lineament extending about 600 miles from southeastern Yukon into Yukon Flats, Alaska. Right-lateral displacement along the fault is estimated at 220 to 260 miles by Roddick (1967). North of the fault, rocks of the Anvil belt are cut by a system of northeast-trending subsidiary fractures, some of which occur in the vicinity of the known ore deposits.

The principal sulphide occurrences of the district are contained within rocks of unit 7, (Roddick and Green, 1961a). This unit comprises quartz-sericite schist, hornfels, phyllite, chlorite schist, and greenstone, and is probably divisible* into two crude sub-units, one essentially sedimentary, the other volcanic, with local intercalated ultramafic sills. The known ore deposits lie within the sedimentary assemblage; in the case of the Faro and Vangorda deposits, the host rocks are quartz-biotite-sericite schists and quartz-sericite-chlorite schists respectively. Superposed on the regional green-schist metamorphic grade of unit 7 rocks, are effects of a second stage of metamorphism, probably related to intrusion of the Anvil batholith. The biotite-rich zones in rocks on the Faro property, and elsewhere along the southwest margin of the batholith are probably of contact metamorphic origin. The ore bodies show some characteristics of syngenetic (conformable, preferential host), and replacement (details of ore mineral assemblages, replacement features, possible associated alteration halo, etc.) deposits.

*Information from Anvil Mining Corporation Limited.

1-56 Rose Creek

Faro Property (Anvil Mining Corporation Limited) (62°21.5'N,
(Lead-Zinc) 133°22'W)

The Faro property is located at an elevation of about 4,000 feet just above Rose Creek valley and about 8 miles north of Pelly River. The property is now accessible by a 24-mile road leading from the ferry crossing (ice-bridge

during winter) at Pelly River upstream from Blind Creek mouth, to the main Faro camp on a bench above Rose Creek valley. An all-weather, 3,800-foot airstrip is maintained by the company at Faro camp. The Faro No. 1 deposit lies about 1 mile north-east of the camp and immediately west of Faro Creek, a tributary of Rose Creek. The Faro No. 2 zone, site of the initial discovery, lies about 4,000 feet southeast of Faro No. 1, and east of Faro Creek. The Faro No. 3 zone appears to date to represent the southeast extension of the No. 1 zone.

During the 1966 season principal exploration efforts were directed toward delineating the Faro No. 1 deposit through diamond drilling. A total of 56 holes were drilled bringing the cumulative footage on the No. 1 zone to 37,349 feet. In addition, drilling was carried out over geochemical and gravity anomalies lying between the Faro No. 1 and No. 2 zones, with the result that the No. 3 zone was partly delineated. Other work on the property included drilling for millsite foundation testing southwest of the No. 1 zone and drilling to test potential dump site areas. As many as 60 men were employed during the 1966 operations.

Late in 1966, work was started on an adit into the No. 1 orebody for bulk sampling purposes. The portal was located at an elevation of 3,920 feet at point about 2,000 feet south of the southwest margin of the orebody and driven on a heading N 08° E. Design length of the adit is about 2,700 feet, which will allow sampling through the entire orebody. After initial tunneling difficulties due to the shallow slope of the bedrock surface beneath overburden which resulted in several cave-ins and mudslides through the back of the adit, underground work progressed steadily and by mid-March, 1967 the orebody was entered and bulk sampling began. Samples were trucked to Whitehorse for shipment via rail and ship to Golden, Colorado, for milling and metalurgical testing.

On March 20, 1967, the company announced that, subject to satisfactory arrangements concerning senior financing, market contracts, transportation, townsite construction and hydroelectric power supply, the Faro deposits would be brought into production by the winter of 1969. Estimated pre-production costs are about \$56 million, and plans call for a 5,500 ton per day concentrator to produce 370,000 tons of lead-zinc concentrates annually from open pit mining operations. Currently, ore reserves are stated as 50 million tons averaging in excess of 10 per cent combined lead and zinc and over 1 ounce per ton silver (Northern Miner, March 27, 1967, p. 1). It is anticipated that initial shipment of concentrates will be via the Ross River-Carmacks road, scheduled for completion in 1968.

The Faro No. 1 orebody comprises a northwest-striking shallowly southwest dipping lens-like mass about 2,400 feet long by 1,200 feet wide. The plunge of the body

ranges from 35° southeast to nearly horizontal. Overburden depth ranges from 40 to 60 feet. The body has a weak magnetic and electromagnetic expression, and a moderate geochemical anomaly expressed as a downslope copper-lead-zinc train. Principal metallic minerals are pyrite, pyrrhotite, galena, sphalerite, and chalcopyrite. No systematic mineral zoning has been recognized in the ores. Host rocks are light grey, finely laminated impure quartzite, quartz-sericite schist and quartz-biotite schist.

Anvil Mining Corporation Limited
(General exploration - Anvil District)

In addition to development work on the Faro property, Anvil Mining Corporation Limited carried out extensive exploration on others of its 2,500-claim total holdings in the Anvil district. Essentially all of the company properties have been covered in previous years by airborne magnetic and electromagnetic surveys, (in past done by Dynasty Explorations Limited) and during 1966 a program of ground geophysical and geochemical surveys was continued as follow-up to the airborne work. Reconnaissance diamond drilling was carried out on the Ace group property (about 62°20'N, 132°48'W) (4 holes totalling 1,966 feet), on the Ivan group (about 62°35'N, 133°15'W) north of Mount Mye (4 holes totalling 1,553 feet), and on the Dea and Sea (Swim Lakes) properties (about 62°12'N, 133°02'W) (7 holes totalling 2,977 feet). Three holes totalling 1,497 feet were also drilled on the Bill group property of Pelly River Mines Limited, now controlled by Anvil Mining Corporation Limited. In addition, a program of detail geologic mapping (1 inch to ½ mile) along the south flank of the Anvil Range was initiated. A total of up to 50 men were employed on these various outside exploration projects.

Mount Mye

Jaye Explorations Limited (62°22'N, 132°53'W)
(Lead-Zinc)

During 1966 this company carried out geological, magnetic, electromagnetic and gravity surveys over its 76-claim property on the northeast flank of Mount Mye in the Anvil Range area. Geological mapping indicated the presence of an east-west trending belt of metasedimentary and metavolcanic schists of unit 7 (Roddick and Green, 1961) on the property. The belt contains intercalated limestone members and graphitic schist horizons. Four AX diamond drill-holes ranging in depth from 469 feet to 752 feet and totalling 2,521 feet were put down on targets outlined mainly by gravity anomalies, with negative results. It seem probable that the local gravity anomalies present are in part caused by relatively massive greenstone lenses or sills intercalated with the quartzitic

schists.

F 57

Vangorda Creek

Vangorda Mines Limited (62°15'N, 133°12'W)
(Lead-Zinc)

Inactive; see Green and Godwin (1964, pp. 31-32).

F 58

Swim Lakes

Swim Lakes Property (Kerr Addison Mines Limited) (62°12½'N, 133°
(Lead-Zinc) 02'W).

References: Green (1965, p.36; 1966, p. 50).

During the 1966 season, Kerr Addison Mines Limited continued the drilling program begun last year on their 72-claim Swim Lakes 'A' group property, located about 6 miles southeast of the original Vangorda Creek property of Vangorda Mines Limited. The program has involved 30 holes totalling about 14,500 feet. During 1966, 4 machines were utilized and up to 24 men were employed in the operation. Early in 1967, the company announced (Northern Miner, March 9, 1967, p. 5) that the drilling had largely delineated a zone containing approximately 5,000,000 tons of ore, averaging about 9.5 per cent combined lead and zinc, 1.5 ounces per ton silver, and with minor copper and gold values.

Silver Arrow Explorations Limited (about 62°10'N, 132°43'W)
(Lead-Zinc)

Silver Arrow Explorations Limited holds a total of 49 claims in the Vangorda area, about 4 miles east of Swim Lakes. During 1966, airborne electromagnetic and ground magnetic surveys were conducted over the property. On the basis of the geochemical and geophysical results, a 5-hole drilling program was completed in late 1966 and early 1967. The property was not visited

Tay River Mines Limited (about 62°15'N, 132°45'W to 62°22'N,
(Lead-Zinc) 133°15'W)

The company holds a total of 287 claims in four separate properties in the general area between Mount Mye and Swim Lakes in the Anvil Range district. The properties are underlain by granitic rocks of the Anvil batholith and by metasedimentary and metavolcanic rocks of probable Mississippian age. During 1966, ground magnetic and electromagnetic surveys,

and mapping and prospecting programs were conducted over the company holdings. Geochemical soil and silt sampling programs were carried out in selected areas. The results of the work were not encouraging and no further work is planned in the immediate future.

WHITEHORSE AREA

F 117-122

Whitehorse Copper Belt

New Imperial Mines Limited (60°33'N to 60°45'N, 134°53'W to 135°
(Copper-Iron) 10'W)

References: McConnell (1909); MacLean (1914, pp. 159-165);
Cockfield and Bell (1926, pp. 48-49; 1944, pp. 18-19);
Wheeler (1961, pp. 137-142); Green and Godwin (1964,
pp. 33-39); Kindle (1964); Green (1965, pp. 33-39; 1966,
pp. 50-51).

During 1966, New Imperial Mines Limited completed preparations for bringing its Little Chief open-pit mine into production (60°38.3'N, 135°03.7'W), and at the end of April, 1967, the mill began treating ore from the pit-head stockpile. The Little Chief deposit is the first of a number of copper properties held by the company in the Whitehorse Copper Belt to be brought to a production stage. The other principal deposits - War Eagle, Arctic Chief, Best Chance, Cowley Park and Keewenaw - have been initially explored by the company over the past few seasons, but will not be extensively developed until the Little Chief operation is well into production.

The Copper Belt operations are being developed in conjunction with Sumitomo Metal Mining Company of Japan, who have provided part of the development capital and who will purchase all copper, gold, and silver concentrates from the mines for a minimum 10-year period. The central, 2,500 ton-per-day mill, located about 2 miles east of MacRae (mile 911, Alaska Highway) at the Little Chief mine is designed to eventually treat ores from the other properties also. Concentrates will be shipped by rail and ship to Vancouver, via Skagway, and thence transhipped on ocean ore-carriers to smelters in Japan.

The copper-iron deposits of the Whitehorse Copper Belt have had a long and erratic history of piecemeal exploration and development. The first discoveries in 1887-88 (Copper King, Anaconda, Big Chief, and Little Chief) precipitated extensive prospecting and staking in the area, and by late 1899 most of the nearly thirty presently-known occurrences had been discovered (Kindle, 1964). The showings are distributed within a 17-mile by 2 to 3-mile wide belt lying to the west of the Alaska Highway and extending from the northeast flank of Golden Horn Mountain on the south (Cowley Park) to about 4 miles

northwest of Whitehorse (War Eagle) on the north. During the period 1900-1915, intermittent production of high-grade, direct-shipping copper ore, totalling 162,440 tons and ranging in grade from 3.5 per cent to 46.4 per cent copper was reported to have been shipped from various of the properties (Kindle, 1964). After 1920 little work was done until 1947-48, when Noranda Mines Limited carried out a surface exploration program, including diamond drilling. The present company began intensive re-investigation of some of the Copper Belt properties in 1963.

The copper ores occur mainly as contact metasomatic deposits developed in skarn zones formed near intrusive contacts between granodioritic to dioritic rocks of the Coast Intrusion sequence and limestones of the Upper Triassic Lewes River Group (unit 3c, Wheeler, 1961). Two types of ore-mineral assemblages occur; disseminated to massive lenses of bornite and chalcopyrite in calcium-magnesium-silicate skarn composed essentially of diopside, chlorite, epidote, garnet, and tremolite; and, bornite-chalcopyrite-magnetite deposits in calcium-magnesium-iron skarn that contains abundant serpentine, and rarely, asbestos. The latter type appear to be mainly concentrated in deposits in the central part of the belt, such as the Little Chief, Big Chief, and Arctic Chief.

At the Little Chief mine, bornite-chalcopyrite and bornite-chalcopyrite-magnetite ores occur in irregular lenses lying near the west boundary of a large calcium-magnesium-silicate skarn body that extends from the south end of Little Chief Lake (now drained in preparation for open-pit mining) northwest for about 2,400 feet to Big Chief Lake. The skarn is bounded on the east by dioritic intrusive rocks and along its north and northwest sides by massive limestone and, locally, diorite. The skarn probably partly overlies limestone, and drilling in the Little Chief mine area has intersected relatively unaltered lenses of limestone intercalated with skarn.

Drilling of the Little Chief orebody has outlined an estimated 1,910,000 tons of ore averaging 1.4 per cent copper (Northern Miner, January 19, 1967) to be mined from the approximately 900 feet by 450 feet by 300 feet deep open pit. In addition, encouraging results were obtained from a 5-hole deep drilling program (totalling 4,254 feet) carried out late in the 1966 season, which indicated a further 3,452,000 tons of possible ore grading 2.14 per cent copper below the pit floor (op. cit.). Early in 1967, the deep drilling program was resumed to further block out the deep ore. The drilling, coupled with surface information, has established that in gross form, the orebody is roughly tabular, strikes approximately north, dips about 55 degrees east, and is still open to 900 feet below surface.

In addition to the pre-production work at the Little Chief mine, the company continued its surface exploration

program over other of its ground in the area during the 1966 season. Work done included geological mapping, ground magnetic surveys, and evaluation of airborne geophysical survey results.

Quatsino Copper-Gold Mines Limited (about 60°37'N, 135°06'W)
New Privateer Mine Limited
Buchanan Mines Limited
(Antimony)

A 56-claim property lying west of and adjacent to the Little Chief and Arctic Chief properties of New Imperial Mines Limited is jointly held by Quatsino Copper-Gold Mines Limited, New Privateer Mine Limited and Buchanan Mines Limited. Early in 1967 it was announced (Northern Miner, February 16, 1967) that a high-grade antimony discovery had been made on the property. Assays of up to 27.5 per cent antimony were reported from 3-foot channel samples across the showing. The property was not visited.

F 79

Lake Laberge

Pine Lake Mining Company Limited (61°04'N, 135°02'W)
(Copper)

Reference: Bostock (1936c).

Pine Lake Mining Company Limited holds 70 claims covering a copper prospect along the east side of Lake Laberge just north of the old Lake Laberge-Livingstone Creek trail. Old copper showings are known in the area, but work during 1966 outlined new bornite-chalcopyrite mineralization reportedly contained in a skarn zone formed in Lewes River Group limestone (unit 5, Bostock, 1936c) near the contact with a small granitic intrusion. Ground geophysical surveys were carried out late in 1966 and in April 1967 the company completed a 30-mile access road from Whitehorse to the property. A diamond drilling program will be carried out early in the 1967 season. The property was not visited.

F 125

WHEATON RIVER AREA

Yukon Antimony Corporation Limited (Becker-Cochran Property)
(Antimony) (60°11'N, 135°13'W)

References: Cairnes (1916, p. 48; in Bostock, 1957, pp. 335-336); Bostock (1941, p. 35); Wheeler (1961, p. 132); Green (1965, p. 42; 1966, pp. 52-55).

Antimony was first discovered on Carbon and Chieftain Hills, near Wheaton River in 1893. Subsequently, the Becker-Cochran property, located on the east slope of Carbon Hill was

explored by limited underground workings in the years 1914-1915. Wheeler (1961) reported that some work was done on the property in 1951.

In 1964 the present company acquired the Becker-Cochran property, in addition to several other showings in the area. An access road from Wheaton River to the property was re-opened, some bulldozer stripping was carried out, and a 12-ton bulk sample for metallurgical tests was mined (Green, 1965). In 1965 the company installed a camp on Becker Creek near Wheaton River, reached by a 23-mile access road that leaves the Carcross road at mile 11. Improved access roads were built from the camp to the Becker-Cochran property and other nearby showings. Extensive bulldozer stripping, surface mapping and sampling, surface and underground diamond drilling, and about 500 feet of underground exploration was carried out (Green, 1966).

During the 1966 season, an additional 1,025 feet of underground exploration work was done, as well as 1,500 feet of diamond drilling, about half underground and half from surface. A decision concerning future development work on the property is pending, subject to evaluation of assay results from the 1966 work.

The Becker-Cochran showing occurs along a pronounced gouge-filled shear zone up to 4 to 5 feet wide cutting altered rhyolitic to dacitic volcanic rocks of uncertain age (unit A, Wheeler, 1961) enclosed by granodiorite of the Coast Intrusions (unit 8, Wheeler, 1961). The main shear strikes N 50° W and dips 75° SW. Sulphide mineralization, including fine pyrite and stibnite and massive knots of coarse stibnite crystals, occurs with quartz gangue as irregular lenses and patches within the shear. Ore shoots are 4 to 12 inches wide and generally not continuous along strike for more than a few feet. In places, the ores are cut by rhyolite-porphyr dykes.

Underground exploration carried out in 1965 and 1966, involved work from three adits. In 1965, 350 feet of northwest drifting was done along the main shear from the No. 1 portal at an elevation of 5,260 feet. Locally heavy mineralization was encountered, particularly near the end of the drift. In 1966, the drift was extended 170 feet, but only minor mineralization was encountered. Three drill-holes were fanned from the end of the drift, but no additional mineralization was intersected. The No. 2 adit was driven southeast along the main shear, at the same elevation as the No. 1 adit and about 270 feet southeast of its portal. The 135-foot long drift intersected only minor mineralization. In 1966, the No. 3 adit was driven from an elevation of 5,110 feet and a location about 400 feet east of the No. 1 portal. A 452 foot crosscut, heading S 33° W intersected a shear system carrying good mineralization 425 feet from the portal; this was followed 250 feet to the northwest but no significant additional mineralization was encount-

ered. A finger-drift was headed north for 60 feet from a point 145 feet along the northwest drift from its junction with the crosscut, but failed to intersect significant mineralization.

F 123

Skukum Copper Property (60°11'N, 135°22'W)
(Copper)

Yukon Antimony Corporation Limited holds a 27-claim property on Skukum and Berney Creeks, near their junction with Wheaton River, immediately west of Carbon Hill. During the 1966 season a copper showing was discovered on the property, on the north side of Skukum Creek, just upstream from its junction with Berney Creek. The showing was not visited, but is reported to consist of disseminated chalcopyrite and malachite in granitic rocks. It has been estimated that the deposit may contain 3 million tons grading approximately 0.5 per cent copper (Financial Post Survey of Mines 1967, p. 301). An extensive exploration program is planned for 1967.

F 130

Tally-Ho Gulch (60°14.5'N, 135°03'W)
(Gold-Silver)

References: Cairnes (1910b, in Bostock 1957, p. 334; 1912, pp. 108-110; 1916, p. 44, in Bostock 1957, p. 419); Cockfield and Bell (1926, p. 43; 1944, p. 15); Wheeler (1961, p. 123).

Silver Pack Mines Limited, an affiliate company of International Mine Services Limited, holds an option on eight Crown Grant claims on Tally-Ho Mountain, southeast of Wheaton River. An additional 104 claims surrounding the Crown Grants are held by J.D.S. Bohme, attorney for International Mine Services Limited. The property includes the original Tally-Ho Gulch gold-silver showing, discovered in the early 1900's and explored intermittently between 1909 and 1912. Mineralization, principally argentiferous galena, occurs in a quartz-impregnated fault-breccia zone cutting granodiorite of the Coast Intrusions (unit 8, Wheeler, 1961). In the early years the property was investigated by means of two adits, one about 700 feet long, the other less than 500 feet, and limited crosscutting and drifting was done. Since about 1926 the property has been idle. Cairnes (1910b) reported assays averaging \$80 per ton in gold and silver (at \$20 per ounce gold) from part of the underground workings.

During 1966, the present owners constructed an access road to the old workings from mile 18 on the Carcross-Yukon Antimony road. The two adits were partly re-opened, and about 1,500 feet of diamond drilling (6 holes) carried out from a crosscut in the lower adit. The property was not visited.

CARCROSS AREA

15133

Montana Mountain

Arctic Caribou (Big Thing) Property (60°05'N, 134°42'W)
(Gold-Silver)

References: Cairnes (1906, pp. 24-25; 1908a, p. 14; 1917, pp. 28-36, in Bostock, 1957, pp. 209-217; 245-275; 426-459); Cocksfield and Bell (1926, p. 39; 1944, p. 12); Wheeler (1961, p. 127); Green (1966, pp. 55-60).

Arctic Mining and Exploration Company Limited holds 123 claims in the vicinity of Sugarloaf Hill, Montana Mountain area. In 1965, the company began re-investigation of the old Big Thing property, covered by two Crown Grant claims (Pride of the Yukon, and Caribou), and first discovered in the early 1900's. Access to the present operation is by a 8.4 mile secondary road leading from the village of Carcross. A year-round camp, housing a work crew ranging from 8 to 20 men, has been maintained at the site since mid-1966.

During the period 1905-1916, underground development work carried out on the property included a 450-foot inclined shaft driven from an elevation of about 6,080 feet into the south side of Sugarloaf Hill, and about 1,050 feet of drifting on four levels. In addition, a 2,320-foot horizontal tunnel was driven southeasterly into Sugarloaf Hill from an elevation of about 5,100 feet, that eventually connected with the inclined shaft workings.

In past years, some hand-picked ore was stockpiled and it is reported (Annual Report, Arctic Mining and Exploration Company Limited, November, 1965) that approximately 3,000 tons of ore grading 1.08 ounces per ton gold and 27.7 ounces per ton silver were shipped.

The gold-silver ores occur in a series of northeast-striking, shallow to moderately northwest-dipping quartz veins that cut a medium-to coarse-grained, locally porphyritic granodiorite. The latter is part of a larger stock that probably extends north to Carcross (unit 8, Wheeler, 1961). The principal vein systems (No. 1 or 'Footwall', and No. 2) are fairly consistent, but contain gentle downdip flexures so that dips range from nearly horizontal to about 40 degrees northwest. Along strike the veins have been displaced by two fault systems, one striking across the veins, the other nearly parallel to them. The combination of changes in dip and slicing-off by flat faults has made underground work difficult.

The quartz veins range from single structures less than 1 foot thick, to stockworks up to 12 feet wide containing numerous branching and coalescing veinlets. Most mineralized zones are rarely more than 2 feet wide. The principal metallic

minerals are pyrite, arsenopyrite, sphalerite, galena (minor) and rare chalcopyrite, occurring in irregular lenses and shoots within the quartz gangue. Gold and silver values up to 4-5 ounces per ton and 50-60 ounces per ton respectively occur locally, but other vein segments are barren; most well-mineralized zones average less than 1 ounce per ton gold and about 15-20 ounces per ton silver. A grab sample taken by the writer from a high-grade section at the junction of the main crosscut with the No. 1 (Footwall) vein assayed*: 0.44 ounces per ton gold, 40.6 ounces per ton silver, 1.9 per cent lead, 4.2 per cent zinc and 0.01 per cent copper.

The surface extensions of the veins have been exposed in a series of trenches on the hillslope above the present portal. They occur as highly-fractured, crumbly grey quartz stringers carrying fine sulphides (mainly arsenopyrite) in the deep-weathered granodiorite host. Alteration of the granodiorite is extensive and vein selvages are commonly stained with yellow and green powdery material, identified by Green (1966) as scorodite, a secondary arsenic mineral. A chip sample (mainly rubble) taken across one of the smaller surface exposures (about 2 feet) assayed*: trace gold, 1.38 ounces per ton silver, trace lead, zinc and copper.

Underground work by the present company, begun in October, 1965, has included about 4,500 feet of drifting and about 3,000 feet of underground diamond drilling (to the end of 1966). Underground development included a new 1,000-foot adit (main crosscut) driven northeasterly from an elevation of about 5,800 feet, northeast of, and below the old inclined shaft entrance. From the main crosscut, five principal drifts - 835 E, 835 W, 850 E, 848 E and 848 W - followed the 'Footwall' and No. 2 vein trends for distances of about 225, 500, 450, 125 and 750 feet respectively. The 848 W drift did not encounter significant mineralization. The best ore grades were encountered in the junction area of the main crosscut and the No. 2 vein, approximately 750 feet from the portal, and along the 850 E drift from this point. In September of 1966, an underground drilling program was started to block out up- and down-dip extensions of the two principal veins. The drilling program continued throughout the winter.

In late February, 1967, the company announced (Northern Miner, February 23, 1967, p. 1) that production plans for the property on a 200 ton-per-day basis were being considered. Ore reserves were stated as 132,000 tons grading 0.69 ounces per ton gold and 19.8 ounces per ton silver with an additional estimated 40,000 tons of possible ore.

*Assayed by G. Spalding, Whitehorse, Y.T.

Peerless Group (60°05'N, 134°42'W)
(Gold-Silver)

Originally part of the old Big Thing property (see Arctic Caribou) the 7-claim Peerless group is now held by International Mine Services Limited. The claims encompass the original lower workings of the Big Thing property, including most of the 2,320-foot horizontal tunnel driven from the north-west side of Sugarloaf Hill at an elevation of about 5,100 feet. During the 1966 season, the company re-opened the tunnel. Some underground mapping and sampling was also done.

F136

Bear Molybdenum Property (about 60°07'N, 134°43'W)
(Molybdenum)

Gui-Por Uranium Mines and Metals Limited has an option on 38 claims (Tin Cup Group) and owns 19 adjacent claims (Liz and Bear Groups) straddling the Carcross-Arctic Caribou access road on the north slope of Montana Mountain. The area is underlain mainly by granitic rocks of the Coast Intrusion sequence (unit 8, Wheeler, 1961) and two small molybdenum showings are known on the property. During the 1966 season, a copper-molybdenum geochemical survey carried out over part of the property outlined an anomalous area. Late in the season a bulldozer trenching operation was begun over the anomaly, and some molybdenum mineralization associated with quartz veins was exposed.

F135

Venus Group (Venus Mines Limited) (60°01'N, 134°38.2'W)
(Gold-Silver)

References: Cairnes (1908, pp. 16-17; 1909, p. 31; 1817, pp. 39-41; in Bostock, 1957, pp. 254-255; 282; 447-449); MacLean (1914, pp. 194-200); Cockfield and Bell (1926, p. 40); Wheeler (1961, pp. 129-130).

The Venus group consists of 27 claims (including 8 Crown Grants) located along the west side of Windy Arm, Tagish Lake, near the site of the long-abandoned settlement of Conrad City. During the period 1904-1918 this area was under intermittent investigation for gold and silver and numerous properties, including Venus No. 1, Venus No. 2, Venus Extension, Vault, Montana, Mountain Hero, Dail, Flemming, and M and M, amongst others were worked to varying degrees. The remains of the original 100-ton mill built on the lakeshore in 1908 to treat ores from the Venus, Montana, Mountain Hero, and Vault operations are still present at Conrad, as are the aerial bucket tramway systems leading from the Venus and Montana portals downhill to the mill. Small ore shipments were made from time to time from the district and Cairnes (1917) reported that about 6,000 tons of ore was supposed to have been mined at the Venus operation, part of which was shipped to smelters.

Gold-silver values occur in a series of northerly-trending, shallow-dipping quartz vein systems cutting intermediate to acidic volcanic rocks of the Cretaceous Hutshi Group (unit 7, Wheeler, 1961). One of the principal veins, the Venus, is a persistent structure that has been traced, on surface and underground, for more than a mile. It consists of coarse crystalline quartz and carbonate, carrying irregular bands and lenses of pyrite, arsenopyrite, galena, and minor sphalerite and chalcopyrite. The vein ranges from a few inches to 5 feet in thickness, its strike averages N 10° E and its dip is about 35° W. It was explored by underground workings in four adjacent properties - Vault, Venus No. 1, Venus No. 2 and Venus Extension. Although good values were encountered in places (Wheeler, 1961, p. 130) development work showed that gold-silver distribution was erratic. A chip sample across 2 feet, taken by the present writer, from the main Venus vein exposed near the mouth of a small tunnel in the hillslope about 1,000 feet north of the Venus Extension tunnel assayed*: 1.42 ounces per ton gold, 5.14 ounces per ton silver, 1.1 per cent lead, trace zinc and copper.

In May 1966, the present company, Venus Mines Limited, constructed an 18-mile tote-road from Carcross to the Venus group, where a camp and portal site were established at an elevation of about 2,700 feet, and about 800 feet south of the Venus Extension tunnel. During the period June to late September, 1966, 1,614 feet of underground exploration was carried out. A crosscut was driven northwest and intersected the Venus vein about 200 feet from the portal; the vein was then followed in a northerly-trending drift (No. 1 N) for about 300 feet, at which point the vein was lost in a complex fault zone. The crosscut was then extended a further 130 feet past the No. 1 N drift and a second vein structure was intersected. This was followed by drifting approximately parallel to the No. 1 N drift, but after 250 feet the structure was lost due to faulting. The drift was continued through the fault zone where a vein structure up to 6 feet wide and striking approximately east and dipping about 30 degrees north was intersected. Except for its strike, the new vein reportedly has characteristics similar to the Venus vein.

Seventy feet past the new vein intersection, drifting was stopped and a diamond drilling program was initiated to outline the new structure. Drill-holes provided two intersections on the new vein as well as one on the projection of the Venus vein 80 feet to the east of the drift. This intersection assayed**: 0.39 ounces per ton gold, 4.7 ounces per ton silver and 1.4 per cent lead, over a width of 4 feet. The exploration program was suspended for the winter but in April 1967, the company resumed its underground drilling and drifting programs.

*Assayed by G. Spalding, Whitehorse, Y.T.

**Information provided by Venus Mines Limited.

As exposed in the No. 1 N drift in the present workings, the Venus vein ranges from a few inches to nearly 1 foot in thickness. Pinches and swells are common, and ore mineralization is erratic. Well-mineralized zones show a crude banding of sulphides (mainly pyrite, arsenopyrite, and galena) parallel to the vein walls. Quartz in the interior part of the vein is commonly coarse, and vuggy openings contain well-formed inward-growing quartz crystals forming comb structures. The vein strike averages N 10° E and dips 30 to 35° W. A grab sample taken by the writer from the main vein in the No. 1 N drift assayed*: 0.12 ounces per ton gold, 0.50 ounces per ton silver, trace lead, zinc and copper.

In addition to the main vein, numerous other smaller, quartz-filled tension-gash structures have been intersected underground, some of which carry sulphide mineralization and gold-silver values.

*Assayed by G. Spalding, Whitehorse, Y.T.

UPPER WHITE RIVER AREA

F 67

Micro Group (P. Versluce and Associates) (61°57'N, 140°32'W)
(Canalask Property)
(Nickel-Copper)

References: Campbell (1960); Muller (1958; 1967).

P. Versluce and Associates, Whitehorse, hold a total of 54 claims on the east and west banks of White River, covering the old nickel-copper occurrence of Canalask Nickel Mines Limited. The property is reached by a 2.8-mile access road that leaves the Alaska Highway near mile 1167.

The Canalask property has a similar geological setting and exploration history as the Wellgreen nickel-copper property of Hudson Bay Mining and Smelting Company Limited. Nickel-copper sulphides were first discovered on the east bank of White River in 1952 by Prospectors Airways Company Limited, which did about 5,300 feet of surface diamond drilling on the property during the 1952-1953 seasons. In 1954 the property was acquired by Canalask Nickel Mines Limited and between 1954 and early 1958 this company completed an extensive surface and underground exploration program that involved approximately 8,800 feet of surface drilling, 1,700 feet of underground drifting, and 1,500 feet of underground drilling. As of October, 1956, indicated ore reserves were 550,000 tons averaging 1.68 per cent nickel. The underground work was carried out from a 420-foot adit driven east from the east bank of White River at an elevation of 2,700 feet. A total of about 1,000 feet of drifting and cross-cutting was completed at this level. A 336-

foot winze from the No. 2 North crosscut connects the 2,700-foot level with a second, 2,400-foot level, along which about 375 feet of drifting was done.

Early in 1958, Canalask Nickel Mines Limited suspended work on the property and the claims were eventually allowed to lapse. In 1964 P. Versluce and associates staked the original property, as well as additional claims on the west bank of the river. During 1966, surface exploration, including blasting, hand trenching, and bulldozer trenching, carried out by the present owners, disclosed five new mineralized areas, four on the east side of the river in the vicinity of the original workings and the other on the west bank of the river across from and slightly downstream (north) of the old portal. Further investigation of these showings is planned in 1967.

The nickel-copper sulphides (pyrrhotite, chalcopyrite, pentlandite with sphalerite, pyrite and marcasite) occur mainly as irregular disseminations, less commonly as massive lenses, in very fine-grained altered intermediate volcanic rocks, members of the Lower Permian unit 10 assemblage of Muller (1967). These rocks have been variously described as 'cherty tuffs', 'silicified andesite', and 'albitized volcanics'. The main sulphide zone lies 300 to 400 feet to the north of a steeply north-dipping, east-west trending peridotite intrusion. According to Campbell (1960) the intrusion is at least 2,600 feet long and up to 750 feet wide. A discontinuous section across the body is exposed along the east bank of White River, to the south of the adit portal. Its footwall consists of a 100-foot wide zone of altered anorthositic gabbro or diorite, probably carrying minor olivine. Adjacent to this to the north is aphanitic serpentized dunite containing minor disseminated pyrrhotite. The contact with the footwall gabbro is not exposed. The ultramafic part of the intrusion grades from the basal (?) serpentized dunite through feldspathic peridotite into a fine to medium-grained picrite at its north margin. Both the latter rock types contain visible pyrrhotite. The total width of the ultramafic zone in this area is about 600 feet.

F 68

Canyon City

Silver City Mines Limited (Marc Group) (about 61°48'N, 140°48'W)
(Copper)

Silver City Mines Limited holds a total of 186 claims near the abandoned settlement of Canyon City on upper White River about 18 miles southwest of mile 1168 on the Alaska Highway. The property includes the old Discovery Copper Grant on which native copper with minor chalcocite and chalcopyrite, occurring in Triassic anygdaloidal basalt, was discovered about 1905 (Cairnes 1915, pp. 139-141). Subsequently, the original discoveries were investigated by short adits and some hand

trenching and several large slabs of native copper were found. One now forms a display outside the Yukon Historical Society McBride Museum in Whitehorse.

The present company plans geological, geophysical and geochemical exploration programs in the area during 1967.

KLUANE AREA

F 71

Quill Creek

Wellgreen Property (Hudson Bay Mining and Smelting Company Limited and Hudson-Yukon Mining Company) (61°28'N, 139°30' W)
(Nickel-Copper)

References: Campbell (1960); Muller (1958; 1967).

In 1952, prospectors W.B. Green and C. Aird of the Yukon Mining Company Limited discovered massive sulphides on Nickel Creek, a small tributary of Quill Creek, about 10 miles west of Burwash Flats. The property was optioned by Hudson Bay Mining and Smelting Company Limited and a subsidiary company - Hudson-Yukon Mining Company - was later established to direct exploration and development work. During the period 1953-1956 an extensive surface and underground exploration program was completed, and at the end of 1956 ore reserves were estimated as 737,600 tons averaging 2.04 per cent nickel, 1.42 per cent copper, 0.073 per cent cobalt, 0.038 ounces per ton platinum, and 0.027 ounces per ton palladium (Canadian Mining Journal, May 1957, p. 143). The exploration program was suspended at the end of 1956, due to limited success in outlining deeper ore and to the depressed price of nickel at the time. Since 1956 the property has been idle.

The Wellgreen property is reached by a 7-mile access road that leaves the Alaska Highway near mile 1111 and follows the valley of Quill Creek to a permanent mine camp, located just above the junction of Nickel and Quill Creeks. The underground work was carried out from an adit located at an elevation of 4,250 feet on the southwest bank of Nickel Creek about 375 feet vertically below the discovery outcrop. The adit was driven westerly for about 4,000 feet and was connected by winzes and raises to three additional working levels, one (4,470-foot level) above the adit; the other two (4,050-foot level and 3,650-foot level) below. A total of about 14,000 feet of underground drifting, raising, and sinking was completed. In addition, some 65,000 feet of surface and underground diamond drilling was carried out on the property.

In the Wellgreen mine area, argillite and altered intermediate to mafic volcanic rocks of probable Lower Permian age (unit 10, Muller, 1967) are cut by a peridotite intrusion that is part of a larger intrusion or series of intrusions with

a total length of about 4 miles and a width of up to 1,800 feet. In the vicinity of Nickel Creek it comprises at least two, narrow, sub-parallel, steep-dipping, dyke-like segments, possibly representing the sheared-off limbs of a folded sill. The principal nickel-copper deposit lies adjacent to the southern segment of the intrusion. There, the intrusion strikes about east, dips steeply south, and has a width of 200-300 feet. It contains chiefly serpentinized peridotite and feldspathic peridotite, but along its footwall (north) margin a thin zone of fine to medium-grained, altered, anorthositic gabbro or diorite is present. Sulphides, principally pyrrhotite, chalcopyrite and pentlandite with minor sphalerite, occur as massive to heavily-disseminated lenses mainly within the gabbroic footwall rocks but also within a bordering hornfels zone. The marginal rocks of the ultramafic zone - feldspathic peridotite, locally picrite - carry conspicuous disseminated pyrrhotite with low nickel values. Underground work indicated that the ore occurs in a series of south-dipping ore-shoots closely following the ultramafic-gabbro contact.

F72

Quill Creek Copper Mines Limited (about 61°27'N, 139°26'W)
(Ram and Jay Claims)
(Copper)

Quill Creek Copper Mines Limited, controlled by P. Versluce and associates of Whitehorse, holds a total of 150 claims (Ram and Jay groups) covering several copper showings in Triassic amygdaloidal basalts (unit 13, Muller, 1967) near the headwaters of Quill Creek. Late in the 1966 season the claims were optioned by Newmont Mining Corporation Limited, and this company plans exploration of the ground during 1967.

The property is reached from the Quill Creek-Well-green Mine access road leaving the Alaska Highway near mile 1111. A rough access road has been constructed from near the end of the Quill Creek road along upper Quill Creek to Ram Creek, and thence into Ram Basin, the location of one of the main showings on the property.

The two principal showings are the Jay and Ram. The main Jay showing lies on the headwall slope of a north-facing cirque above the headwaters of a small northwest-flowing tributary of Quill Creek. The showing consists of scattered patches of disseminated bornite, chalcocite and minor native copper in malachite-stained, strongly-fractured, purplish, amygdaloidal basalt. The total mineralized area exposed appears to be about 350 feet long by 80 to 100 feet wide, on a 40-degree slope, but much of the outcrop is obscured by scree moving down from higher elevations and thus the dimensions of the mineralized zone are not well defined. Above the showing, the basalt is capped by brown to grey-weathering limestone (unit 14, Muller, 1967). The basalt and limestone strata are gently arched and the mineralized zone appears to lie near the

crest of a southeast (?) - plunging anticlinal structure that has been breached by the cirque. Three grab samples, chosen to represent the most heavily mineralized outcrops and the least-obviously mineralized areas within the zone assayed*: from 2.2 per cent to trace copper respectively, with trace gold and silver.

The Ram showing lies in Ram Basin, an overburden-filled hollow drained by Ram Creek, a tributary of upper Quill Creek. The showing is about one mile south of the main Jay zone. Outcrop is sparse, but several hand-dug trenches and pits have exposed malachite-stained, well fractured basalt. A grab sample from one of these exposures assayed* 4.2 per cent copper and 0.30 ounces per ton silver. About 1,200 feet south of the main showing, copper mineralization occurs in sheared and fractured basalt at several places along the east bank of Ram Creek. One of these showings was drilled by Hudson Bay Mining and Smelting Company Limited about 1954. The drilling proved the mineralized zone to be lens-like, and about 70 feet thick. The distribution of the Ram showings with respect to the Jay, and their occurrence at lower elevations suggests that the two may occupy similar stratigraphic and structural positions within the local anticlinal structure exposed at the main Jay showing.

*Assayed by G. Spalding, Whitehorse, Y.T.

DEZADEASH AREA

Jarvis River

Canadian Baranca Mines (60°52'N, 137°53'W) (Copper)

Canadian Baranca Mines holds 28 claims covering an old copper showing previously investigated by Hudson Bay Mining and Smelting Company Limited near Jarvis River south of mile 1035, Alaska Highway and west of Haines Junction. The showing is located near the head of a small northerly-flowing tributary of Jarvis River, on the northwest flank of Mount Decoeli.

During 1966 the company constructed an access road to the property from the Alaska Highway near the south end of Kloo Lake. The showing was investigated by three diamond drill holes and grades of 2.16 per cent copper over a true width of 16 feet were reported (Northern Miner, January 19, 1967). Further work is planned for 1967. The property was not visited.

F112

Sockeye Lake

Johobo Mines Limited Property (General Enterprises Limited)
(Copper) (60°29'N, 137°34'W)

References: Kindle (1953, pp. 57-58); Skinner (1961, pp. 28-30; 1962, pp. 27-29); Green and Godwin (1963, pp. 24-25; 1964, p. 29); Green (1965, pp. 35-36).

Johobo Mines Limited, owned by H. Johannes and H.E. Boyd of Whitehorse, and H. Honing of Leofnard, Saskatchewan, holds 58 claims covering a copper prospect 2 miles southeast of Sockeye Lake and 18 miles south of Haines Junction. The property was optioned by General Enterprises Limited of Whitehorse, Yukon, late in 1963 and in 1964 a limited amount of work was done, including re-opening of the 18-mile access road from mile 143 on the Haines cut-off road. During 1966 some bulldozer stripping was carried out near the known showings in preparation for further exploration in 1967. The property was not visited.

F115

Haines Junction

Golden Gate Explorations Limited (60°44'N, 137°17'W)
(Asbestos)

References: Kindle (1953, pp. 57-58); Skinner (1961, pp. 28-30; 1962, pp. 27-29); Green and Godwin (1963, pp. 24-25; 1964, pp. 29-30).

Golden Gate Exploration Limited holds 76 claims in the Kathleen River area about 7 miles east of Haines Junction, in part covering the original Rex Asbestos property formerly owned by P. Hohnson, H.C. Fromme, W.V. Abraham and the V. Noble estate (Green and Godwin, 1964, p. 30). The property is reached by a 7-mile access road that leaves the Haines cut-off road near mile 152.

Asbestos was first discovered in the area in 1953 and some trenching was done by Noble and associates in 1957 and 1958. In subsequent years the property was investigated in turn by Canex Aerial Explorations Limited (1959), Nicolet Asbestos Corporation (1960), Spooner Mines and Oils Limited (1961) and Consolidated Mining and Smelting Company of Canada Limited (1963). The latter company carried out a 5-hole diamond drilling program on the property which was only partly successful due to local overburden depths in excess of 100 feet.

In 1965 the present company acquired the property and during the 1966 season carried out additional trenching and an 8-hole drilling program. Two of the 8 holes did not reach bedrock, but the other 6, covering an area about 600 feet by 200 feet, reportedly intersected asbestos values averaging

2 per cent fibre over horizontal widths of 210 feet (Northern Miner, November 17, 1966). Late in the 1966 season, an airborne magnetometer survey conducted in the area outlined a number of new anomalies which were covered by additional staking. Further exploration work is planned in these areas in 1967. The property was optioned briefly by Newmont Mining Corporation of Canada Limited in late 1966, but the option was later terminated (Northern Miner, December 8, 1966).

The property was visited in late July 1966, and several of the bulldozer trenches that reached bedrock were examined. In one trench, a pit blasted in bedrock provides good exposures of the asbestos-bearing rock, a massive fine- to medium grained, partly serpentinized dunite (unit 5A, Kindle, 1953). Scattered veins carrying cross-fibre asbestos in lengths from 1/4 inch to 1/2 inch occur with random orientation in the rock. The best exposure observed contained approximately 2 per cent fibre, by visual estimate.

WATSON LAKE MINING DISTRICT

PELLY MOUNTAINS AREA

F 90

Ketza River

Silver Key Mines Limited (all about 61°33'N, 132°10'W)
(Silver-Lead)

References: Wheeler, Green and Roddick (1960a); Skinner (1961, pp. 39-40; 1962, p. 36); Green (1966, pp. 64-68).

Silver Key Mines Limited holds a total of 125 claims and 7 fractions covering numerous silver-lead showings near the headwaters of Ketza River about 30 miles south-southwest of Ross River. The property is reached by a 23-mile access road that leaves the Watson Lake-Ross River road about 10 miles east of its junction with the Canol road. There is a permanent base camp at the junction of Cache Creek and Ketza River near the northeast boundary of the property. During the 1966 season a crew of up to 14 men were engaged in exploration, stripping and drilling a number of the showings. Several of the principal showings were visited by the author in mid-September 1966. Other showings on the property are described by Green (1966, pp. 64-68).

Silver-lead occurrences have been known in the Ketza River area since 1947 and intermittent exploration has been done in the district since that time, notably by Hudson Bay Exploration and Development Company Limited and Conwest Exploration Company Limited (Green, 1966, pp. 64-65). The present company was incorporated in 1964 and since then has acquired most of the property covering the original Ketza River

discoveries.

The silver-lead mineralization occurs along vein breaks cutting quartzite, quartzitic schists and phyllites and argillaceous rocks containing graphitic layers of probable Mississippian or earlier age (Wheeler, Green and Roddick, (1960a). Vein material is commonly quartz and siderite with variable amounts galena, pyrite and subordinate sphalerite. Mineralization is usually best developed to massive character where breaks cut more competent quartzitic horizons; in phyllitic and argillaceous schists, sulphides (chiefly pyrite, pyrrhotite and subordinate galena) commonly occur as thin, discontinuous stringers and disseminations conformable to schistosity and bedding planes.

Cache Creek Zone

Several sulphide showings have been exposed by trenching and stripping along a northwest-trending structure lying along the northeast side of Cache Creek. The No. 1 showing consists of irregular lenses and pods of disseminated to massive galena and subordinate pyrite and sphalerite with quartz and carbonate in graphitic argillite containing impure quartzite bands. The rocks are highly contorted in detail but generally strike about northeast and dip 60 degrees northwest. When visited, the zone had been opened over a strike length of about 100 feet by bulldozer trenching and benching and a short 45°-angled hole was being drilled to test its extension to depth.

The Cache Creek No. 2 showing lies about 300 feet southeast of the No. 1 zone. It consists of rusty sulphide-bearing lenses and stringers in quartzitic argillaceous schist. The principal sulphide is pyrite, but locally knots and pods of heavy sulphide mineralization containing up to 10 per cent galena occur. The zone has been exposed over a length of about 150 feet by trenching. The schists strike about east and dip 30°-50° N and the mineralized zone appears to be generally conformable to schistosity. It may have a maximum width of 8 to 10 feet.

F-2 Showing

The F-2 showing is located about $\frac{3}{4}$ mile south of the Cache Creek showings, on a shoulder above Cache Creek. It consists of a strong, regular break that has been traced for a total distance of 980 feet. The zone strikes N 10° E, dips about 60° E and is locally up to 15 feet wide. It carries quartz and rusty carbonate vein material, pyrite, and discontinuous massive galena lenses, locally up to 10 inches thick. The main part of the break is in massive quartzite that is overlain by rubbly, blocky-weathering limestone. Downslope from the main showing and towards its southern end, steeply

north-dipping argillite is exposed, apparently in unconformable contact with the overlying quartzite. This zone has been tested by 9 angled diamond drill-holes collared along a bench downslope and to the west of the surface exposure. A chip sample collected across a 7-foot width of discontinuous galena mineralization exposed above the part of the zone tested by drilling assayed*: 0.01 ounces per ton gold, 22.6 ounces per ton silver, 35.6 per cent lead, trace zinc, and 0.01 per cent copper.

F-3 Showing

The F-3 showing is located southeast of the Cache Creek zone near the headwaters of a small north-flowing tributary to Cache Creek. It is about $\frac{1}{2}$ mile northeast of the F-2 showing. This zone comprises a moderately-strong break cutting graphitic argillite and argillaceous schists unconformably overlain by massive quartzite. The zone strikes about northwest, dips steeply southwest and contains stringers and lenses of quartz with much rusty gouge material. Massive galena occurs in small discontinuous lenses and pods along the break and the most extensive mineralization is contained within the fractured quartzite above the unconformable contact with argillite. The mineralized zone locally attains a width of 3 to 5 feet but is erratic and discontinuous along strike. The zone has been exposed over a distance of about 150 feet by benching with a bulldozer. A grab sample of rusty vein material containing disseminated galena mineralization assayed*: trace gold, 7.40 ounces per ton silver, 16.6 per cent lead, trace zinc and trace copper.

A-1 Zone

Late in the 1966 season a geochemical survey carried out jointly by Silver Key Mines Limited and adjacent Stump Mines Limited outlined a strong anomaly bordering the southwest part of the former company's property. Subsequent bulldozer stripping over part of the anomaly lying on Stump Mines Limited property exposed a mineralized vein structure with a reported strike length of 1,040 feet (Financial Record, October 10, 1966). Initial sampling of the zone reportedly indicated an average grade over a 600-foot strike length and 4-foot width of: 0.005 ounces per ton gold, 32.6 ounces per ton silver, and 27.0 per cent lead (op. cit.).

*Assayed by G. Spalding, Whitehorse, Y.T.

F 98

Hoole River

Northlake Mines Limited (61°20'N to 61°32'N, 130°50'W to 131°
(General exploration) 37'W)

During the 1966 season this company carried out an extensive helicopter-supported exploration program over a 824-claim block lying north of Tintina Trench between Hoole and Pelly Rivers and about 45 miles southeast of Ross River. The program included airborne geophysical surveys (magnetic and electromagnetic), ground geophysics, geological mapping, and geochemical surveys over selected areas. The area is underlain chiefly by quartzitic and chloritic schists of uncertain age (unit A, Wheeler, Green and Roddick, 1960), probably partly of volcanic origin, that have been intruded by serpentized ultramafic rocks (dunite, peridotite). The general exploration approach involved detailed prospecting, ground geophysics, and geochemical surveys along contact zones of the ultramafic intrusions, defined in part by the airborne surveys. Also, several old copper-lead-zinc occurrences are known, and prospecting and survey programs were fanned out from these targets. Several coincident geophysical and geochemical anomalies were outlined, and will be further investigated during 1967. Minor short-fibre asbestos occurrences were known in the area and these were further prospected. A prominent electromagnetic anomaly near Hoole River was tested by 4 diamond drill-holes, totalling about 1,600 feet. Minor sulphides were encountered and further drilling is planned.

As a result of the 1966 program, Northlake Mines Limited dropped all but 280 claims of the original claims early in 1967, and staked an additional 130 claims to cover favourable areas outlined by 1966 field work.

F 97

Fyre Lake

Fyre Lake Property (Atlas Explorations Limited) (61°13.5'N,
(Copper) 130°31'W)

References: Wheeler, Green and Roddick (1960b); Skinner (1961, p. 42; 1962, pp. 39-40); Chisholm and Brock (1967).

Atlas Explorations Limited holds a total of 167 claims covering copper prospects near Fyre Lake on North River, about 6 miles north of Tintina Trench (Hoole River-Black River) and about 95 miles northwest of Watson Lake.

The original Fyre (or 'Fire') Lake copper showing was discovered in 1960 by Cassiar Asbestos Corporation Limited (Skinner, 1961) and during 1960 and 1961 it was extensively explored by that company through trenching and drilling. The main showing lies about 3 miles northeast of Fyre Lake in a

cirque near the headwaters of a southerly flowing tributary of the lake. It is at an elevation of about 4,800 feet. The showing consists of disseminated pyrite, pyrrhotite, chalcopyrite and minor sphalerite in nearly flat-lying quartz-mica and quartz-chlorite schists (unit A, Wheeler, Green and Roddick, 1960b). Work done by Cassiar Asbestos Corporation Limited indicated that the mineralized zone trends northwesterly, is about 400 feet long, 125 to 150 feet wide and up to 30 feet thick (Skinner, 1962, p. 39).

Early in 1966, Atlas Exploration Limited acquired 48 or the original claims from prospector G.E. Stephens and staked an additional 119 claims in the area. Subsequently, airborne geophysical surveys and ground geophysical and geochemical surveys outlined a number of anomalies on the property, two of which were selected for additional detailed work. The 'Dub' No. 1 area, lying at an elevation of about 3,500 feet and 1,200 feet east of the southeast corner of Fyre Lake, comprises coincident geochemical and geophysical anomalies underlain by quartz-mica and quartz-chlorite schists and phyllites. Reconnaissance geological mapping was carried out in the area and a drilling program is planned for 1967.

The 'Dub' No. 2 area includes the original Cassiar Asbestos Corporation Limited showing, and detailed geophysical and geochemical surveys outlined extensions to the original zone as well as delineating a new anomalous zone nearby (Chisholm, and Brock, 1967). Trenching and pitting along the anomalous zones revealed disseminated pyrite-chalcopyrite mineralization in several places. Late in the 1966 season, a diamond drilling program was begun in the 'Dub' No. 2 area and five holes were drilled before adverse weather conditions forced suspension of the work. Additional drilling is planned for 1967. The Fyre Lake property was not visited during 1966.

PELLEY PLATEAU AREA

Pike Group Property (Atlas Explorations Limited) (about 62°11'N,
(Copper-Silver) 130°39'W)

References: Roddick and Green (1961); Chisholm and Brock (1967).

Atlas Explorations Limited holds a total of 776 claims in an area centred about 16 miles northwest of the abandoned trading post at Pelly Lakes. The initial claims were staked following extensive airborne geophysical surveys made in the Traffic Mountain - Pelly Lakes district early in 1966. Subsequent ground geophysical and geochemical surveys outlined anomalous areas along a broad valley west of Pelly Lakes containing three small lakes, one of which is known locally as Pike Lake. Prospecting of the area located copper-silver mineralization associated with a small Tertiary (?) acidic

intrusion, similar to those of unit 13, Roddick and Green (1961). During the 1966 season, surface exploration of the property was initiated, including a bulldozer trenching program and minor packsack test drilling.

The property was visited in early September, 1966, by which time a series of shallow bulldozer trenches had been cut across parts of the mineralized zone. Outcrop is sparse and the geology of the property is incompletely known, but sulphide mineralization appears to occur mainly along and near the southwest margin of an elongate stock or plug that cuts presumably Ordovician and Silurian sedimentary rocks (unit 3, Roddick and Green, 1961). Exposures observed on the property included banded chert, dark limy shale, and impure limestone. In places, notably along the bulldozer road leading from Pike Lake to the camp, rubble or near-outcrop zones of intermediate to mafic volcanic rocks are present (probably unit 14, Roddick and Green, 1961). The acidic intrusion shows subtle variations in composition and texture; in places the rock is a massive, medium-grained granodiorite or quartz monzonite; elsewhere it is porphyritic, and contains conspicuous quartz and plagioclase phenocrysts.

Sulphides, including arsenopyrite, chalcopyrite, pyrite, galena and sphalerite, occur disseminated through a rusty, gossanized zone along the contact of the intrusion and in its strongly-fractured marginal rocks. Near the western end of the zone, the mineralization appears to be confined within the intrusive rocks, which in this locality are generally more leucocratic than normal and are locally altered to pale green cherty-looking rocks. Here, the sulphide assemblage is dominantly arsenopyrite with minor pyrite and chalcopyrite, in contrast to the eastern and central parts of the zone where galena and sphalerite are common. A grab sample collected from one of the trenches across the western zone assayed*: 0.01 ounces per ton gold, 0.81 ounces per ton silver, trace lead and zinc, and 0.01 per cent copper.

The extent and continuity of mineralization on the Pike property is not yet known; however trenching results to date suggest that the zone may be fairly extensive, possibly up to 2 miles long. Chisholm and Brock (1967) reported that a partially-explored section of the mineralized zone is estimated to contain 2,500 tons of ore per vertical foot averaging 0.61 per cent copper and 2.44 ounces per ton silver.

*Assayed by G. Spalding, Whitehorse, Y.T.

FRANCES LAKE AREA

F102

Tyers River

Norquest Joint Venture (about 61°15'N to 61°30'N, 128°20'W to 128°40'W)
(Zinc)

References: Green (1965, pp. 45-46; 1966, pp. 68-71);
Blusson (1966).

During the 1966 season Norquest Joint Venture - formed by the Anaconda Company (Canada) Limited, Asbestos Corporation (Explorations) Limited, Bralorne Pioneer Mines Limited, the Grandby Mining Company Limited, New Jersey Zinc Company (Canada) Limited, and Utah Construction and Mining Company - continued exploration of lead-zinc showings on its 110-claim holdings near Tyers River in the Logan Mountains west of the Watson Lake-Cantung road. The property is reached by a rough 7-mile access road that leaves the Watson Lake-Cantung road near mile 59 and leads to a base camp established near the headwaters of a north-west-flowing tributary of Tyers River. A crew of up to 10 men was employed during the 1966 operation. The writer visited the property in mid-July.

Two principal showings occur on the property, the Fir Tree and Black Jack. The Fir Tree showing lies at an elevation of about 5,000 feet on the valley wall of a small tributary to Tyers River (Green, 1965, p. 45). It consists of up to 10% fine-grained sulphides, chiefly pyrite and sphalerite with *pyrrhotite* minor galea ^{chalcopyrite} occurring as replacement lenses within a band of epidote-bearing quartz-mica-carbonate gneiss which is in turn contained within quartz-feldspar-biotite-chlorite gneiss (unit 2, Blusson, 1966). *The epidote band is about 40' thick, traced 1,200'.*

The Black Jack showing is about 4 miles south of the Fir Tree occurrence and is exposed near the top of a west-facing ridge at an elevation of about 6,500 feet. Sulphide mineralization, chiefly disseminated to massive sphalerite occurs in a series of small rusty replacement lenses* within epidote-clinopyroxene-carbonate bands enclosed by calcareous and quartzitic schists and gneisses. The mineralized lenses are visible as a chain of rusty zones that angle down the west face of the ridge from south to north, and that can be traced for about 1,000 feet along strike. The enclosing schists and gneisses strike about east and dip moderately north. *Granitic dykes & sills up to 10' thick in vicinity.*

During 1966, the company constructed a tote road from the camp area north to the base of the hill below the Fir Tree showing and drilled a total of 7 diamond drill holes along the valleys east and north of the Black Jack showing to follow up geophysical survey results.

* Largest lens is 15' thick & traced 1,400' (Nho 1969, p. 406)

F 100

Frances Lake

Matt Berry Mines Limited (61°27'N, 129°25'W)
(Silver-Lead-Zinc)

This company holds a 40-claim property on the east side of East Arm, Frances Lake, near the mouth of Thompson Creek. A silver-lead-zinc showing was first discovered and staked in the late 1930's by A.K. Money, and in 1943 the area was prospected for Consolidated Mining and Smelting Company of Canada Limited. The property was largely idle until 1960, when Datlaska Mines Limited carried out further surface exploration during the period 1960-1963. In 1965 the property was acquired by the present company, and during 1966, surface work and a diamond drilling program were carried out.

The showing consists of several, parallel northwest trending, southeast-dipping quartz-carbonate vein structures carrying heavy disseminated to massive galena, sphalerite, pyrite, and minor chalcopyrite. The main or No. 1 vein has been exposed along a strike distance of about 60 feet and over widths up to 3 feet. Within the vein structures, mineralization is irregular but in places massive sulphide lenses up to 18 to 24 inches wide occur. Diamond drilling has shown that the veins are offset by a series of northeast-trending left-lateral displacement shear faults. The veins cut west-dipping Palaeozoic argillite and fine-banded quartz-chlorite schist, and the vein system appears to have been, in part, localized by a major dragfold in the schists.

During the 1966 field season 14 angled holes totalling 2,120 feet were drilled to test the continuity and strike extension of the veins. The drilling outlined mineralization in a series of parallel vein structures over a strike length of about 800 feet. Published assay values from drill intersections are*:

*Northern Miner, September 6, 1966 and October 20, 1966.

Hole No.	Width	Ag. (oz)	Pb. %	Zn. %
1	3.5	2.3	6.25	11.69
	2.0	21.4	45.85	14.54
2	2.0	6.1	10.65	10.35
	3.0	11.6	23.08	13.35
2	2.0	2.3	6.22	12.50
3	2.0	4.0	12.22	4.23
3	1.0	0.6	0.82	11.35
	2.0	0.3	0.06	9.02
4	1.0	1.0	2.60	13.37
	1.0	2.8	8.38	9.49
5	3.0	4.7	12.09	2.53
	2.0	0.5	0.18	4.37
	2.0	4.2	10.13	8.74
	2.0	1.3	3.32	12.69
	6.0	0.5	0.40	5.52
6	2.0	0.2	0.97	5.17
	3.0	3.0	10.26	6.79
	3.0	3.9	13.54	7.08
7	2.0	11.8	28.20	3.10
	2.5	21.3	35.20	6.16
8	No mineralized intersection			
9	1.5	8.6	13.70	2.30
	2.0	0.7	1.20	16.40
10	4.5	20.64	32.80	22.30
	.5	5.64	13.9	Tr
	6.0	2.5	5.17	3.01
	1.5	6.6	14.6	4.0
	1.5	12.20	17.2	5.4

Two grab samples collected by this writer from the trench on the main (No. 1) vein assayed as follows:

Sample No.	Au. (oz)	Ag. (oz)	Pb. (%)	Zn. (%)	Cu. (%)
66-13-1	0.005	17.1	38.1	Tr.	0.15
66-13-1A	0.01	10.0	19.8	16.2	0.15

Sample 66-13-1 was mainly massive galena mineralization; 66-13-1A was approximately 50 per cent galena, the remainder mainly sphalerite.

UPPER LIARD RIVER AREA.

Old Gold Creek

Liard Group (Atlas Explorations Limited) (about 60°58'N, 130°42'W)
(Copper)

Atlas Explorations Limited holds a total of 92 claims, in part under option from prospector G.E. Stephens, near

Liard River between Old Gold and Rainbow Creeks. The holdings cover two previously-known copper occurrences, one of which was investigated by Newmont Mining Corporation Limited in 1956.

Early in 1966, Atlas Explorations Limited carried out airborne geophysical surveys over the area, and during the 1966 season ground geophysical and geochemical follow-up surveys were made. Reconnaissance geological mapping was also done in conjunction with the geophysical and geochemical surveys. The area is underlain principally by a sequence of northwest-trending thin-bedded phyllites, locally graphitic, with intercalated greywacke, argillite, and minor limestone. In the northern part of the property, rhyolite and acidic tuffs are in contact with granitic intrusive rocks. Minor chalcopryrite mineralization occurring in quartz-calcite veins was located and some high-grade chalcopryrite float was found.

A crew of up to 9 men was employed in the operation. The property was not visited.

LIARD PLAIN AREA

F149

Tom Lake

Mount Hundere Property (Atlas Explorations Limited) (60°32'N,
(Lead-Zinc) 128°54'W)

References: Poole, Roddick and Green (1960); Wheeler, Green and Roddick (1960b); The Northern Miner (11 July, 1963, p. 13); Green and Godwin (1963, pp. 33-35; 1964, pp. 44-45). *Aho 1969 p 406*

Formerly held by Frances River Syndicate, Atlas Explorations Limited acquired this property early in 1966. A total of 78 claims are held, 8 of which encompass part of the original Frances River Syndicate property. The property lies about 30 miles north of Watson Lake and is reached by a rough 12-mile access road leading from the Watson Lake-Ross River road near the bridge at Frances River.

Discovered in 1962, two main lead-zinc showings (North and South showings) located about 2 miles apart, were investigated through trenching and drilling in 1963 by Canex Aerial Exploration Limited, under option agreement with Frances River Syndicate. The drilling indicated that the two occurrences were not continuous along strike and that tonnage potential was limited (Green and Godwin, 1964, p. 44).

Mineralization comprises disseminated to massive coarse galena and sphalerite replacing skarn rocks developed at a contact between limestone and phyllite or argillite. During the 1966 season, Atlas Explorations Limited carried out a detailed geological mapping program, reconnaissance and detailed

*High temp. "Remarkably little iron sulphide"
Localized in gently plunging folds near faults*

geochemical surveys, and follow-up bulldozer-trenching of geochemical anomalies. The detailed mapping suggests that a distinctive crystalline limestone* horizon, up to 100 feet thick in places, is a preferential host for mineralization. The trenching operations were conducted to test a number of geochemical anomalies, principally near the original South showing, but the program was halted by adverse weather and snow conditions before it could be completed. The property was not visited.

*A rhyolite with lower E.

HYLAND PLATEAU AREA

F/150

Quartz Lake

Redfort Prospecting Syndicate (about 60°30'N, 128°00'W)
(Lead-Zinc-Silver)

This syndicate holds a 192 claim property located about 40 miles northeast of Watson Lake and surrounding the MacMillan property of Liard River Mining Company Limited (Green 1966, pp. 72-74). During 1966, airborne electromagnetic and magnetic surveys were conducted over the property and detailed geological mapping and prospecting programs were carried out. Rock types similar to those underlying the MacMillan property (Mississippian (?) argillite, shale, limestone, and quartzite) were mapped and the possible extension of the Black Fault, near which the MacMillan orebody lies, was traced. A crew of 4 men were employed on the operation. The property was not visited.

Participants in the Redfort Syndicate are Redstone Mines Limited, Rayrock Mines Limited and Fort Reliance Minerals Limited.

CASSIAR MOUNTAINS AREA

F/142

Logjam Creek

Logjam Silver Property (Pure Silver Mines Limited) (60°01'N,
(Silver-Lead) 131°35'W)

References: Poole, Roddick and Green (1960); Skinner (1962, p. 36); Green and Godwin (1964, pp. 47-48); Green (1966, pp. 75-76).

Formerly Logjam Silver Mines Limited, this property was reorganized under the name Pure Silver Mines Limited late in 1966. The property comprises 25 claims located near the headwaters of Logjam Creek, about 10 miles north of mile 748, Alaska Highway. It is reached by a 16-mile winter tote road that leaves the Highway near mile 757.

Since discovery of the silver-lead showings by W. McKinnon of Teslin in 1944, the Logjam property has been intermittently explored by various companies, mainly through surface exploration and minor diamond drilling. In 1965, Logjam Silver Mines Limited commenced underground exploration by means of an adit (crosscut) driven from an elevation 5,200 feet southwest into the steep northeast-facing slope on which the showings occur. As a part of the program six holes, totalling 2,607 feet, were drilled from the main crosscut.

The silver-lead values occur in quartz-bearing veins and lenses that cut a steep-dipping diorite sill which intrudes banded siliceous sediments of Devonian Age (unit 8 of Poole, Roddick and Green, 1960). The sediments are of uncertain derivation, but in the vicinity of the present working, they include argillaceous quartzite, more massive quartzitic members, and probably silicified limestone. The diorite is a fine- to medium-grained rock composed of plagioclase, dark hornblende, clinopyroxene, biotite and a little quartz. It is locally saussuritized. The diorite-sediment contact, as exposed in the underground workings and as shown by drill core intersections, is marked by a narrow, fine-grained, greenish hornfels zone. Diorite adjacent to the hornfels looks partly chilled. Structural relations are not clear, but the mineralized veins appear to be concentrated near the contact of the diorite sill.

When visited in mid-August, 1966, the working face of the crosscut was 870 feet from the portal. At about 590 feet from the entry, a subdrift heads southeast for 110 feet. About 60 feet back from the 870-foot working face, a sulphide-bearing quartz vein striking N 80° E and dipping vertically was intersected. The vein ranges in width from 8 inches to 1 foot and contains heavily-disseminated massive sulphides, principally, arsenopyrite, pyrrhotite, galena and sphalerite. A chip sample over 14 inches across the vein assayed*: 0.06 ounces per ton gold, 6.54 ounces per ton silver, 1.5 per cent lead, 1.0 per cent zinc and trace copper and cobalt. A grab sample of massive sulphides from the same location assayed*: 0.52 ounces per ton gold, 16.3 ounces per ton silver, 10.5 per cent lead, and 16.1 per cent zinc.

Underground work was continued until September 1966, by which time a total of 1,100 feet of drifting had been completed. A second vein structure was intersected by the main crosscut extension, and followed to the east and west by short drifts. Results were considered sufficiently encouraging to warrant further exploration, and early in 1967 the new company (Pure Silver Mines Limited) commenced a new program of underground exploration. Additional drilling is also planned.

*Assayed by G. Spalding, Whitehorse, Y.T.

A crew of up to 5 men was employed on the property during the 1966 season.

NAHANNI MINING DISTRICT

DISTRICT OF MACKENZIE, NORTHWEST TERRITORIES

SELWYN MOUNTAINS AREA

F104

Upper Flat River

Canada Tungsten Mining Corporation Limited (61°57'N, 128°15'W)
(Tungsten)

References: Green and Roddick (1961); Brown (1961); Skinner (1961, pp. 43-46); 1962, pp. 41-43); Green and Godwin (1963, pp. 34-37; 1964, p. 48); White (1963, pp. 390-393); Green (1965, pp. 50-51; 1966, p. 85).

Canada Tungsten Mining Corporation Limited was formed in 1959 to develop a tungsten deposit near the headwaters of Flat River, 130 miles north of Watson Lake, Yukon. The company holds 112 claims in the area. An all-weather road, linking the mine with Watson Lake was completed in 1962.

The deposit was discovered in 1954, investigated as a copper prospect in 1955-1956, then re-investigated for tungsten during the period 1959 to 1961. The mine has been in production since 1962, except for the period between September, 1963 and May, 1964 when the price of tungsten was depressed.

The tungsten orebody lies in the floor of a small cirque at an elevation of about 4,800 feet, and is mined by open-cut methods. The mine is connected to the mill and town-site, located at an elevation of about 3,500 feet, by a 3-mile switch-back haulage road. The deposit consists of a shallowly southwest-dipping lens about 300 feet wide and up to 65 feet thick that lies mainly within a Lower Cambrian 'Ore limestone' member. A diopside-garnet-epidote skarn developed within the limestone hosts the ore. Skarn development is probably related to nearby granitic intrusions, one of which outcrops about 3,000 feet from the mine. Ores occur in two forms; as fine scheelite disseminated in a massive to heavily-disseminated pyrrhotite-chalcopyrite matrix; and, in coarse quartz-calcite-scheelite veins and lenses cutting the massive sulphides. Minor native bismuth is also present.

Since the start of production in 1962 about 340,775 tons of ore grading 2.4 to 2.85 per cent WO_3 and 0.4 to 0.45 per cent copper have been milled. During 1966, 102,000 tons of ore were mined, involving the removal of 412,000 tons of waste and overburden, and 115,568 tons of ore averaging 2.4 per cent

WO₃ were milled to produce 213,022 STU *WO₃. Copper production was 318,121 pounds from 63,963 tons of ore milled.

In addition to the open-cut mining operation, the company carried out development work on its Baker tungsten showing located about 3 miles south of the mine on the west slope of Flat Creek valley.

On December 26, 1966, a fire at the property destroyed the mill and concentrator plants. Reconstruction began early in 1967, but the mill will probably not be ready for operation until late 1967.

* 1 short ton unit= 20 lbs.

F109

Heather Group (Bralorne Pioneer Mines Limited) (about 61°31'N, (Lead-Zinc) *see Key Gp same area 51 P69-55 127°36'W*)

During the 1966 season Bralorne Pioneer Mines Limited carried out geological mapping and prospecting over its 8-claim Heather Group, located on Yukon-Northwest Territories boundary about 10 miles southwest of the junction of Flat River and Pass Creek and about 22 miles east of mile 67 on the Canada Tungsten Mine road. In this area, minor disseminated sulphides, chiefly galena, sphalerite and chalcopryrite, are reported to occur in pyroxenitic skarn zones developed near the northeast-trending contact between dioritic rocks of a Cretaceous (?) intrusion (unit 35, Gabrielse *et al*, 1965) and silicified limestone of probable Cambrian age (unit 8, *op. cit.*). The 1966 work did not outline mineralization of economic interest. The property was not visited.

PLACER MINING

DAWSON MINING DISTRICT

KLONDIKE AREA

The Yukon Consolidated Gold Corporation Limited

References: Skinner (1961, pp. 6-9; 1962, pp. 5-8); Green and Godwin (1963, pp. 41-44; 1964, pp. 50-53); Green (1965, pp. 52-57; 1966, pp. 86-89).

The Yukon Consolidated Gold Corporation Limited was formed in 1923 from eight companies with interests and holdings in the Klondike. Mining has been carried out mainly by large, electrically-driven dredges, but bulldozer-slucing plants have also been operated. The 1966 season terminated the

company's Klondike operations as profitable extractable reserves are now depleted.

Until recently, the company held much of the placer ground in the district (705 claims and 2 hydraulic leases), but over the past two years a total of 408 claims have been dropped, in anticipation of the phasing-out of mining operations. The company ground is on Hunker and Bonanza Creeks, both southern tributaries of the Klondike River, and on Dominion, Sulphur, and Quartz Creeks, northern tributaries of Indian River. Company offices, shops, staff living quarters etc. are at Bear Creek, 8 miles east of Dawson and are linked to the various mining operations and Dawson by a 100-mile road network. In the past, the company has also operated a 15,000 h.p. hydroelectric plant on Klondike River about 4 miles below the junction of its north and south forks. This plant has supplied power to Dawson and drives the dredges and other mining equipment. It will continue to be operated by the company until the spring of 1967, supplying power to Dawson under a contract with the Northern Canada Power Commission.

A brief production summary of the company placer operations is given by the figures below (from Financial Post Survey of Mines, 1967, p. 108).

Year	Cubic Yards Treated	Value of Gold (and Silver Recovered)
1932-62	191,467,257	\$52,804,920
1963	4,478,831	1,650,883
1964	4,004,350	1,682,810
1965	<u>2,705,606</u>	<u>1,292,803</u>
Total	202,656,044	57,431,416

Most of the following information concerning the 1966 operations of the company was supplied by L.L. Rogers, Resident Manager, and A.G. Barrett. The cooperation of the company in supplying this information is gratefully acknowledged.

General

In 1966 the company employed a maximum labour force of 126 men (92 of whom were seasonal), treated a total of 2,777,876 cubic yards of gravel, and produced 34,031 ounces of fine gold and 7,675 ounces of silver, with a total value of \$1,197,511. Comparative figures for 1965 were; 2,843,055 (cubic yards), 33,268 (ounces fine gold), 7,326 (ounces silver) and \$1,167,326. Proven gravel reserves written off during 1966 were 31,767,784 cubic yards (3,522,747 in 1965) and proven

gravel reserves at the end of 1966 were 2,187,680 cubic yards valued at \$786,656 (about 36 cents per cubic yard). Significant in this latter connection is that during 1966 operations, costs per cubic yard treated ranged from 32.6 cents to 83.4 cents.

During 1966, 4 dredges were operated on Dominion, Sulphur (2) and Hunker Creeks, and a bulldozer mining operation carried out on Dominion Creek. Dredging operations began during the first week in May, and terminated in mid-November. Bulldozer mining was carried out from 1 June to 27 September. Both bulldozer and dredging operations were hampered by low water and heavy frost conditions. The dredging program was further delayed by Dredge No. 11 being out of commission for over a week in July due to sinking.

Shortage of labour was a chronic problem throughout the season and became acute in October, requiring the early shutdown of Dredge No. 9 on 13 October to relieve the dredge-crew for other duties. When temperatures dropped suddenly to 40°F below zero in mid-November, the three remaining operational dredges began digging shelves for their final roosts. Dredge No. 6 sank before completing its shelf. Due to the termination of operations, no stripping or thawing of new ground ahead of mining was done in 1966.

By the year end, all operating personnel had been laid off permanently, with the exception of a crew at the North Fork power plant, and a skeleton staff at the Bear Creek headquarters.

Mining Operations

Dominion Creek

Dredge No. 6 (7-cubic-foot buckets) worked on Lower Dominion Creek during the 1966 season. It operated from 3 May to 14 November (when it sank), moved 964,796 cubic yards at a cost of 42.2 cents per yard, and recovered 8,579 ounces of fine gold and 1,941 ounces of silver with a total value of \$301,257.

During 1966 the bulldozer-mining plant on the left limit of middle Dominion Creek operated from 1 June to 27 September, mined 160,515 cubic yards at a cost of 76.3 cents per cubic yard, recovered 3,046 fine ounces of gold and 688 ounces of silver with a total value of \$106,545.

Sulphur Creek

Dredge No. 8 (7-cubic-foot buckets) working up middle Sulphur Creek, finished at about claim 48 Below. It operated from 3 May to 15 November, mined 499,786 cubic yards at a cost of 54.8 cents per yard, recovered 2,975 fine ounces of gold and 686 ounces of silver valued at \$104,101.

Dredge No. 9 (5 3/4-cubic-foot buckets) worked on upper Sulphur Creek below the mouth of Green Gulch. In 1966 it operated from 7 May to 13 October, mined 311,767 cubic yards at a cost of 83.4 cents per yard, recovered 4,491 fine ounces of gold and 952 ounces of silver for a total value of \$159,698.

Hunker Creek

Dredge No. 11 (7-cubic-foot buckets) worked up lower Hunker Creek toward Last Chance Creek. It continued to be the most productive unit of the company's operations, providing nearly half the total production value for 1966. This dredge operated from 1 May to 13 November, and dredged 1,001,527 cubic yards of gravel at a cost of 32.6 cents per yard. Recovery was 14,940 fine ounces of gold and 3,408 ounces of silver for a total value of \$525,910.

Ballarat Mines Limited

References: Skinner (1961, p. 10; 1962, p. 10); Green and Godwin (1963, pp. 47-48; 1964, pp. 53-56); Schmidt (1964); Green (1965, pp. 56-57; 1966, pp. 89-91).

Ballarat Mines Limited, owned by Mr. and Mrs. H.H. Schmidt of Dawson, is the second largest placer producer in the Dawson area, with a total production of about 3,005 crude ounces of gold in 1966. As did many operators in the area, Ballarat experienced mining difficulties this year due to a critical shortage of water. This situation particularly affected stripping and thawing of new ground, and these operations could only be carried out during the early part of the summer, before water shortage became severe.

During 1966, a maximum crew of 11, including manager H. Schmidt, were employed in the company operations on Quartz and Dominion Creeks. Much of the following information on the company's 1966 operations was provided by the owners, and their cooperation is gratefully acknowledged.

Dominion Creek (63°49'N, 138°39'W)

Ballarat Mines Limited owns 2 creek claims and leases 60 contiguous claims extending downstream from the mouth of Caribou Creek to the adjacent property of the Yukon Consolidated Gold Corporation Limited. The company has operated a bulldozer-slucing plant on the left limit bench of this part of Dominion Creek since 1959. During 1966, 9 cuts with a total area of 179,000 bedrock square feet and a volume of 40,500 cubic yards were sluiced on the left limit from the mouth of Portland Creek downstream to the boundary of bulldozer mining operation 14 of the Yukon Consolidated Gold Corporation Limited. An additional 50,000 cubic yards of mechanical stripping was completed on this ground. Approximately 40,000 cubic yards of overburden

stripping was completed with a water-sprinkler system in the early part of the season.

Exploration on Dominion Creek included completion of a test drilling program on a block of ground downstream from the mouth of Caribou Creek. Additional drilling was done to test new ground on both right and left limits, from Lower Discovery to claim 5 Below Lower Discovery.

Quartz Creek (63°47'N, 139°06'W)

The company began mining on Quartz Creek early in the 1966 season, following preparation of ground in this area during 1965. Working on right limit ground upstream from the mouth of Calder Creek, 70,000 bedrock square feet was mined, representing a total of about 30,000 cubic yards sluiced. An additional 60,000 cubic yards of overburden was stripped by bulldozer.

A unique innovation in mining methods was tested on the Quartz Creek operation. This involved the use of a 48-inch by 100-foot conveyor belt system mounted on a D-8 bulldozer to transport gravel to an elevated, wheel-mounted mobile sluicing plant. Although some initial mechanical problems were encountered with the system, the company feels that these can be surmounted and that the method will ultimately reduce mining costs significantly.

Franklin Enterprises Limited
and
Consolidated Mines (Yukon) Limited

Reference: Green (1966, pp. 89-90).*

Franklin Enterprises Limited is owned by G.D. Franklin of Kennewick, Washington, formerly a partner with H.H. Schmidt in Ballarat Mines Limited. In 1966 the company assumed responsibility for operations on Eldorado Creek, in past years carried out by Ballarat Mines Limited. In addition, Franklin, in partnership with L.M. Ross formed a new company - Consolidated Mines (Yukon) Limited - to carry out mining operations elsewhere in the area. The latter company leases ground on Upper Bonanza Creek and Gold Run Creek from the Yukon Consolidated Gold Corporation Limited and on Eureka Creek from Eureka Placers Limited.

Eldorado Creek (63°52'N, 139°15'W)

The company owns claims 29,30 and 43-OA and leases claims 28,31 to 46A and 47 to 56 on Eldorado Creek. A bull-

*Described under Ballarat Mines Limited.

dozer-sluicing plant has been operated on Eldorado since 1961, until 1965 under the ownership of Ballarat Mines Limited. During 1966, the present company produced over 2,000 ounces of crude gold from its Eldorado Creek operation.

Upper Bonanza Creek (63°55.3'N, 139°18'W)

Consolidated Mines (Yukon) Limited leases claims 1 to 10 Above, Upper Bonanza Creek, from the Yukon Consolidated Gold Corporation Limited. Late in the 1966 season, L.M. Ross began stripping on claim 6 Above, in preparation for mining next season.

Bonanza Creek

G. Heitman (64°00'N, 139°21'W)

References: McConnell (1907; in Bostock, 1957, pp. 217-238); Skinner (1962, p. 8); Green and Godwin (1963, pp. 44-45; 1964, p. 56); Green (1966, pp. 92-93).

G. Heitman continued mining in 1966 on claims leased from Cripple Hill Mining Company Limited (Green and Godwin, 1964) on Cripple Hill, Trail Hill and Trail Gulch.

Working with 2 full time helpers and a D-8 bulldozer Heitman mined 70,000 bedrock square feet in Trail Gulch, and about 18,000 bedrock square feet on Trail Hill. Production was 640 ounces of crude gold. Heitman does not plan to work the property next year.

E.M. Lintick and S. Berg (64°00'N, 139°22'W)

Reference: Green (1966, p. 93)

The Lintick and Berg families of Dawson hold 7 claims on Bonanza Creek near Sourdough Hill. No mining was done during 1966, but new ground was stripped in preparation for bulldozer mining in 1967. The property was not visited.

F. Chudy (63°59'N, 139°21.5'W)

Reference: Green (1966, p. 94)

F. Chudy of Whitehorse dropped claims 54 and 55 Below on Bonanza Creek on which last season's mining was done. During July of 1966, Chudy mined on claims 17 and 18 Above, Upper Bonanza Creek, with only limited success. Production was about 60 ounces crude gold.

In August, 1966, Chudy transferred his operation to Eldorado Creek where he holds claims 2,3,4, and 5 up from the mouth of the creek. Working with one part time helper and a TD-18 tractor, Chudy stripped about 150,000 bedrock square feet in preparation for mining next season. A small amount of test mining was carried out this year, with production from this being about 26 ounces of crude gold. Neither of these properties were visited.

A.T. Fry (63°57'N, 139°22'W)

Reference: Green (1966, pp. 94-95).

On Bonanza Creek, A.T. Fry holds claim 32 Below Discovery and leases claims 20,21,27,30 and 36 Below from the Yukon Consolidated Gold Corporation Limited. In addition, Fry holds hill claims opposite 30 and 31 Below on Bonanza Creek, on the right limit of Boulder Creek opposite claim 2 Above, and 2 claims each on either side of Monte Cristo and Fox Gulches. Also, Fry has purchased 2 right limit bench claims opposite 50 and 51 Below on Bonanza Creek, from H. Leaman.

During the 1966 season Mr. and Mrs. Fry worked claim 28 Below on Bonanza Creek, the No. 2 Monte Cristo hill claim, and the bench claims purchased from H. Leaman, on Bonanza right limit. Work on the Monte Cristo area is directed at eventual mining of King Solomon Hill, overlooking Bonanza Creek near Monte Cristo Gulch. Mining operations were hampered by low water conditions during 1966. Production was 135 ounces of crude gold. Equipment includes a D-7 and a D-6 bulldozer.

H.C. and D.F. Boutillier (63°56'N, 139°21'W)

References: Skinner (1961, p. 9; 1962, pp. 9-10); Green and Godwin (1963, p. 46; 1964, p. 57); Green (1965, p. 58; 1966, p. 95).

H.C. and D.F. Boutillier own 11 creek claims on Adams Creek and 4 bench claims on Adams Hill, about 8 miles up on the left limit of Bonanza Creek. In past years they have operated a hydraulic plant on Adams Hill and a bulldozer-slucing plant on Adams Creek. During the period 15 April - 1 October 1966, the Boutillier's mined a total of about 11,000 bedrock square feet and produced 177 ounces of crude gold. The property was not visited.

Victoria Gulch
(Tributary of Upper Bonanza Creek)

F. Perret (63°55'N, 139°12'W)

References: Skinner (1962, p. 10); Green and Godwin (1963, p. 47; 1964, p. 58); Green (1965, p. 59; 1966, p. 96).

F. Perret (in past years in partnership with E. Lesaux) operates a bulldozer-slucing plant at the mouth of Victoria Gulch and leases claims 43 and 44 Above Discovery on Bonanza Creek from the Yukon Consolidated Gold Corporation Limited. Due to low water conditions, no mining was carried out in 1966. Stripping was done in preparation for mining next year.

Eldorado Creek

Franklin Enterprises Limited

Eldorado Creek operations are described in the general report on the company.

Hunker Creek

The Yukon Consolidated Gold Corporation Limited

Hunker Creek operations are described in the general report on the company.

P. Brady (63°56'N, 138°53.5'W)

Reference: Green (1966, p. 97).

P. Brady hand-mines on various of claims 23,24,6 and 7 Below, and 2,30 and 30A Above on Hunker Creek, and Discovery claim on Mint Gulch, a tributary of Hunker Creek. Production in 1966 was about 5 ounces of crude gold.

Last Chance Creek
(Tributary of Hunker Creek)

J. and I.C. Bremner (64°00'N, 139°07'W)

References: Skinner (1961, p. 10; 1962, pp. 10-11); Green and Godwin (1963, p. 48; 1964, p. 59); Green (1965, p. 59; 1966, pp. 97-98).

J. and I.C. Bremner own 29 bench and hill claims and lease 9 creek and bench claims from G.M. Thompson on Lower Last

Chance Creek, a main tributary of lower Hunker Creek. In 1966, the owners, working with one helper, continued mining upstream from last year's operation, a cut in White Channel gravels on Discovery Hill. In addition, test cuts were established in several other areas on the property, with little success. Mining operations were hampered by low water conditions. Total production for 1966 was about 42 ounces of crude gold. The property was not visited.

Gold Bottom Creek
(Tributary of Hunker Creek)

O. Lunde (63°55'N, 138°59'W)

References: Skinner (1961, p. 12; 1962, pp. 11-12); Green and Godwin (1963, pp. 49-50; 1964, p. 60); Green (1965, p. 60; 1966, pp. 98-99).

During the 1966 season O. Lunde continued bulldozer mining on his Gold Bottom Creek property (claims 8 to 17). Production was about 135 ounces of crude gold. The property was not visited.

B. Bratsberg (63°54'N, 138°59'W)

References: Skinner (1961, p. 10; 1962, pp. 11-12); Green and Godwin (1963, p. 50; 1964, pp. 60-61); Green (1965, p. 60; 1966, p. 99).

B. Bratsberg owns the upper 500 feet of Discovery claim and claims 3 to 12 Above Discovery on Gold Bottom Creek. A bulldozer sluicing plant has been operated in the past. No production was recorded in 1966. The property was not visited.

Caribou Creek
(Tributary of Dominion Creek)

A. and N. Burgelman (63°49'N, 138°49'W)

References: Skinner (1961, p. 11; 1962, p. 12); Green and Godwin (1963, p. 52; 1964, pp. 61-62); Green (1965, p. 61; 1966, p. 100).

Mr. and Mrs. Burgelman own claims 2,3,5, to 10, and 20 on Caribou Creek, a right limit tributary of Upper Dominion Creek. In addition, they own claims 117 to 122, and 130,131A and 131B Below on Dominion Creek. During 1966, the Burgelmans mined approximately 15,000 bedrock square feet on claim 122 Below and recovered 311 ounces of crude gold.

Dominion Creek

The Yukon Consolidated Gold Corporation Limited

Dominion Creek operations are described in the general report of the company.

Ballarat Mines Limited

Dominion Creek operations are described in the general report of the company.

Gold Run Creek
(Tributary of Dominion Creek)

Gold Run Placers Limited (J. Lamontagne and E. Schink)
(63°43.5'N, 138°41'W)

References: Green and Godwin (1963, pp. 51-52; 1964, pp. 62-63); Green (1965, p. 62; 1966, pp. 100-101).

Gold Run Placers Limited leases claims 36 to 51 on Gold Run Creek from the Yukon Consolidated Gold Corporation Limited. The property is accessible from the Dominion Creek road by a 3-mile road along the left limit of Gold Run Creek. Using bulldozer-slucing methods, the present operators produced a total of about 4,248 ounces of crude gold during the period 1962 to 1965, inclusive. In 1966, production was about 536 crude ounces of gold. The property was not visited in 1966.

Sulphur Creek

The Yukon Consolidated Gold Corporation Limited

Sulphur Creek operations are described in the general report on the company.

Quartz Creek

A. Sundt (63°50'N, 139°02'W)

References: Skinner (1962, p. 14); Green and Godwin (1963, pp. 53-54; 1964, p. 63); Green (1965, p. 62; 1966, p. 102).

A. Sundt owns 4 claims on Little Blanche Creek, a tributary of Quartz Creek, as well as 8 claims on Quartz Creek itself. In 1966, Sundt operated a bulldozer-slucing plant and recovered about 294 crude ounces of gold. The property was not

visited.

A. Sailer (63°47'N, 139°06'W)

References: Green (1965, p. 62; 1966, p. 102).

In 1966, Sailer recovered about 112 ounces of crude gold from his operation on Quartz Creek. The property was not visited.

Ballarat Mines Limited

Quartz Creek operations are described in the general report on the company.

Allgold Creek

K and S Placers (63°56'N, 138°37.5'W)

References: Skinner (1962, p. 14); Green and Godwin (1963, p. 56; 1964, p. 66); Green (1965, pp. 63-64; 1966, pp. 103-104).

K and S Placers, owned by M. Kinakin (formerly Kinakin and W. Scott) leases Discovery claim and claims 1 to 10 Above from Consolidated Brewis Minerals Limited. In 1966, K and S Placers added an additional 20 claims on Allgold Creek to its holdings (claims 11 to 30 Above). A camp is maintained on Allgold Creek about ½ mile upstream from the settlement of Flat Creek on the Dawson-Mayo road. The company has operated a bulldozer-sluicing plant since 1961 and total production to the end of 1965 was about 3,626 ounces of crude gold.

During the period May to early October, 1966, Kinakin, working with one part time helper recovered about 606 ounces of crude gold from bulldozer-sluicing operations on claims 6 and 7 Above. Equipment includes a D-7 and a TD-18 tractor.

Klondike River Valley

D.M. Strachan (63°56.5'N, 138°37.5'W)

References: Green and Godwin (1964, p. 76); Green (1965, p. 64; 1966, p. 104).

D.M. Strachan and associates of Dawson hold 4 placer claims along the south side of Klondike River Valley, just west of the settlement of Flat Creek.

During 1966, about 2 weeks were spent on the property, stripping ground with 2 bulldozers in preparation for mining in 1967. Strachan and his associates have also leased 25 claims on Last Chance Creek from the Yukon Consolidated Gold Corporation Limited and other owners and expect to be working in this area also in 1967.

SIXTYMILE GOLDFIELD

References: McConnell (1905, pp. 33A-37A; in Bostock, 1957, pp. 37-48); Cockfield (1921); Bostock (1936b, p. 1; 1939, pp. 3-4; 1941, pp. 3-4); Skinner (1961, p. 13); Green and Godwin (1964, pp. 69-71); Green (1965, pp. 66-67; 1966, pp. 105-107).

The Sixtymile goldfield lies near the Alaska border about 40 miles west of Dawson. Access to the area is by a rough 10-mile road that leaves the Sixtymile-Boundary road near mile 49. The area includes several formerly important placer creeks, principal of which are Miller, Glacier and part of Big Gold. Part of the valley of the Sixtymile River was also mined.

Following discovery of placer gold in 1892, the area became an important producer, with a total recorded recovery of 213,600 ounces of fine gold, up to 1962, the last year of extensive operations. Various mining methods have been utilized, including hand mining, bulldozer sluicing plants and two dredge operations. Since 1962 activity in the area has been restricted to a few small individual operations and total production has been less than 500 ounces. For a complete historical description of the goldfield, the reader is referred to Green (1966, pp. 105-107).

Sixtymile River

O. and D. Medby (64°00'N, 140°47'W)

References: Green and Godwin (1964, pp. 69-71); Green (1965, pp. 66-67; 1966, p. 108).

O. Medby holds Discovery claim and 14 placer claims on a right limit bench of Sixtymile River, beginning about 1/4 mile upstream from Miller Creek. In 1965 production from a bulldozer-sluicing operation was about 149 ounces of crude gold. In 1966, low water conditions prevented mining, and, no production was recorded. New ground was prepared for mining next year. The property was not visited.

W. Kaufman (64°00'N, 140°47'W)

Reference: Green (1966, p. 108).

Under agreement, Kaufman worked parts O. Medby's claims 5 to 14 on the right limit bench of Sixtymile River during 1965. No further work was done in 1966.

KIRKMAN CREEK-STEWART RIVER AREA

Kirkman Creek

L.M. Ross (63°00'N, 139°15'W)

References: Skinner (1961, pp. 13-14; 1962, pp. 15-16); Green and Godwin (1963, p. 57; 1964, p. 72); Green (1965, pp. 67-68; 1966, pp. 108-109).

Since 1957, L.M. Ross has operated a bulldozer-slucing plant on Kirkman Creek, a tributary entering the Yukon River about 90 miles upstream from Dawson. Late in the 1966 season, operations on the creek were concluded and Ross began moving his equipment back to Dawson via river-boat. The property included claims 14 to 19 Below Upper Discovery, two 1-mile leases lower on the creek, and claims 7 Above to 6 Below Upper Discovery, leased from Ballarat Mines Limited.

Total production from 1957 to the end of 1965 was about 4,134 ounces of crude gold. During 1966, working with one helper, Ross mined 165,000 bedrock square feet and recovered about 397 ounces of crude gold. (see also Upper Bonanza Creek, page 74). The property was not visited in 1966.

Brewer Creek

K. Djukastein (63°11'N, 139°00'W)

References: Green (1965, p. 68; 1966, p. 109).

K. Djukastein completed his third year of operation on a one-mile prospecting lease on Brewer Creek, a left limit tributary of Stewart River, about 3 miles downstream from Barker Creek. In 1966, Djukastein, working with one helper, mined 19,000 bedrock square feet and recovered about 279 ounces of crude gold plus about 5 ounces jewellery gold. In addition 3 prospect shafts were sunk to test new ground. Equipment includes a D-4 bulldozer. The property was not visited.

MAYO MINING DISTRICT

HAGGART CREEK AND DUBLIN GULCH AREA

Haggart Creek

Spruce Creek Placers Limited (64°01'N, 135°51'W)

References: Skinner (1961, p. 15; 1962, p. 18); Green and Godwin (1963, pp. 57-58; 1964, pp. 74-75); Green (1965, pp. 70-72; 1966, pp. 110-112).

This company, owned by F. M. Wilson, J.M. Acheson and W.L. Drury, holds a 22-claim lease from the E.H. Barker estate on Haggart Creek between Dublin Gulch and Fifteen Pup. The company also holds 1-mile and 3-mile left limit prospecting leases downstream from Dublin Gulch and Fifteen Pup, respectively. Access to the property is by a 25-mile road from about mile 268 on the Mayo-Elsa road.

Spruce Creek Placers Limited has mined this ground since 1961, using bulldozer sluicing operations. Cumulative production to the end of the 1965 season was 3,975 ounces of crude gold. In 1966, 491 ounces were produced from 23,000 cubic yards sluiced on claims 1 and 2 Above and 5 Below Discovery, during the period April 30 to October 22. In addition, about 155,000 cubic yards of overburden was stripped from these claims, utilizing an automatic sluice-gate aided by a bulldozer and dragline. A churn drilling program was carried out on claim 5 Below to test new ground. Up to 4 persons were employed in the operation and equipment included 2 D-8 bulldozers, a 1½ yard dragline and an Atlas Copco overburden drill.

During 1966 work was concentrated mainly on the left limit ground of claim 5 Below, continuing exploration of a buried deep channel deposit begun last year. In this area, a 35-foot deep cut was made to bedrock involving removal of about 24,000 cubic yards of gravel and overburden. Bedrock area mined was 5,700 square feet and 236 ounces of crude gold were recovered from sluicing about 14,500 cubic yards. Mining proved difficult due to the presence of 'islands' of frozen ground in the cut and the irregular configuration of the bedrock surface. The present east limit of the new deep cut lies over the right limit of the deep channel, and further progress across the channel is hampered because of the progressively increasing depth of overburden that must be removed as the cut is extended upslope across Haggart Creek left limit. A series of test holes was drilled in the fall of 1966 (see W.S. Moore Company, below) and the left limits of the deep channel were established. Drilling showed that a maximum of about 90 feet of overburden and gravel is present over the deepest part of the channel. Plans for further testing of the channel, either by tunnelling from the present cut, or by extending the cut into the channel with the use of the dragline,

are being considered.

W.S. Moore Company Limited (64°01'N, 135°51'W)

This company has optioned exploration rights to part of Spruce Creek Placers Limited ground on Haggart Creek and in late 1966 began a churn drilling program to test the left limit deep channel area of claim 5 Below (see Spruce Creek Placers Limited, above). Further work in this area is planned for the 1967 season.

Dublin Gulch

F. Taylor (64°02'N, 135°50'W)

References: Skinner (1961, p. 14; 1962, p. 17); Green and Godwin (1963, pp. 59-60; 1964, pp. 76-77); Green (1965, pp. 72-73).

F. Taylor owns 7 claims extending upstream from the mouth of Dublin Gulch. The property is accessible by a rough road leading up the north side of Dublin Gulch about a mile past the camp of Spruce Creek Placers Limited.

Taylor has mined the Dublin Gulch property intermittently since 1937. Cumulative production to the end of 1965 was 8,815 ounces crude gold and about 7 tons of tungsten concentrate (scheelite). During 1966, with the part time help of his son, Taylor mined about 510 ounces crude gold during the period from May to the end of October. About 32 ounces of jewellery grade gold was also recovered. In addition about 3 tons of tungsten concentrate, recovered over the past three years, was shipped from the property in 1966. Equipment includes an automatic sluice gate and a new D-7 bulldozer.

Production during 1966 was from a centre cut about 700 feet long by 60 feet wide on claims 2 and 3 Above. Considerable difficulty was encountered in mining due to low water conditions in the Gulch, and to the presence of a thick (up to 14 feet) clay horizon in the cut gravel, which hindered sluicing operations.

HIGHET AND JOHNSON CREEK AREA

Highet Creek

E.C. Bleiler (63°45.5'N, 136°09'W)

References: Skinner (1961, pp. 15-16; 1962, p. 19); Green and Godwin (1963, pp. 60-61; 1964, pp. 78-79); Green (1965, pp. 73-76; 1966, pp. 113-114).

E.C. Bleiler and son continued mining on their 31 claim placer property on Hight Creek. The operation is accessible by a 13-mile road leading from the Mayo-Elsa road. The property has been mined since 1958 and total production to the end of 1965 was about 2,113 ounces of crude gold. Production in 1966 was about 518 ounces. The property was not visited in 1966.

W. and J. Gordon (63°44'N, 136°07.5'W)

Mr. and Mrs. W. Gordon of Mayo hold 1 placer lease and 2 placer claims on Hight Creek about 2 miles above the junction of Hight and Bennett Creeks. Access is by the same road that leads to the Bleiler property.

During the 1966 season, ground was prepared for mining in 1967. About $\frac{1}{2}$ mile of ditch was put in and 800 feet of flume constructed for water routing. This property was not visited.

Johnson Creek

Barduson Placers Limited (63°47'N, 136°22'W)

References: Cairnes (1916, pp. 25-26; in Bostock, 1957, pp. 398-399); Skinner (1961, p. 16; 1962, pp. 19-20); Green and Godwin (1963, pp. 61-62; 1964, p. 79); Green (1965, pp. 76-78; 1966, pp. 115-116).

This company, owned by H. Barchen, operates a sluicing plant on Johnson Creek about $\frac{1}{4}$ mile below the mouth of Sabbath Creek. Access is by about $5\frac{1}{2}$ miles of rough road leading from upper Hight Creek and navigable only by 4-wheel drive vehicle.

The present operator began mining on Johnson Creek in 1958, and total production to the end of 1965 was about 6,837 ounces of crude gold. During 1966, Barchen working with one full-time helper over the period June 5 to October 12 stripped 17,000 cubic yards and recovered 582 ounces of crude gold from 26,000 cubic yards sluiced. Equipment included one D-8 and one D-6 bulldozer.

Mining during 1966 was on claims 2 and 3 Below and claim 5 Above. On the former, a centre cut 500 feet long by 80 feet wide with an average depth of 18 feet was mined. On claim 5 Above, a right limit cut 250 feet long by 70 feet wide with a depth of 24 to 30 feet was mined.

This property was not visited in 1966. The section exposed during mining in 1965 on claim 3 Below was reported by Green (1966, p. 116) as follows:

	Thickness (feet)	
	Unit	Total from Base
Banded silt with some muck.....	4	17
Gravel; rusty and poorly sorted with well-rounded boulders to 1½ feet, the larger mainly granitic rocks, in a matrix of micaceous sand.....	9	13
Comminuted phyllite containing a few angular boulders and broken fragments of phyllite and phyllitic quartzite.....	4	4
Bedrock; blue-grey clay with fragments of quartz, probably formed through alteration of grey phyllite.....		

H. Barchen advises that the ground mined during 1966 consisted mainly of poorly sorted gravels, possibly in part, of glacial origin. In a few places angular slabs of schist, possibly rockslide debris, were found within the gravels near bedrock. On claims 2 and 3 Above a distinctive 1½-foot thick well sorted, uniform gravel layer containing mainly schist pebbles in a sandy matrix reportedly occurs. Good gold values were recovered from this particular layer.

McLagen Creek

C.J. and H. Klippert (63°42'N, 136°14'W)

Reference: Green (1966, pp. 116-117).

The Klippert brothers of Mayo hold a total of 22 placer claims on McLagen Creek, a small tributary of Minto Lake. The property is reached by a 3-mile tote road from the end of the Minto Lake road.

Working from mid-June to early October the operators continued last season's left limit cut for about 1,000 feet upstream. Gravel and overburden is up to 30 feet thick in this area and difficulty was encountered in reaching bedrock. Little success was experienced here, and a new trial cut was started a further 1,000 feet upstream. Tentative plans for next season include some test-drilling on the property, prior to the start of mining. Equipment includes a D-6 bulldozer and a front end loader. This property was not visited in 1966.

Bear Creek

J.J. Van Bibber (63°31'N, 136°21'W)

References: Green and Godwin (1964, p. 80); Green (1966, pp. 117-118).

This property was not worked during 1966, and Van Bibber has dropped all but 5 claims of his previous holdings on Bear Creek. A 1-mile prospecting lease has been taken out on Thunder Gulch, a tributary of Lightning Creek in the Keno Hill area, and stripping operations were started here in the fall of 1966. Neither of these properties were visited during 1966.

DUNCAN CREEK AREA

Upper Duncan Creek

D. Heinz (63°53'N, 135°19'W)

References: Cairnes (1916, pp. 16-19; in Bostock, 1957, pp. 387-391); Green (1966, pp. 118-120).

D. Heinz continued part time mining on his holdings on Upper Duncan Creek. The property consists of two, one-mile placer prospecting leases. Access is by rough road about one mile long that fords Lightning Creek a short distance above its mouth.

Placer gold was discovered on Upper Duncan Creek in 1898 and the ground was worked until at least 1915. Production to the end of 1915 was estimated at about \$55,000 (3,320 ounces). Since then, production has been minor (Green, 1966, p. 119).

In 1965, Heinz recovered about 25 ounces crude gold from bulldozer-sluicing operations. Production for 1966 was also about 25 ounces. This property was not visited.

WHITEHORSE MINING DISTRICT

KLUANE LAKE AREA

Burwash Creek

Burwash Mining Company Limited (61°22.5'N, 139°17'W)

References: Cairnes (1915, pp. 22-24; in Bostock, 1957, p. 367-371); Skinner (1961, pp. 17-18; 1962, pp. 20-21); Green and Godwin (1963, p. 63; 1964, pp. 82-83); Green (1965, p. 80; 1966, pp. 120-121).

Burwash Mining Company Limited, owned by H. Besner, owns 22 claims on Burwash Creek, a tributary of Kluane River. Access to the property is by a rough secondary road about 6 miles in length, leading from mile 1104 on the Alaska Highway.

Burwash Creek was extensively mined over the period 1904 to about 1915, with a total estimated production of between \$30,000 and 40,000 in gold (Green, 1966, p. 120). The present operator has mined on the creek since 1945, working a stretch from near Burwash Canyon upstream to a point about 1/4 mile downstream from the mouth of Tatamagouche Creek, a distance of about 4 miles. Production to the end of 1965 was about 22,838 ounces crude gold. Final production figures for 1966 are not available but when visited in late September, it was anticipated that recovery would be about the same as last year (695 ounces). Highlight of the season was the recovery of two large nuggets, one weighing 15 1/2 ounces, the other 9 1/4 ounces. Up to 4 men were employed in the operation and equipment included 4 bulldozers, a 3/4 yard diesel shovel and a monitor and low pressure sprinkler system for thawing and stripping operations.

Bullion Creek

H. Thorsen (about 60°58.5'N, 138°39'W)

References: Skinner (1961, p. 17; 1962, p. 21); Green and Godwin (1963, pp. 62-63).

Bullion Creek flows into Slims River about 4 miles above the latter's mouth at the south end of Kluane Lake. Placer gold was discovered on the creek in 1903 and in subsequent years various parts of its course were mined intermittently.

During the period 1958-1961, Action Mining Company operated a bulldozer sluicing plant on the creek and produced a total of about 6,150 crude ounces of gold during this period. Since then, the creek has been mined intermittently by various individuals. At present, H. Thorsen holds 5 claims located on lower Bullion Creek, downstream from the mouth of Wolf Creek. Production from 1966 operations was about 78 ounces crude gold. The property was not visited.

COAL MINING AND EXPLORATION

WHITEHORSE MINING DISTRICT

CARMACKS AREA

Tantalus Butte Mine (62°08'N, 136°16'W)

References: Cairnes (1910a, pp. 52-53); Bostock (1936a, pp. 59-62); Wheeler (1961, p. 74); Skinner (1961, p. 30; 1962, p. 30); Green and Godwin (1963, p. 65; 1964, pp. 83-84); Green (1965, pp. 82-84; 1966, pp. 121-122).

The Tantalus Butte Mine of the Yukon Coal Company Limited - owned by Territorial Supply Company Limited, a subsidiary of United Keno Hill Mines Limited and Cassiar Asbestos Corporation Limited - is the only producing coal mine in Yukon. It is located at Carmacks, about 100 miles north-northwest of Whitehorse. The mine has operated since about 1923, except between 1939 and 1948. Since 1948, annual production has ranged from less than 4,000 tons to a maximum of 14,113 tons (1954) and cumulative production for the period 1948 to 1965 inclusive was 125,967 tons. Production during 1966 was 6,000 tons, virtually all of which was used by United Keno Hill Mines Limited at Elsa and Calumet. A crew of 10 men was employed.

The coal is of the high-volatile Bituminous Group. It occurs in the Tantalus Formation which includes conglomerate with subordinate sandstone and shale and a few coal seams (Bostock, 1936a, p. 28). Wheeler (1961, p. 74) considered the Tantalus Formation to be of Upper Jurassic (?) and Lower Cretaceous age.

The main entry of the mine is at an elevation of 2,056 feet or about 350 feet above Yukon River. It follows the hanging-wall of the main seam in a general north-northwest direction and is about 2,600 feet long. The main coal seam strikes about north-northwest, dips 50-55° SW, and ranges in thickness from 8 to 20 feet. It is cut by northeast-trending, steep southeast-dipping faults which cross the main entry at distances about 1,300 and 1,800 feet from the portal. Mining is done by room and pillar methods, at present the rooms or drives are inclined at 30 degrees to the main entry and spaced 120 feet apart. Most production in 1966 came from the part of the mine north of the second cross-fault but some pillar-mining was done in the area between the two main faults. Analyses of coal samples from the mine are given by Green (1966, p. 123).

Anvil Mining Corporation Limited (about 62°05'N, 136°15'W)
(Coal)

This company holds a total of 8 coal leases adjacent to the Yukon Coal Company Limited Tantalus Butte Mine and to the original Tantalus Mine on the south side of Yukon River, just east of the present bridge. A bulldozer trenching program carried out during 1966 in the latter area located a 30-foot thick coal seam which may be the south extension of the seam worked in the original Tantalus Mine. The coal from the new seam is reportedly similar in character and quality as that being produced from the present Tantalus Butte Mine.

ROSS RIVER AREA

Whiskey Lake

Coal Group (about 61°57.5'N, 132°30'W)

Reference: Wheeler, Green and Roddick (1960).

G. Harris and I.L. Foster of Whitehorse hold 2 coal leases near Whiskey Lake covering a new coal outcrop discovery in Paleocene sandstone and shale in Tintina Trench (unit 10, Wheeler, Green and Roddick, 1960) just west of the Canol Road. Assays from the exposure are reported to show high carbon, low ash, non-coking grade bituminous coal.

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