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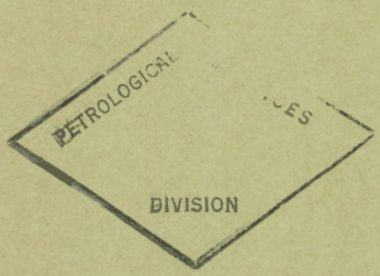

THE MINERAL INDUSTRY OF YUKON TERRITORY AND SOUTHWESTERN DISTRICT OF MACKENZIE, NORTHWEST TERRITORIES, 1963

(Report and 1 figure)

L. H. Green and C. I. Godwin

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DEPARTMENT OF MINES AND TECHNICAL SURVEYS

CONTENTS

CONTENTS (cont.)

ABSTRACT

The paper deals with developments in the mineral industry of Yukon Territory and southwestern District of Mackenzie during 1963. It is the fourth of an annual series.

The mineral industry has formed the backbone of the economy of Yukon since the discovery of the Klondike Gold Fields in 1896. In 1963, the estimated value of mineral production of Yukon was $14,626,150. Most of this was from silver, lead, and zinc produced by United Keno Hill Mines Limited, the sole lode operation in the Territory.

In lode exploration, significant discoveries and developments were made by New Imperial Mines Limited on copper deposits of the Whitehorse Copper Belt, Ormsby Mines Limited on the Laforma gold property near Carmacks, and Cassiar Asbestos Corporation Limited on the Clinton Creek asbestos property near Dawson.

In placer mining, the Yukon Consolidated Gold Corporation continued dredging operations in the Klondike area. In addition, a number of independent operators were active throughout the Yukon.

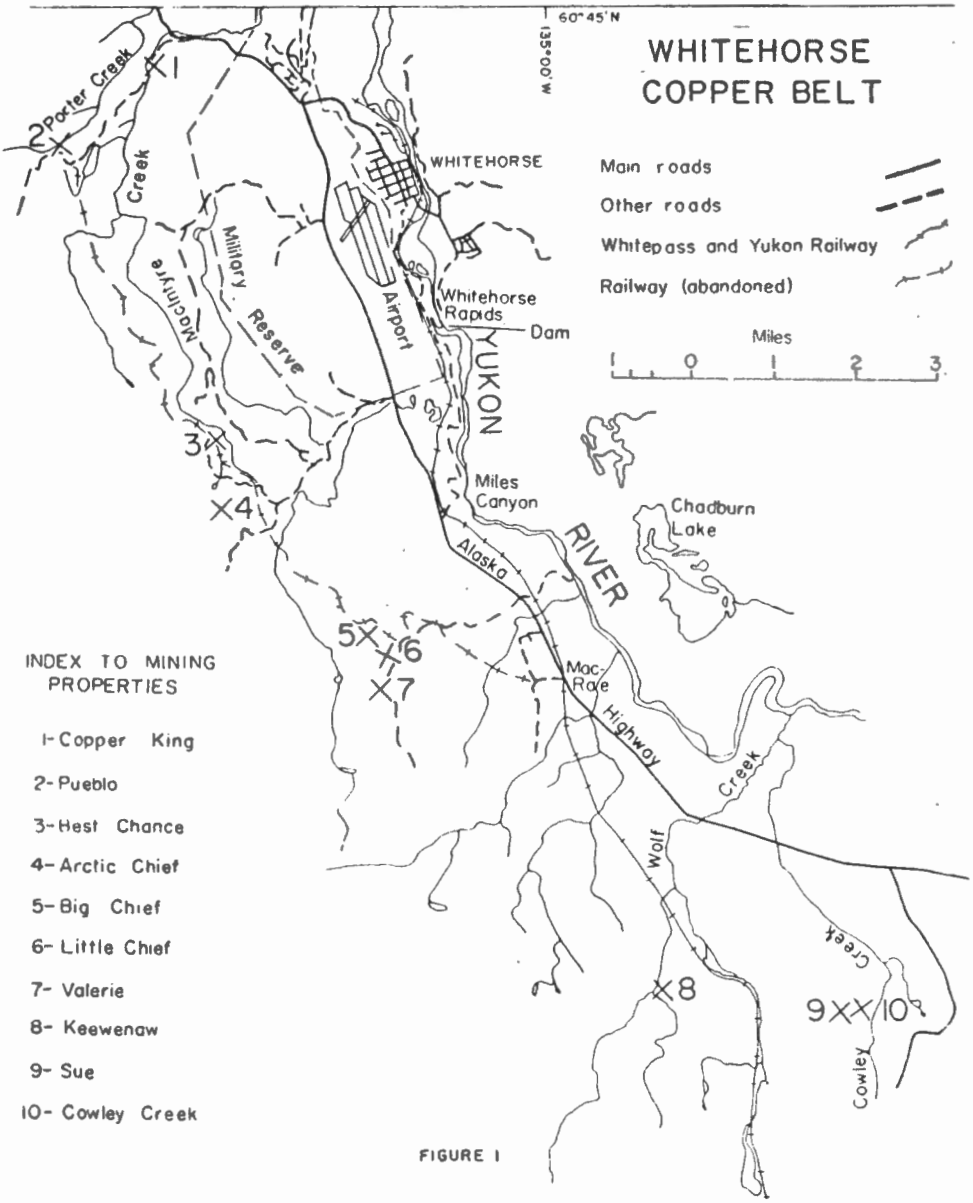
WHITEHORSE
COPPER BELT
60°45'N
135°00'W
Main roads
Other roads
Whitepass and Yukon Railway
Railway (abandoned)
Miles
1 0 1 2 3
WHITEHORSE
Porter Creek
Creek
Macintyre
Military Reserve
Airport
Whitehorse Rapids
Dam
YUKON
RIVER
Miles Canyon
Alaska
Chadburn Lake
Mac Rae
Highway
Wolf
Creek
Cowley
Creek
INDEX TO MINING PROPERTIES
1- Copper King
2- Pueblo
3- West Chance
4- Arctic Chief
5- Big Chief
6- Little Chief
7- Valerie
8- Keewenaw
9- Sue
10- Cowley Creek

FIGURE 1

MINERAL INDUSTRY OF YUKON TERRITORY AND SOUTHWESTERN DISTRICT OF MACKENZIE, 1963

INTRODUCTION

This is the fourth of a series of papers on developments in the mineral industry of Yukon Territory and the southwestern District of Mackenzie. Most of the report is based on visits by the technical staff of the Whitehorse Office of the Geological Survey of Canada to active mining properties. Additional information was obtained from personal communications with individuals and companies, press releases and technical papers, and from reports by the Mining Recorders at Dawson, Mayo, Watson Lake, and Whitehorse.

The writers are grateful for the many kindnesses received from the various property owners or their representatives. Thanks are also due to a number of individuals and companies for supplying operational and technical data. The writers were ably assisted in the field by J.C. Bottaro.

Earlier reports on mining developments in the Yukon are contained in the Annual and Summary Reports of the Geological Survey for the period 1898 to 1933. Many of the original reports are now out of print but most of the information dealing with the Yukon has been compiled by Bostock (1957)[1]. The latter publication is invaluable as a ready reference on many of the early discoveries in the Yukon. Mining developments in the period 1934 to 1940 are described in a series of reports by Bostock (1935, 1936b, 1937, 1938, 1939, and 1941), 1960 to 1961 in reports by Skinner (1961, 1962), and 1962 by Green and Godwin (1963).

TRANSPORTATION

The city of Whitehorse, capital of the Yukon Territory, is the centre of distribution for the Territory, and is supplied mainly from Vancouver and Edmonton. Most freight is brought to Whitehorse by boat and rail from Vancouver, although truck, bus, and scheduled aircraft provide alternate services from Vancouver, Edmonton, and Alaska.

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[1] Names and/or dates in parentheses refer to publications listed in the Selected Bibliography.

Within the Territory freight and mineral products are transported year around by truck along three main routes: the Alaska Highway, the Whitehorse-Keno Road, and the Stewart Crossing-Dawson Road. A number of other roads provide access to these routes. In addition, freighting by trucks on winter roads has been very successful, notably for oil exploration beyond the Dempster Highway in the Peel Plateau area. Both the Federal and Territorial Government participate in the construction of roads to resource exploiting projects.

Eight charter airline companies in the Yukon provide aircraft that are fitted to the special needs of mining, exploration, and prospecting — especially float planes and light craft able to use short runways and lakes. Helicopter transport is playing an increasingly important role in exploration, and has made it possible for operations to be extended into areas formerly considered virtually inaccessible. During recent years the availability of helicopters on an hourly or daily basis from many points within the Yukon enabled even small operations to take advantage of this form of transportation.

A comparison of the cost of shipping by different methods is given in Table I.

MINERAL PRODUCTION OF YUKON

The mineral industry has formed the backbone of the economy of Yukon since the discovery of the Klondike Gold Fields in 1896. The greatest value of mineral production was attained in the year 1900 when over 22 million dollars worth of gold and silver were produced. The value of mineral production dropped below 10 million dollars a few years later and did not rise above this until 1952 when the operations of United Keno Hill Mines Limited on Galena and Keno Hills came into full production. The value has subsequently remained in excess of 10 million dollars. Mineral production for the Yukon, both cumulative and for the years 1961 to 1963, is given in Table II.

The only lode producer in the Yukon during 1963 was United Keno Hill Mines Limited on Galena and Keno Hills. In the fiscal year ended 30 September 1963, the company sold silver-lead-zinc concentrates valued at $10,110,038 before the deduction of smelter charges, freight, and marketing expenses. The Yukon Coal Company Limited, which is affiliated with the above company, produced 8,232 tons of coal at Carmacks.

TABLE I

Transportation Costs of Yukon Territory, 1963

BUS (Express, Whitehorse to Edmonton and Vancouver)

Pounds	1-5	5-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Rate-Edmonton ...	1.50	1.85	2.70	2.90	3.75	4.65	5.30	6.65	7.90	9.00	10.50
Rate-Vancouver ..	2.85	3.50	5.30	6.45	7.79	9.20	10.50	12.25	14.50	16.55	18.75

TRUCKING (Basic Rates, Whitehorse to Edmonton and Vancouver)

Hundredweight.....	LTL[a]	LTL[a]-5	5-10	10-50	50-100	100-200
Rate ($/cwt.)-Edmonton	6.90	6.60	6.10	5.50	5.35	4.97
Rate ($/cwt.)-Vancouver	7.25	7.10	6.85	6.45	6.15	5.90

RAIL AND BOAT

Commodity Rates on Ore and Concentrates[b]

Whitehorse to North Vancouver (30,000 lb. carloads):

Lead or Zinc Concentrates	$16.00/ton
Asbestos Ore Fibre	18.25/ton

Commodity Rates on Mining Equipment and Supplies[c]

North Vancouver to Whitehorse (10,000 lb. carloads): $2.98/cwt.

AIRCARGO (Daily service: Whitehorse to Edmonton and Vancouver)

Class	Minimum	Destination	Rate
Air Express	$1.50	Edmonton	$ .43/lb.
	1.50	Vancouver	.49/lb.
Air Freight	5.25	Edmonton	.21/lb. or 18.00/cwt.
	5.25	Vancouver	.21/lb. or 18.00/cwt.

CHARTER AIRCRAFT (Basic Rates)

Type	Rate per Hour	Rate per Mile
Helicopter		
Bell G-2	$103.00[d]	Not Applicable
Hiller 12-E	130.00[d]	Not Applicable
Fixed-Wing		
Cessna 180	$ 55.00	0.55
Beaver	77.00	0.77

[a] Less than truckload.

[b] Rate approximately 1 1/2 cents per ton mile.

[c] Rate approximately 6 cents per ton mile.

[d] Reduction of $7.50 per hour if gasoline is supplied.

TABLE II

Mineral Production of Yukon Territory[a]

Mineral		1961	1962	1963[b]	Cumulative Total (1886 to Dec. 31, 1963)
Gold	fine oz.	66,878	54,805	53,120	10,947,738
	$	2,371,494	2,050,255	2,004,749	255,812,868
Silver	fine oz.	6,937,086	6,482,244	6,115,704	131,715,134
	$	6,538,897	7,551,814	8,464,134	101,335,197
Lead	lb.	16,769,815	16,290,125	17,479,163	427,758,725
	$	1,712,198	1,615,980	1,922,708	45,340,575
Zinc	lb.	12,137,418	11,888,876	13,834,854	204,804,331
	$	1,528,100	1,438,554	1,768,094	27,032,906
Cadmium	lb.	142,685	134,493	140,601	2,251,585
	$	228,296	231,328	337,442	4,021,699
Copper	lb.	880,773	429,000		14,372,285
	$	257,098	132,990		3,101,783
Tungsten	lb. (WO_3)		3,580		32,169
	$		1,611		27,499
Platinum	fine oz.				19[c]
	$				1,553[c]
Coal	tons	7,703	7,649	8,584	255,478
	$	114,221	115,198	129,023	2,326,523
Total	$	12,750,304	13,137,730	14,626,150	439,000,776[d]

[a]Figures from Dominion Bureau of Statistics (1957; and later releases).

[b]Preliminary figures.

[c]Produced in 1960.

[d]Antimony valued at $173 has also been produced and is included in the total.

Placer gold production in 1963 is listed in Table III, which is compiled from information supplied by operators and by Mining Recorders' reports. The majority of the production was by the Yukon Consolidated Gold Corporation. This company operated 6 dredges and 2 bulldozer sluicing plants in the Klondike area, and produced 41,971 ounces of fine gold and 8,488 ounces of silver worth $1,482,894. Other small scale operations throughout the Yukon produced approximately 20,605 ounces of crude gold. Most operators in the Yukon receive assistance under the Emergency Gold Mining Assistance Act.

TABLE III

Yukon Placer Gold Production, 1963

District	Area	Number of Operators	Approximate Production of Crude Gold (ounces)
Dawson	Klondike: Y.C.G.C.*	1	41,971**
	Other	23	13,412
	Clear Creek	2	670
	Sixtymile River	2	154
	Kirkman Creek	1	527
	Henderson Creek	1	58
Mayo	Haggart Creek and Dublin Gulch	2	1,881
	Highet Creek and Johnson Creek	2	1,350
	Other	3	116
Whitehorse	Kluane Lake	1	1,060
	Carmacks	1	23
Total		38	61,222

* The Yukon Consolidated Gold Corporation, Limited.

** Fine Gold.

EXPLORATION IN YUKON

The year was an active one with a large number of syndicates, several companies, and some individuals engaged in exploration. Operations carried out included: prospecting by individuals and large helicopter-supported parties, geophysical and geochemical investigations, underground operations, diamond drilling, and property examinations.

Early 1963 was marked by a rush of activity sparked by the release by the Geological Survey of Canada of the aeromagnetic maps that covered the southeastern corner of the Yukon (60°00'N to 62°00'N; 128°00'W to about 135°00'W). In particular, an unnamed syndicate staked 240 claims in the vicinity of the Whitehorse Copper Belt and Newmont Mining Corporation of Canada Limited staked 494 claims in the Pelly Plateau area covering an area in which nickel-bearing float was known. The aeromagnetic maps correlate reasonably well with geological maps of the same area. In several areas, contacts between units shown on the geological maps can be extended into heavily drift-covered areas on the basis of the aeromagnetic maps. A number of the aeromagnetic maps showed long, narrow strings of magnetic highs indicating the presence of ultrabasic rocks. The maps of the Whitehorse Copper Belt are characterized by elliptical anomalies; however, only one such anomaly coincides with a magnetite orebody and some of the others are known to coincide with basalt flows.

During the summer of 1963, a number of promising showings found late in the 1962 field season were explored and abandoned. However, late in the year a number of encouraging results were announced. In the Whitehorse area, New Imperial Mines Limited reported that 1,600,000 tons of ore were indicated by their drilling program on the Whitehorse Copper Belt. In the Carmacks area, Ormsby Mines Limited encountered a very encouraging gold ore shoot that resulted in extensive plans for 1964. In the Galena and Keno Hills area, United Keno Hill Mines Limited reported encouraging results from a greatly expanded exploration program. In the Ross River area, there was renewed interest in the Vangorda lead-zinc property held by Kerr-Addison Mines Limited.

TABLE IV

Mineral Claims Recorded, Yukon Territory

(Figures supplied by Department of Northern Affairs and National Resources)

Mining District	1959	1960	1961	1962	1963
Dawson	85	244	202	135	283
Mayo	71	165	618	1269	347
Watson Lake*				758	1046
Whitehorse	521	928	1642	1002	1052
Total	677	1337	2462	3164	2728

*District established 27 April 1962.

MINERAL PRODUCTION AND EXPLORATION, NAHANNI MINING DISTRICT, DISTRICT OF MACKENZIE

At Canada Tungsten Mining Corporation Limited's tungsten property in the Flat River area, mining was suspended in late July and milling at the beginning of September, owing to the low price of tungsten. Redstone Mines Limited continued exploration of a bedded copper deposit discovered in 1962 near Little Dal Lake.

During 1963, 208 mineral claims were recorded in the Nahanni Mining District. The Mining Recorder's office for the district is in Watson Lake, Yukon.

LODE MINING AND EXPLORATION

MAYO MINING DISTRICT

GALENA AND KENO HILLS AREA

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

Selected References: Boyle (1956, 1957); Green and McTaggart (1960); McTaggart (1960); United Keno Hill Mines Limited (1961, 1963); Kindle (1962); Skinner (1961, pp. 21-25; 1962, pp. 22-27); Green and Godwin (1963, pp. 5-8).

United Keno Hill Mines Limited is Canada's leading producer of silver, and operates the only large-scale lode mines in the Yukon. The gross value of the production for the fiscal year ending 30 September 1963, was $10,110,038. In recent years the value of production has far exceeded other industries and directly and indirectly the Company supports much of the economy of the Yukon.

Keno Hill Mining Company Limited was formed in 1945 to take over a number of properties in the district including those of the Treadwell Yukon Corporation Limited. In 1948, the capitalization of the company was altered and the name changed to United Keno Hill Mines Limited. Total production from 1947 to 30 September 1963 was 2,252,794 tons of ore, from which 84,430,758 ounces of silver, 305,304,821 pounds of lead, 235,338,453 pounds of zinc and 3,010,672 pounds of cadmium, valued at about $120,908,500 were recovered. As of 30 September 1963 the company owned 653 and in part owned 13 mineral claims, all located in the Galena Hill-Keno Hill area. Employees at this date totalled 587 in the Elsa-Calumet area plus a number employed elsewhere in the Yukon.

The company's principal properties are accessible by all-weather roads. Concentrates, totalling 25,509 tons in the 1963 fiscal year, are trucked 290 miles to Whitehorse, Yukon, from whence they are trans-shipped to Vancouver, B.C., via railway and coastal steamer. Freight from Whitehorse, and coal from the Yukon Coal Company Limited mine at Carmacks are handled on the return haul.

The first discovery in the camp was the Silver King property in 1906 but lode mining did not begin until 1913. Interest in the camp increased following the discovery of the No. 9 vein on Keno Hill in 1919 and with a few interruptions, notably between 1942 and 1946 inclusive, there has been almost continuous production.

During the fiscal year ending 30 September 1963, the production came from the Hector-Calumet, and Elsa mines with minor development ore from the Keno, Silver King, and other properties. The following summary of operating results is taken from the Annual Reports of the Company:

	12-Month Period Ended 30 September		
	1963	1962	1961
Dry tons milled	186,721	184,123	186,116
Daily milling rate in tons	511.5	504.4	509.5
Mill heads:			
Silver (oz./ton)	34.03	40.55	41.16
Lead (%)	5.44	5.84	5.83
Zinc (%)	4.69	4.42	4.84
Metal production			
Silver (oz.)	5,978,075	7,000,837	7,231,908
Lead (lb.)	16,751,012	17,587,767	17,911,672
Zinc (lb.)	14,759,821	13,885,884	15,512,624
Cadmium (lb.)	199,708	184,364	202,432
Metal sales[a]	$10,110,038	$9,635,252	$8,540,143
Source of ore treated in mill			
Hector mine (%)		8.98	12.26
Calumet mine (%)	64.96	63.03	65.86
Elsa mine (%)	15.44	20.20	19.09
Keno mine (development) (%)	6.73	5.87	0.71
Silver King mine (development)(%)	10.80	1.84	1.85
Galkeno mine (development) (%)	0.08	0.08	0.23
No Cash (development) (%)	1.00		
Comstock Keno (development) (%)	0.99		
Ore reserves			
Tons[b]	493,955	445,630	514,369
Silver (oz./ton)	34.58	38.41	38.47
Lead (%)	6.59	7.12	6.78
Zinc (%)	5.50	5.08	4.95

[a]Without deductions for smelter charges, freight and marketing.

[b]Exclusive of the Onek property.

The principal production of the camp is won from erratic ore shoots developed along vein faults. As a result, a great deal of exploratory work is required. During the fiscal year ending 30 September 1963 this consisted of a total of 22,441 feet of drifting and crosscutting, 4,723 feet of raising, 387 feet of shaft sinking, 25,762 feet of underground diamond drilling and 13,040 feet of surface diamond drilling. In addition, an extensive surface exploration program was carried out. Much of the following information is taken from the Annual Reports of the Company.

At the Hector-Calumet mine (United Keno Hill Mines Limited, 1961) production has come from numerous ore shoots developed in a branching and joining vein system, which has been explored to the 1,165 level by means of an internal shaft. The various vein structures are referred to by numbers. The general strike of the vein system is N45°E and the dip 65°SE. Three major cross-faults striking northwest and dipping 45°SW cut and displace the vein systems. Development work during the fiscal year — 10,254 feet of drifting and crosscutting, and 3,092 feet of raising — was carried out on all levels and a number of veins. On the 18-19 vein zone ore shoots aggregating 587 feet in length grading 37.6 ounces of silver over a width of 6.1 feet were developed.

At the Elsa mine (United Keno Hill Mines Limited, 1961) a number of vein systems have been traced for 2,300 feet laterally. The most important are the 2 vein (striking N70°E and dipping 65°S), the 5 vein (striking N60°E and dipping steeply south), and the 15 vein (striking N10°E and dipping 30°W). The main production has come from ore shoots along the junction of the 5 and 15 veins beneath the Porcupine Creek fault. This fault strikes east and dips about 30 degrees to the south, and is almost a bedding fault. To the southwest, the 2 vein is cut off by the Brefalt Creek fault, which strikes northwest and dips 50°SW. Development work during the fiscal year — 2,892 feet of drifting and crosscutting, and 347 feet of raising — was carried out mainly on the 2 vein on the 650 and 525 levels and on a new structure, the 17 vein on the 650 level southwest of the Brefalt Creek fault. No ore was found on the 2 vein, but the strong No. 17 vein structure showed a well mineralized ore section of 101 feet with an average width of 6.0 feet and grade of 40.0 ounces of silver per ton. Minerals in this vein consist of shattered quartz, pyrite, siderite, and galena, and resemble the vein material of the Silver King mine rather than the tetrahedrite-rich veins found elsewhere in the Elsa mine.

At the Silver King mine (Boyle, 1957, pp. 22-25) productive orebodies occurred along two joining vein faults. The No. 1 vein (204 of Boyle) strikes N50°E and dips 70° southeast, and the No. 2 vein (202 of Boyle) strikes N75°E and dips 70° southeast. Ore shoots occurred on both veins near the junction and on the No. 1 vein beneath Galena Creek, about 600 feet to the southwest. United Keno Hill Mines Limited have carried out underground development at the property since 1961. Work during the fiscal year — 1,086 feet of drifting and crosscutting, and 573 feet of raising — was for the purpose of subdrifting under ore blocks, crosscutting for deep diamond drill stations, and drifting of the No. 2 vein. A short ore shoot 45 feet in length and grading 32.9 ounces of silver over an average width of 5.3 feet was developed in the No. 2 vein on the 300 level.

The Keno property, near Keno Summit, contains a number of longitudinal and transverse vein faults (Boyle, 1956, Figs. 2 and 7). Three parallel, longitudinal vein faults strike east-northeast and dip steeply south. From north to south they are referred to as the Main Break (Fault), the No. 6, and the Porcupine. Numerous transverse vein faults that strike northeast and dip steeply southeast occur between the Main Break and the No. 6 longitudinal faults. The company has built a camp on the south slope of Keno Hill and most of the work in recent years has been done from two levels driven on this face of the hill. The 700 level near the camp was driven at an elevation of 4,831 feet above sea-level to investigate the Porcupine, No. 6, and No. 9 faults. These workings have been connected underground to the 200 level, which was driven a few years earlier on the same face of the hill to the upper part of the No. 6 and No. 9 vein faults. Development work has been done on a number of intermediate levels. The company plans to bring the mine into production at a rate of 125 to 150 tons per day in the near future. Development work during the fiscal year - 4,037 feet of drifting and crosscutting, 659 feet of raising, and 237 feet of shaft sinking - was largely directed to exploration, on the 700 level, of veins other than No. 9. On the No. 6 vein an ore shoot, 98 feet long and grading 40.4 ounces of silver per ton over a width of 5.3 feet, was opened.

The Galkeno mine, originally developed as the Mackeno mine (Boyle, 1957, pp. 13-14), was purchased by United Keno Hill Mines in 1958. Exploration work carried out during the fiscal year consisted of 2,900 feet of drifting and crosscutting. At year end, the 900 adit, commenced by former owners in an attempt to drain the higher workings, reached the McLeod vein in poor ground and showed no values. The total length of this adit is 4,949 feet. Drifting was also carried out on the 28 vein on the 300 level, but although the structure was strong and contained sparse mineralization, it did not make ore.

The No Cash property is located about 9,000 feet northeast of Elsa, close to the station on the Elsa-Calumet aerial tramline. Boyle (1957, pp. 27-28) reported that the drifts expose a complex fractured zone, ranging in width from 5 to 15 feet with a general dip of 60 degrees southeast. Small tonnages of hand-sorted ore were shipped from the property prior to 1936, and some 4,500 tons of ore containing over 70 ounces of silver to the ton was mined by United Keno Hill Mines in the course of development work during the period 1948-52. Development work between 1961 and 1962 involved rehabilitation of the 100 level adit, sinking a winze to the 225 level, and a limited amount of drifting on the 225 level. Development work during the fiscal year consisted of 1,020 feet of drifting and crosscutting, and 37 feet of raising. Drifting on the 225 level developed 236 feet of ore grading 47.4 ounces of silver per ton over an average

width of 5.9 feet. Development on the 225 level proved slow and costly owing to inadequate facilities and, consequently, late in the year work on this level was halted in favour of a lower adit. The lower adit is intended to cut the No Cash vein about 250 feet below the 225 level. At the end of the year, it had advanced 234 feet of the estimated 3,600 foot length.

The Comstock Keno Mines Limited's group of 10 claims on Keno Hill was leased by the company on 19 December 1961. The Porcupine longitudinal vein fault (Boyle, 1956, pp. 32-33), as exposed in the Comstock Keno drift, dips 70 to 85 degrees southeast and is a breccia zone 8 to 10 feet wide that contains pods of galena in places a foot or more in width. Rehabilitation of old workings commenced in the summer of 1962. In the 1963 fiscal year work consisted of 252 feet of drifting and crosscutting, 15 feet of raising, and 150 feet of shaft sinking. The sinking developed a 53-foot block of ore averaging 29.0 ounces of silver per ton over a width of 5.3 feet. Development was temporarily suspended pending completion of the Keno property installations from which this property will be serviced.

Surface exploration was carried out in the Lucky Queen, No Cash-Dixie, Silver King, and Elsa areas. The work included detailed prospecting, soil sampling, geophysical surveying, overburden drilling, and diamond drilling. Overburden drilling, using an Atlas Copco overburden drill, was done in the No Cash-Dixie area on Galena Hill. Holes were put down to bedrock on 100 foot intervals along lines spaced 200 feet apart. The cuttings recovered were split, panned, and tested geochemically for lead, zinc, copper, and mercury. The company reports that the results were encouraging in locating mineralized veins in permanently frozen deep overburden areas and in outlining vein systems.

Galena Hill and South McQuesten River Valley

Silver Titan Mines Limited (63°54'N, 135°35'W)

References: McTaggart (1960); Green and Godwin (1963, pp. 8-9); The Northern Miner (21 November 1963).

Exploration of Silver Titan Mines Limited's properties in the Galena Hill and South McQuesten River area was carried out as a joint project by the former company together with Noranda Exploration Company Limited, Kerr-Addison Gold Mines Limited, Canex Aerial Exploration Limited, and Homestake Mining Company. The holdings of the company, as of mid-1963, included 99 claims on the west end of Galena Hill, referred to as the Galena Hill property, and 221

claims on the north side of South McQuesten River, referred to as the Northlimb property. Both properties are heavily drift covered but are, in part, underlain by massive quartzite similar to that of Keno and Galena Hills (unit 1, McTaggart); consequently, exploration has been for silver-lead deposits similar to those of the latter area. A maximum of 10 men worked from a base camp near the Silver King mine.

During the summer of 1963, the company conducted a reconnaissance geochemical investigation of silt samples from streams between McQuesten Lake and North McQuesten River, a distance of about 28 miles. Detailed work done in selected areas included geochemical investigations, resistivity surveys, geological mapping, and trenching (The Northern Miner, 21 November 1963).

On the Galena Hill property, late in 1963, the company commenced a series of prospect pits to test favourable areas suggested by resistivity and geochemical surveys. By early 1964, 5 pits with an average depth to bedrock of about 25 feet had been completed (A.E. Aho, personal communication).

On the Shanghai Group of the Northlimb property bulldozer trenching was done and a prospect adit driven late in 1963 to explore a possible vein fault. Small silver-rich veins and float were found in the bulldozer cuts, but work failed to reach bedrock over what is believed to be the main vein fault (A.E. Aho, personal communication). On the UR property bulldozer trenching exposed one 6-foot wide vein fault with breccia and siderite but no sulphides; other trenches did not reach bedrock (idem).

Keno Hill

Werneke Group (63°57 1/2'N, 135°19'W)

The centre of the Werneke group of 16 claims - held by H. Barchen and J.B. O'Neil - is about 1 mile west of the abandoned camp of Werneke. The group was optioned to Dualco Explorations Limited who did bulldozer stripping during the field season. Green visited the group in late August 1963 when stripping was underway. The option was dropped later in the year.

Bedrock on the group is composed of graphitic quartz-mica schist and sill-like bodies of altered gabbro or diorite (greenstone). A number of cuts were put across a rusty-coloured break that trends about N70°E and has been traced for over 200 feet. In the westernmost cut the break was perhaps 6 inches wide and

contained vein quartz, galena, secondary lead minerals, and gouge. Other cuts to the east showed only a rusty zone a few inches thick. A picked specimen from the westernmost cut assayed*: 0.70 ounces of gold and 26.3 ounces of silver per ton, 8.9 per cent lead, 2.3 per cent zinc, and 0.15 per cent copper.

Galena Hill

Eagle Group (Jersey Yukon Mines Limited) (63°54 1/2'N, 135°22'W)

Reference: Boyle (1957, p. 29)

Jersey Yukon Mines Limited holds 53 claims on Galena Hill including the Eagle property.

In August 1963, the company commenced bulldozer stripping of the Eagle vein. When visited by Green in late August, the vein had been exposed in 2 long cuts for a distance of about 500 feet and had been traced for a total distance of about 1,100 feet. Where exposed the vein zone strikes N 60° E and dips 55° SE and is as much as 16 feet in width. The hanging wall of the vein is graphitic and pale green chloritic quartz-mica schist; the footwall, massive grey quartzite and quartz-mica schist, the latter in part graphitic. The vein itself contains much broken and iron-stained rock, and many minor breaks can be traced within it. Sulphides exposed consisted of a few pyrite bands and one pod of galena-rich material, possibly 2 feet by 3 feet. The vein is a strong one and would appear worthy of careful exploration, particularly if it could be traced to where both walls are in massive quartzite.

Subsequently, the company reported (personal communication) that during September and October the vein had been traced to the northeast where both walls are in massive quartzite and that an underground exploration program is planned on this section of the vein in the summer of 1964.

Crown Silver and Development Limited (63°53'N, 135°23'W)

The company holds a block of 16 claims on the south slope of Galena Hill. Late in the 1963 season, C. Baker re-opened an old shaft near Fisher Creek, which crosses the Duncan Creek road about 1.3 miles south of the junction of the Galkeno-Calumet road. From

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

the bridge, the shaft is about 500 feet up-stream and 300 feet above the creek on the west side. The shaft is about 40 feet deep, and galena and tetrahedrite had been reported from the original work. Baker found a minor amount of these minerals in the loose material removed in re-opening the shaft, but was unable to find any in place and concluded that they must have come from a very small lens. When visited by Green in early October, the walls of the shaft were coated with ice and the only bedrock observed was black graphitic phyllite with numerous quartz lenses exposed at the bottom of the shaft. This material is similar to the material on the dump and the outcrops at Nigger Bend, near the Fisher Creek bridge.

HAGGART AND SECRET CREEKS AREA

Peso Silver Mines Limited (64°00 1/2'N, 135°58'W)

References: Skinner (1961, pp. 32-33; 1962, pp. 31-34); Canadian Mining Journal (Jan. 1963, p. 85); Green and Godwin (1963, pp. 12-15); Western Miner and Oil Review (July 1963, p. 46); The Northern Miner (5 December 1963, p. 12).

Peso Silver Mines Limited owns 234 claims in the Haggart-Secret Creek area. The main showings are the Peso veins and the Rex vein. Main camp, near the Peso No. 1 vein, is 26 miles by road from Proctor's sawmill on the Mayo-Elsa road, and is reached by a branch road, 5 miles in length, which leaves the Haggart Creek road and follows the valley of Secret Creek. The Rex vein is about 2 1/2 miles east-southeast of the camp, and is reached from the camp by a jeep road.

Work by Peso Silver Mines Limited to the end of 1962 on the Peso and Rex Groups included: 1,250 feet of underground drifting on the Peso No. 1 vein; trenching, several prospect shafts, and geophysical work on the Peso and Rex Groups; 2,870 feet of diamond drilling, and the collaring and driving of 37 feet of adit on the Rex vein zone. During the 1963 field season, the company carried out a geochemical survey of the property and did a limited amount of bulldozer stripping.

Late in 1963, Charter Oil Company Limited arranged to purchase a substantial interest in Peso Silver Mines Limited. The latter company has announced that an extensive underground exploration and development program is planned for the Rex vein in 1964.

The Rex vein zone that strikes N 80° E and dips about 55°N is an irregularly mineralized fault-gouge zone in which oxidation has been extensive and irregular. Minerals in the zone include: siderite, sphalerite, jamesonite, galena, pyrite, tetrahedrite, minor boulangerite, and iron oxides. In 1962, trenching indicated a traceable length of about 1,500 feet, and diamond drilling, a width of 7 feet to a depth of between 250 and 300 feet (Canadian Mining Journal, Jan. 1963, p. 85). A jamesonite-tetrahedrite zone was reported to have been found east of the above showing during the 1963 season (Western Miner and Oil Review, July 1963, p. 46).

ROSS CREEK AND SEATTLE CREEK AREA

C.D. Poli and A.A. Smith (63°52 1/2'N, 136°05'W)

References: Bostock (1947; 1948).

During the summer of 1963, Poli and Smith discovered and subsequently staked ground in this area underlain by massive blue-grey quartzite similar to that on Keno and Galena Hills. At year-end they held 51 claims. The quartzite underlies the steep upper slope and part of the plateau surface that is developed on the hill forming the south side of the valley of South McQuesten River between Ross Creek and Seattle Creek. A major north-trending fault that passes through Mount Haldane about 1.2 miles west of the triangulation station appears to have displaced the quartzite to the north of the projected extension from Mayo map-area (Bostock, 1947). The quartzite can be traced to west of Seattle Creek where it appears to project into the drift-covered valley of the South McQuesten River. Poli and Smith did considerable bulldozer trenching on the claims and found some galena float. The claims are worthy of careful prospecting in that they are underlain by quartzite similar to that considered favourable on Keno and Galena Hills and are in an area that is not known to have been prospected in the past.

SNAKE RIVER AREA

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

Reference: Green and Godwin (1963, pp. 15-18)

Crest Exploration Limited, a wholly-owned subsidiary of the California Standard Company, holds 527 iron claims in the Yukon and 190 claims in the Mackenzie District of the Northwest Territories.

These claims, most of which were staked in the spring of 1962, cover a major sedimentary iron (hematite) deposit.

In March 1963, Proctor Construction Company Limited moved equipment, under contract, to the Snake River area. A gravelled, 4,300 foot airstrip (65°21 1/2'N, 133°20'W) was constructed parallel to the Snake River and is connected to the main camp (about 9 miles southeast of the airstrip) by a road. Transportation to the property was supplied by company aircraft operating from Whitehorse and chartered aircraft from Mayo, Y.T. Up to five light helicopters were employed on the property.

From early June to early October 1963, a crew of up to 70 men was employed on the property. Work carried out during the season consisted of diamond drilling, sampling, claim surveys, and limited geological mapping. Four diamond drills recovered a total of about 10,000 feet of mainly AX core. Holes, generally between 200 and 600 feet long, were occasionally extended to 800 feet. About 120 tons of samples were shipped from the property, including a 52-ton bulk sample sent to the Mines Branch of the Department of Mines and Technical Surveys for beneficiation tests.

During the summer there were a large number of visitors to the property including a delegation from the Japanese Iron and Steel Federation.

DAWSON MINING DISTRICT

KLONDIKE AREA

Eldorado and Bonanza Creeks

Klondike Lode Gold Mines Limited (63°54'N, 139°18'W)

References: Skinner (1961, pp. 31-32; 1962, pp. 30-31); Green and Godwin (1963, p. 19).

The company was inactive in 1963.

OLD CROW RANGE AREA

British Mountains Syndicate (67°30'N, 140°54'W)

References: Norris, Price, and Mountjoy (1963); The Northern Miner (19 December 1963, p. 12).

During the 1963 field season British Mountains Syndicate staked 48 mineral claims (Fox 1-49) near the Yukon-Alaska boundary about 28 miles northwest of Old Crow and 5 miles north of the Porcupine River. Participants in the syndicate are McIntyre Porcupine Mines Limited, Falconbridge Nickel Mines Limited, Conwest Exploration Company Limited, Area Mines Limited, Leitch Gold Mines Limited and Highland-Bell Limited jointly, and Frobex Limited, which is managing the syndicate.

The claims, in the vicinity of the tungsten showings mapped by Norris et al (1963), are reported to cover an extensive area containing lead-zinc mineralization with low precious metal values (The Northern Miner, 19 Dec. 1963, p. 12).

FIFTEENMILE RIVER AREA

Silver City Property (64°19'N, 139°50'W)

References: Cockfield (1928b, pp. 8A-10A)*; Green and Roddick (1962); Green and Godwin (1963, p. 20).

J. Risco of Dawson, Yukon, owns 7 claims in the Silver City area on the right limit of Yukon River, at the bend below the mouth of Fifteenmile River, 22 miles northwest of Dawson. L. Patnode of Whitehorse and W. Kaufman of Dawson optioned the property late in the 1962 season, and during March 1963 staked an additional 39 claims in the area.

The area carries silver-lead and antimony occurrences. Cockfield (1928) reported a 5-ton shipment of hand-sorted material from float on the beach. Talus above the beach contains blocks of quartz-carbonate rock that contain nickel-bearing serpentine, disseminated galena, and a few specks of tetrahedrite. Country rock consists of crumpled, chloritic and quartz sericite schists, and shattered greenstones (unit D, Green and Roddick).

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 576-578).

The deformation of the country rock may be due to structures related to the Tintina Trench, only 3 miles to the northeast.

During 1963, Kaufman and up to 2 helpers, drove a 3-foot by 5-foot adit to a total length of 276 feet, most of which was driven using hand steel. Late in the summer 3 cuts, totalling approximately 40,000 cubic feet, were hydraulicked in the overburden. Equipment used in this operation included a 2-stage centrifugal pump driven by a 240 hp gas motor. A cut about 350 feet vertically below the adit encountered galena-rich float.

FORTYMILE AREA

Clinton Creek

Clinton Creek Asbestos Group (64°27'N, 140°42'W)

References: Western Miner and Oil Review (Jan. 1959, p. 42); Green and Roddick (1962, pp. 15-16).

The Clinton Creek claim group of 153 claims is wholly owned by Cassiar Asbestos Corporation Limited, a corporation in which Conwest Exploration Company Limited has the managing interest. The claims on Clinton Creek are about 45 miles northwest of Dawson, Y.T. Access is provided by a 5-mile jeep road to the Fortymile River and by two airstrips. One airstrip is 1,900 feet long and 1 mile from base camp; the second, constructed in the fall of 1963, is 4,500 feet long and 1 1/2 miles from camp. When the water level is high, float planes land on the Fortymile River; when the water level is low, they land on the Yukon River near the abandoned town of Fortymile. A road from the northern side of mile 34 on the Sixtymile Road was constructed in 1958, but this has been abandoned.

Asbestos was discovered on Clinton Creek by G. Walters, and staking of the area in 1957 was financed by the Caleys (all of Dawson, Y.T.). The property was then optioned by Conwest Exploration Company Limited in 1957. In September 1957, Cassiar Asbestos Corporation Limited optioned the property from Conwest and, during 1960, purchased the prospectors' interest for cash, fulfilled their option with Conwest, and gained complete ownership of the property.

Base camp, established in 1957, is at the junction of Clinton Creek with Porcupine Creek. Four asbestos showings occur in the vicinity of the camp, and they are:

(1) Porcupine Hill, southwest of camp.
(2) Snowshoe Hill, south of camp.
(3) Wolverine Hill, northeast of camp.
(4) Trace Hill, north of camp.

The Porcupine Hill showing is the most interesting one to date. In 1957, about 9,300 feet of surface trenching was done, and in 1957 and 1958, two adits were driven on the 1,220-foot level and the 1,320-foot level that totalled 4,100 feet. A detailed magnetometer survey over the hill was carried out early in 1963, and a possible western extension of serpentine that was indicated by this survey was tested with a NX-coring diamond drill. The program began in 1963 and will be continued in 1964.

On Snowshoe Hill, in 1957 and 1958, about 5,700 feet of trenching was done, and an adit and crosscut totalling 1,200 feet was driven on the 1,180-foot level. Although some of the surface trenches contain good fibre, only minor cross fibre was encountered underground. The deposit is, consequently, considered to be shallow and bowl-shaped.

On Wolverine Hill trenching in 1957 encountered mainly surface fibre in what appears to be a minor showing.

Trace Hill, in the past, has had very little work done on it. Surface prospecting in 1963, however, turned up interesting fibre, and 4,500 feet of trench were excavated. Trenching was followed by drilling late in the summer.

On all the showings there has been a total of about 25,000 feet of trenching. The Annual Report of Cassiar Asbestos Corporation Limited for the year ended 30 September 1958 (Western Miner and Oil Review, Jan. 1959, p. 42), reveals that a total of 5,300 feet of drifts and crosscuts were driven under the showings exposed by trenching. In conjunction with the underground work, 5 separate bulk samples totalling 423 tons were shipped to Cassiar and milled on a production scale to determine the fibre content and recovery. Smaller samples were run in the pilot mill to obtain the distribution of values as a check on the bulk sampling. The work was carried out under the direction of the general superintendent, N.F. Murray, who reports more than 5,000,000 tons of high-grade asbestos ore indicated to 50 feet below the adit level with a waste-to-ore ratio of approximately 2 to 1.

In 1963, engineering and geological work was done on the property to permit future planning. At base camp a crew of up to 25 men was under the supervision of geologist R.A. Dodge. A claim survey was conducted and survey lines were used as magnetometer lines. In addition, a grid over the showings adjacent to the camp was established for detailed magnetometer work. A total of 32.8 miles of magnetometer survey was conducted. Other work included the construction of a new airport, and prospecting by 3 parties that used pack dogs in the area roughly bounded by the Yukon River, the Yukon-Alaska border, and the Sixtymile Road.

The asbestos occurs in reddish brown weathering, dark green serpentinized ultrabasic rocks (unit A, Green and Roddick, 1962), which apparently intrude a quartzite, schist, and gneiss unit (unit C) that also includes minor crystalline limestone. In the vicinity of the base camp units include: (i) dark green serpentine, (ii) quartz-carbonate rock, (iii) platy slate, phyllite, and blocky quartzite.

Serpentine bodies on the property are probably irregular, but the one on Porcupine Hill appears to strike northeasterly and dip to the northwest. Fibre is associated with concentrations of magnetite, and serpentine that is often bleached light green. Underground, in Porcupine Hill, excellent cross-fibre stringers were noted; locally these stringers formed a rhombohedral pattern on faces of drifts. Plus 5 per cent visible fibre is considered, from an exploration point of view, to be of "ore" grade.

Quartz carbonate rock envelops the serpentine bodies. Locally, the quartz-carbonate contains chrome mica (fuchsite), nickeliferous serpentine (garnierite), and altered serpentine. In the trenches the quartz-carbonate rock is distinguished by its rusty buff-weathering. The enveloping quartz-carbonate alteration is characteristic of all the Clinton Creek showings and is similar to the alteration around the Cassiar Creek asbestos showing that is about 18 miles to the southeast.

Country rock, apparently intruded by the serpentine, is mainly black to grey platy phyllite and argillite. Light brown to grey quartzite with good foliation occurs in several localities near the showings.

Prospecting in the area is extremely difficult, owing to overburden and abundant vegetation. Creep has moved bedrock for considerable distances from its origin and makes geological mapping difficult. Dip-needle surveys or other magnetic methods are undoubtedly valuable aids in locating serpentine deposits in the area. The best indication of asbestos is found beneath the vegetation as a brownish grey asbestos fibre mat, which may be as much as several inches thick.

Cassiar Creek

Caley Asbestos Property (64°18'N, 140°12'W)

Reference: Green and Roddick (1962, pp. 15-16).

The Caley asbestos property, owned by F. Caley and associates of Dawson, Yukon, consists of 43 claims. The property is on the north side of Cassiar Creek, 2 miles upstream from the Yukon River. A road was constructed in 1958 from near mile 29 on the Sixtymile Road to the property, but it has been abandoned.

The asbestos deposit, originally staked by F. Caley and associates in 1956, was optioned by Conwest Exploration Company Limited, and subsequently was transferred to Cassiar Asbestos Corporation Limited in September 1957. When Cassiar Asbestos Corporation Limited dropped their option in August 1963, the property was immediately re-optioned from Caley and associates by Canadian Johns-Manville Company Limited. During the remainder of the 1963 field season the latter company carried out surface exploration on the property.

In 1959 Cassiar Asbestos Corporation Limited drove 2 northwesterly trending adits, totalling 1,180 feet. Bulk samples, totalling 3 1/2 tons and test milled at Cassiar, B.C., indicated that the value of recoverable fibre was low.

The crysotile asbestos deposit is in a lens-like body of serpentine (unit A, Green and Roddick, 1962) that roughly strikes northeast and dips, approximately parallel to the topography, to the southeast. The top part of the lens has apparently been eroded. The serpentine is enveloped by carbonate alteration, and intrudes quartz mica schist (unit D).

CASINO CREEK AREA

J. Meloy (62°42 1/2'N, 138°50'W)

References: Bostock (1936a, pp. 43-44); Little (1959, p. 18).

J. Meloy owns 16 claims near the head of Casino Creek. In 1963, Rio Tinto Canadian Exploration Limited, and its affiliate the Yukon Consolidated Gold Corporation Limited, optioned these claims and staked an additional 32 claims in the area. The property may be reached by a 4-mile cat road that branches off the Canadian Creek truck road, about 14 miles from where it leaves the Yukon River near the mouth of Britannia Creek.

Two prospects on the property, known as the Helicopter and Bomber showings, occur about 3,000 feet apart and are near two small tributaries of Casino Creek at an approximate elevation of 3,500 feet. Outcrop between the showings and in the general vicinity is almost negligible due to talus, buckbrush, and trees. Only the ground exposed by trenches, excavated in 1950 by Meloy, was seen by Godwin when the property was visited in the middle of August 1963. Since his visit the optioning companies, under the direction of B. Hester, carried out a trenching, mapping, and sampling program that was concentrated on the Bomber showing. A total of about 4,340 feet of trench was cut or deepened with a small bulldozer over the period from 16 August to 20 September 1963.

On the Helicopter showing a vein is exposed by 3 trenches and several small pits. The intersection of vein material in the trenches and pits indicates that the vein strikes northwest and dips steeply. Vein material is mainly galena with white anglesite alteration, some quartz, and some black manganese stain. A grab specimen of massive galena taken by Godwin from a 6-inch width of vein exposed in a pit assayed*: 0.02 ounce of gold and 12.4 ounces of silver to the ton, 56.8 per cent lead, and 0.8 per cent zinc. Country rock surrounding the vein is medium-grained granite, which is generally strongly weathered and decomposed.

The Bomber showing, the larger of the two showings, consists mainly of four subparallel, steeply dipping, northwesterly trending veins, which are exposed by one shaft, and six trenches that are at approximate right angles to the veins. Although the veins are not a constant distance apart along their length, in one trench the four veins were spaced at 50-foot intervals. Veins are up to 5 feet wide and are marked by the following:

(1) white crystalline barite;
(2) galena and white anglesite alteration that tends to occur as discontinuous lenses;
(3) brown limonite;
(4) black manganese stain concentrated on fractures;
(5) crystalline and locally vuggy quartz;
(6) white alteration (kaolinization(?)) of the country rock adjacent to the vein.

Country rock is the same decomposed medium-grained granite that was found on the Helicopter showing.

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

The most southwesterly vein on the Bomber showing is apparently the shortest and weakest of the four veins, and is marked mainly by black manganese stain. Some galena and barite float, however, was found near the vein in the bottom of a trench. The strongest vein noted was the most northwesterly one. It had an exposed length of about 200 feet and extended up the hillside over a change in elevation of about 50 feet. A shallow shaft, sunk on this vein, had sloughed at the bottom so that only the upper 7 feet of the vein was visible. The exposed part of the vein was 3 feet wide, bordered by gouge, and about one-tenth galena in surface area. One pod of galena was 5 inches wide and a grab specimen of this pod, taken by Godwin, assayed*: 0.04 ounce of gold and 108.6 ounces of silver to the ton, 61.5 per cent lead, and trace zinc. The greatest width of galena (2 1/2 feet) noted on the property was from the vein immediately to the southwest of the strongest one noted above. A grab specimen, taken by Godwin from this 2 1/2-foot width, assayed*: 0.01 ounce of gold and 275.4 ounces of silver to the ton, 66.5 per cent lead, and no zinc.

Fresh porphyritic, biotite, hornblende granite with phenocrysts up to 1/2 inch long outcrops on the ridge, about 3/4 of a mile to the north of the property. On the eastern end of this ridge occurs a rounded dome of Tertiary(?) quartz feldspar porphyry that is similar to that mapped in the Carmacks sheet (Bostock, 1936a). Creeks near this dome have deposits of rusty-red limonite (Little, 1959).

HAYSTACK MOUNTAIN AREA

McKinnon Creek

Canex Aerial Exploration Limited (63°41'N, 139°07 1/2'W)

References: McConnell (1905, pp. 65B-66B)**; MacLean (1914, pp. 62-71); Bostock (1942).

Late in 1963, Canex Aerial Exploration Limited staked 40 quartz claims on McKinnon Creek, covering an area of Eocene conglomerate that is known to contain gold values. The area was originally staked at the turn of the century by the McKinnon brothers and C. Fothergill. McConnell (1905) and MacLean (1914) described the earlier work, and Bostock (1942), the Eocene conglomerate.

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

** Reprinted in Geological Survey of Canada Memoir 284 (Bostock, 1957, p. 109).

WHITEHORSE MINING DISTRICT

CARMACKS AREA

Freegold Mountain

Ormsby Mines Limited (Laforma Property, 62°16'N, 137°06'W)

References: Bostock (1936a, pp. 52-56; 1941, pp. 22-26); Johnston (1937); Skinner (1961, pp. 33-35; 1962, p. 34); Green and Godwin (1963, pp. 20-23).

Ormsby Mines Limited, controlled by Consolidated Discovery Yellowknife Mines Limited, holds 32 leased claims that include the original Laforma Group covering gold showings in the vicinity of Freegold Mountain. The company purchased the property in 1960 from W.J. Langham, G. Fairclough, and the late E. Forrest. Access to the property is via a 42-mile truck road from Carmacks, Yukon.

During 1961 and 1962 Ormsby Mines Limited improved the access road, constructed a camp, and collared and drove the No. 4 level, elevation 3,350 feet, a total of 1,364 feet.

From 2 June to 10 December 1963, drifting on the No. 4 level was extended 1,397 feet and 18 BX diamond drill holes totalling 2,031 feet were drilled from underground stations to explore the extension of both the Pal vein and the stronger G-3 vein. J.C. Byrne, President and Managing Director of Ormsby Mines Limited, in a letter to the shareholders (16 December 1963) summarized development as follows:

> "The main ore shoot in the G-3 zone which lies north of any work on upper levels has been drifted for a length of 372 feet. Average grade is 1.29 ounces per ton over a width of 4 feet and the last drift face is still in ounce ore over a width of 3.5 feet. The G-3 zone on this level has now been drifted for a length of 1,000 feet of which 444 feet has been in ore which should mine out at $38.45 per ton over a width of 5 feet after allowing for dilution. This is 185 tons per vertical foot ...."

The G-3 zone strikes about N25°E and dips steeply northwest. In addition to the above work on the No. 4 level, the Rambler vein was mapped, and 10 AX holes totalling 2,077 feet were diamond drilled from the surface. Work on the property was facilitated by an assay laboratory in the camp.

Byrne (letter to shareholders, 16 December 1963) has announced an extended development program in 1964 that will include: further drifting on the No. 4 level, extending the drifts on the upper levels, and raising and diamond drilling from the No. 4 level to the surface and to 300 feet below the No. 4 level. Good values found by the above would result in the driving of a low-level production adit, 500 feet below the No. 4 level, and the establishment of a permanent plant in the valley of Seymour Creek.

The G-3 zone is continuous and marked by faulting and clay-like alterations. The zone, in part, follows a quartz porphyry - granite contact, but generally is within granodiorite. When visited by Godwin at the beginning of August the following was exposed on one face in the G-3 on the No. 4 level.

(1) The hanging wall was altered granodiorite that contained minor pyrite stringers and one set of tourmalinized joint surfaces.

(2) A 4 1/2-foot wide zone (G-3) striking N 20°E and dipping 80° northwest comprised: (i) a 1-foot width, hanging-wall side, that contained pyrite and arsenopyrite, and was distinctly banded with soft, black tourmaline and broken pieces of vein quartz; (ii) a 3 1/2-foot width, footwall side, that contained abundant light brown clayey gouge and pods of graphite, but notably contained only minor vein quartz.

(3) The footwall was slightly altered granodiorite.

When visited by the writers at the beginning of November an 8-inch wide quartz vein that paralleled the Pal vein and was about 10 feet from it in the hanging wall had been drifted along for 40 feet, but the vein appeared to be discontinuous. Seventy feet of drifting has also been done along the Pal zone.

Victoria Mountain

Mount Nansen Mines Limited (62°04'N, 137°10'W)

References: Bostock (1936a); Green and Godwin (1963, pp. 23-24).

Early in 1963 Mount Nansen Mines Limited was formed by members of Mount Nansen Exploration Syndicate, namely: Conwest Exploration Company Limited and Central Patricia Gold Mines Limited, Faraday Uranium Mines Limited, Kerr-Addison Gold Mines Limited,

Newmont Mining Corporation of Canada Limited, Noranda Mines Limited, J. Rankin, and Rio Tinto Canadian Exploration Limited, to explore a gold-silver property about 14 miles south of the Laforma property and about 40 miles west of Carmacks. Field work was supervised by Newmont Mining Corporation of Canada Limited.

About 269 claims, most of which are on the crest or along the westerly facing slope of the ridge extending south from Victoria Mountain, are held by the company. The main or Webber showing is near the head of Webber Creek (a left limit tributary of Nansen Creek) at an elevation of about 4,500 feet, and is about 5 miles south-southwest of Victoria Mountain. Topography in the area is well rounded and unglaciated. The property may be reached by a 20-mile winter road, which crosses over Victoria Mountain and starts at the Carmacks - Laforma road about 32 miles from Carmacks. Access to the property is also provided by a 7-mile tractor road from Victoria Lake, which is suitable for float-equipped aircraft. The airstrip near Victoria Lake is soft and unusable during the summer.

In mid-April the company moved a trailer camp and equipment to the property. From late May to the end of August work included: about 450 feet of longitudinal stripping, detailed sampling, and mapping of the Webber Creek vein; 3 (mainly BX core) diamond-drill holes totalling 1,075 feet in the Webber Creek vein; about 30,000 feet of shallow bulldozer trenches and geochemical sampling of same; about 850 feet of longitudinal stripping, detailed sampling, and mapping of the Cabin Creek vein, which was discovered in 1963 by the geochemical-trench survey. Up to 15 men were employed. The camp and equipment were removed from the property in mid-November.

Outcrop is poor near the veins, but scattered outcrops suggest that much of the area may be underlain by metamorphic rocks of the Yukon Group (unit 1, Bostock, 1936a). These rocks range from fine grained to augen gneisses with a variable content of mafic minerals. On the ridge to the north of the showing, the Mount Nansen Group (unit 7) consists of volcanic conglomerate with well rounded cobbles, chiefly of volcanic rock, but including a few of gneiss, in a tuffaceous matrix. On the ridge to the east of the showing, quartz porphyry (unit 13) is fine grained and contains scattered quartz and feldspar phenocrysts to about 3 mm in size. Granitic rocks (unit 10) occur about 9,000 feet east-southeast of the Webber Creek vein near the Brown McDade camp.

When visited by the writers in late June, the Webber Creek vein had been trenched and sampled for a length of about 450 feet. The vein strikes about N 35°W and dips steeply. The vein material appears to consist of a hard core of silicified material to a few feet in thickness bounded by soft rusty weathering zones. Mineralization consists of a

few pods of galena and dark quartz containing finely disseminated sulphides. Green scorodite staining is common. Much of the wall rock is heavily altered, probably to clay minerals. It is believed to include both gneiss of the Yukon Group (unit 1) and younger intrusive rocks (unit 13) ranging from rhyolite to quartz porphyry.

The company reports that surface sampling of the vein outlined three sections of interest:

(1) length 34.0 feet; average width 3.8 feet; average grade: 0.44 ounces of gold per ton, and 56.58 ounces of silver per ton.

(2) length 70.0 feet; average width 3.8 feet; average grade: 0.65 ounces of gold per ton, and 60.9Z ounces of silver per ton.

(3) length 81.0 feet, average width 4.2 feet; average grade: 0.47 ounces of gold per ton, and 19.68 ounces of silver per ton.

No significant intersections were found in diamond drilling the vein. Core recovery in the deeply weathered and altered rocks was good because face-ejection bits, swivel-tube core barrels, and drilling mud were used.

Later in the season, the company carried out an extensive geochemical program. Sampling was done in bulldozer trenches dug to a depth of 2 feet beneath the volcanic ash layer that in this area lies immediately beneath the vegetation and is up to a foot thick. Samples, taken at 15-foot intervals, were generally assayed for zinc and antimony.

The Cabin Creek vein, about 2,000 feet south of the Webber vein, was found by this program. The vein strikes about N45°W and dips steeply. The vein was stripped for 850 feet and exposed for 550 feet (a 300-foot section in the centre was not stripped to bedrock). Sampling indicated one interesting section 110 feet in length.

MOUNT NANSEN AND KLAZA RIVER AREA

Dickson Yukon Prospecting Syndicate (approximately: 62°00'N to 62°15'N, 137°15'W to 138°00'W)

The Dickson Yukon Prospecting Syndicate, under the direction of prospector G. Dickson, Whitehorse, Y.T., holds 40 claims

near the Revenue Copper property (62°19'N, 137°16'W), 24 claims on the east end of Freegold Mountain (62°16'N, 137°03'W), and 200 claims in the Vangorda Creek area (centre approximately 62°15'N, 133°15'W). The syndicate, formed in April 1963, includes: Faraday Uranium Mines Limited, Homestake Mining Company Limited, Union Carbide Corporation Limited, United States Smelting, Refining and Mining Company Limited, Violamac Mines Limited, and T. Lindsley interests. Other individuals and companies have also invested in the syndicate.

During 1963, prospecting was done mainly in the area west of Mount Nansen to the Klaza River. In the field, Dickson supervised the operation of 8 men and one D-7 bulldozer. Nothing of particular interest was found and no claims were staked on the basis of the prospecting in the above area.

DEZADEASH AREA

Sockeye Lake

Johobo Mines Limited Copper Property (General Enterprises Limited) (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).

Johobo Mines Limited, owned by H. Johannes, H.E. Boyd of Whitehorse, and H. Honing of Leofnard, Sask., has a 58-claim copper property 2 miles southeast of Sockeye Lake and 18 miles south of Haines Junction. An option on the property held by Dominion Explorers Limited was dropped early in 1963, and the property was inactive during the summer. General Enterprises Limited of Whitehorse, Yukon, optioned the property late in 1963 and re-opened the 18-mile access road from mile 143 Haines Road in preparation for work planned for 1964.

Kathleen River

Rex Asbestos Prospect (60°44'N, 137°18'W)

References: Kindle (1953, p. 39); The Northern Miner (26 September 1963, p. 13); Skinner (1961, p. 38; 1962, p. 35).

The Rex Asbestos Prospect, owned by P. Johnson, H.C. Fromme, W.V. Abraham, and the V. Noble estate, consists of 50 claims and 5 fractions. The main showing, elevation 2,750 feet, occurs between two distinct knolls, which are 2 1/2 miles northwest of the junction of Quill Creek and Kathleen River. The access road to the property is 6 1/2 miles long and leaves the eastern side of the Haines road at mile post 152.

Asbestos float was discovered at this locality in the autumn of 1953 by V. Noble, and some trenching was done by Noble and associates in 1957 and 1958. Canex Aerial Exploration Limited optioned the property in November 1958 and explored it in 1959. In 1960, Nicolet Asbestos Corporation optioned it and conducted a magnetometer survey on the property. In August 1961, Spooner Mines and Oils Limited optioned it and did further exploratory work.

The Consolidated Mining and Smelting Company of Canada Limited optioned the property in June 1963. During the summer the company mapped the area geologically, and carried out a magnetometer survey that outlined three anomalous areas 5,000 to 7,000 gammas above background. On the basis of the latter and previous trenching, five holes were drilled. The drilling operation was shut down in mid-October.

One of the anomalous areas coincided with the early trenching. Fibre to a maximum length of about 7/8 of an inch is found in the peridotite exposed in these trenches. Drill holes R-1 and R-5 are located on the trenches. Hole R-1 was drilled at minus 40 degrees on a bearing of N50°E. BX core, recovered from 19 to 231 feet, contained cross fibre and slip fibre in the upper 100 feet of the hole. The lower part of the hole was in partly serpentinized peridotite. Hole R-5 was drilled at minus 49 degrees on a bearing of N30°W. BX core was recovered from 13 to 143 feet. Slip fibre and minor cross fibre in brecciated zones occurred near the top of the hole, but barren peridotite occurred at the bottom.

Drill hole R-4, situated on another anomaly about 1,500 feet southeast of holes R-1 and R-5, was drilled vertically to a depth of 79 feet. No bedrock was encountered and water return was lost.

Drill holes R-2 and R-3, on the remaining anomaly, were drilled approximately 2,400 feet southeast of R-1 and R-5. R-2, drilled to a depth of 147 feet at minus 69 degrees on a bearing of N50°E, did not encounter bedrock. AX core from hole R-3, drilled vertically in the same area, was recovered from 197 to 231 feet. The core is mainly coarsely crystalline peridotite containing a very minor amount of slip fibre.

Exploration on the property was difficult because of deep overburden and the shortage of water beyond early summer. Drilling, during late summer and fall, was sustained by trucking water several miles from Quill Creek.

ANVIL RANGE AREA

Vangorda Creek Property (62°15'N, 133°12'W)

References: Northern Miner (22 March 1956; 8 April 1957); Roddick and Green (1961).

The Vangorda Creek property extends from the southwestern base of Mt. Mye southward to a small unnamed lake (locally referred to as Shrimp or Jacknife Lake) that is 6 miles southsouthwest of Mt. Mye. Access to the property, which is 125 miles northeast of Whitehorse, is either by Shrimp Lake, suitable for float-equipped aircraft, or by an airstrip near the main deposit. A 12-mile access road that, in part, follows Blind Creek from the Pelly River was used during development of the property.

The original showing on this property was staked in July 1953 by A. Kulan and associates. Prospectors' Airways Company Limited optioned the claims in 1953 and explored the property. Vangorda Mines Limited was formed on 26 September 1955, with Prospectors' Airways Company Limited holding the controlling interest. Since a merger in November 1963 the controlling interest is held by Kerr-Addison Gold Mines Limited. On the Vangorda property, at the date of the merger, Vangorda Mines Limited owned 48 claims and 5 fractions, Prospectors' Airways Company Limited owned 34 claims and 5 fractions, and Kerr-Addison Gold Mines Limited owned 64 claims. A total of 41 claims had been surveyed.

Early development work on the property included: a magnetometer survey, a geochemical soil survey, a gravitymeter survey, a self-potential survey, and vertical diamond drilling.

Four major geochemical anomalies and numerous magnetic anomalies were discovered on the property. The main deposit occurs near the edge of the largest geochemical anomaly. This anomaly is elongated to the west away from the deposit in the apparent direction of drainage. Numerous magnetic anomalies also occur near the main deposit. The drilling that was done in 1954 and 1955 indicated 9,400,000 tons averaging 3.16 per cent lead, 4.96 per cent zinc, 0.27 per cent copper, 1.06 ounces of silver per ton, and 0.02 ounces of gold per ton (The Northern Miner, April 1957). Exploration in the area was continued to 1956, but no large tonnage was added.

During a brief visit to the property in September 1963, the writers examined drill core and a three-dimensional model of the drilling stored on the property, and the surface showing on Vangorda Creek.

The model shows the main deposit to be about 3,000 feet long by 480 feet wide. The sulphide deposit lies just below the unfrozen overburden at depths from 20 to 80 feet. The thickness of the sulphide zones averages about 50 feet, but ranges from 25 to 300 feet, suggesting lens-like replacements.

The drill core indicates that most of the property is underlain by black graphitic schist and light greenish grey quartz-chlorite-sericite schist (Roddick and Green, 1961, unit 7). The rock has strong foliation and banding. The latter, which may represent bedding, has frequently been folded into small S-shaped folds by movement along and adjacent to the folia. Where present, sulphides have partly or completely replaced the schist parallel to its foliation. Disseminated sulphides seem to be concentrated in quartz-rich bands of the schist and massive sulphides retain a banded appearance. Sulphide minerals include: dark brown sphalerite, pyrite, pyrrhotite, galena, and chalcopyrite. Other rock types noted in the core are white quartz-feldspar porphyry, fine-grained basic dykes, and magnetite-bearing serpentine.

The main surface showing outcrops immediately north of the base camp along a tributary of Vangorda Creek. It consists of massive fine-grained sulphides exposed for a length of 120 feet and a vertical height of about 12 feet. Distinctive, recent, rusty conglomerate consisting mainly of schist fragments cemented by iron oxide occurs near the showing. Other outcrops include granitic rocks (Roddick and Green, 1961, unit 11) that have intruded and altered the schists in the northern part of the property, and a dense green siliceous rock and limestone with skarn bands in the southern part of the property.

WHITEHORSE AREA

Whitehorse Copper Belt

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

References: McConnell (1909); MacLean (1914, pp. 159-165); Cockfield and Bell (1926, pp. 48-49; 1944, pp. 18-19); Cockfield (1928a, pp. 14-18)*; Wheeler (1952, pp. 11-15); Dominion Bureau of Statistics (1957, p. 119); Skinner (1961, p. 38); Wheeler (1961, pp. 137-142); Kindle (1963); Geological Survey of Canada (1963c).

New Imperial Mines Limited undertook an extensive exploration and development program during 1963 on a number of old copper properties** in the Whitehorse copper belt. This northwesterly trending belt, reached by secondary roads, is about 4 miles southwest of Whitehorse and roughly 16 miles long by 3 miles wide.

Until the present program little work has been done on the belt since 1947. At the end of 1963, the company owned 225 mineral claims and one crown-granted mineral claim. The company also held options on 62 mineral claims and 17 crown-granted mineral claims. Estimated total tonnage at the end of 1963 in the properties drilled by the company was about 1,600,000 tons (Dr. A.C. Skerl, personal communication). A tentative mill site has been picked out. Much of the following material is drawn from McConnell's authoritative report (1909), and Wheeler's (1961) compilation of reports on the belt.

The history of the Whitehorse copper belt dates back to the early Klondike gold rush. Discoveries of copper-bearing outcrops are reported to have been made by miners on their way to Dawson in the summer of 1897. The discoverers were hunting at the time, and the finds were not located. The credit for staking the first claim goes to Jack McIntyre, who located the Copper King on 6 July 1898. By the end of the following year most of the district had been thoroughly prospected on the surface, and most of the important claims had been discovered and staked.

The first shipment of ore was made in 1900 from the Copper King mine. The shipment was made up of 9 tons of rich bornite ore, and is stated to have yielded 46.40 per cent copper. Other early shipments included: a small one from the Valerie in 1903, a second of 460 tons from the Copper King in 1903, and a 170 ton

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* Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 581-585).

** For locations of properties see Figure 1.

shipment of selected ore from the Arctic Chief in 1904. Very little work was done in the years 1904 to 1905, but the rising price of copper in 1906 revived interest in the camp. The copper production of the Yukon from 1900 to 1930 was 13,062,512 pounds, valued at 2,711,695 dollars (Dominion Bureau of Statistics, Canadian Mineral Statistics, 1957, p. 119); undoubtedly almost all of this came from the Whitehorse Copper Belt. Except for two minor years in 1929 and 1930, the belt has had no recorded production since 1920.

Development to 1907 was considered by R.G. McConnell (1909, p. 2) to be remarkably slow considering the many favourable showings. He attributed the slow progress to the delay in providing proper transportation facilities. Most of the important mines, at that time, were situated at distances of 4 to 7 miles from the White Pass and Yukon Railway terminus in Whitehorse, and were connected with it by wagon roads constructed by the Territorial Government. The transportation charges to Whitehorse by wagon were from 3 to 4 dollars per ton, and from Whitehorse by rail and steamer to the various coast smelters, 6 dollars per ton. The large iron-bearing deposits on which the camp depended were all comparatively low grade at that time, averaging about 4 per cent copper, so that the margin of profit under those conditions was small. White Pass, however, completed a 12 1/2-mile spur line in 1909 that went from McRae through the belt close to many of the important producers to the Pueblo mine. MacLean (1914) reported that this extension of railway facilities, along with a reduction in freight and smelter charges, had by 1912 reduced the total cost of transportation and smelting to approximately 5.14 dollars per ton. Cockfield (1928, p. 15A) noted a limitation of the deposits that was due to their irregular and bunchy character, which added considerably to the cost of mining.

Noranda Mines Limited undertook an extensive exploration program on the belt in 1946 and 1947. In this period exploration was concentrated on the Big Chief, Little Chief, Keewenaw, and Valerie properties. Options on the property were abandoned in 1948 after completing: hand trenching and bulldozing, 20 diamond drill holes totalling about 6,000 feet, self-potential surveys, dip-needle surveys, and geological mapping of the areas investigated.

Imperial Mines and Metals Limited, incorporated in 1954, held 42 claims on the belt and subsequently did some preliminary surface mapping and diamond drilling. In 1956, 11 drill holes totalling approximately 2,200 feet were drilled on the Best Chance property. At the same time a magnetometer survey of the Best Chance and the Arctic Chief property was conducted.

In 1957, New Imperial Mines Limited succeeded Imperial Mines and Metals Limited. Until 1962 the new company did only representation work on the copper belt. Geological mapping and a magnetometer survey was done on the Little Chief property in 1962.

On 24 May 1963, New Imperial Mines Limited commenced work on the belt under the direction of consulting geologist Dr. A.C. Skerl of Vancouver. Magnetometer surveys, self-potential surveys, 2 rotary-drill holes, and 74 diamond-drill holes totalling 15,929 feet were completed by 15 December 1963. Two diamond drills were operated most of the summer and a third was utilized later in the season. In addition, one Winkie portable diamond drill was used for preliminary exploration. Two drills were winterized and operated until 15 December 1963. Work was recommenced by the company on 13 January 1964. Around the clock drilling employed four men per machine. In addition, a drilling supervisor and up to six field men were employed.

On the belt, work by New Imperial Mines Limited during the 1963 season was concentrated on the following properties: Sue 9-16, Arctic Chief, Best Chance, Valerie, Cowley Park (site of the Sue 1-4 and Cowley Creek properties), and during the winter, on the Little Chief. The following brief summary of the geology of the belt and these properties is taken almost entirely from McConnell (1909) and Wheeler (1961, pp. 137-142).

General Geology

The deposits of the Whitehorse copper belt are of the contact metamorphic type and lie at or near the contact of the granitic rocks with the limestones of the Upper Triassic Lewes River Group. The chief ore minerals are bornite and chalcopyrite, which occur most commonly in a skarn composed of brown garnet, diopside, some epidote, and tremolite; they are also found in a magnetite-rich skarn at the Arctic Chief mine in the south-central part of the copper belt. Specular hematite is common in the ore from the Pueblo mine in the northern part of the belt.

In most places the contact between the limestone and the granitic rocks is masked by the skarn, which occurs partly in the altered granite and partly in the limestone. In the granitic areas the skarn is massive, and grades gradually into dark, dioritic-looking rocks, whereas, in many parts of the limestone areas the skarn shows a distinct banding. Bodies of copper sulphides, either as massive pockets or disseminated masses, are nearly always found in the skarn along the limestone-skarn contact.

Exposures are not plentiful along the copper belt, and much of the drift-covered area may conceal more deposits. The magnetite-rich skarns of the central part of the belt lend themselves to magnetic methods of exploration.

An airborne magnetic survey of the Whitehorse Copper Belt was flown in 1961 as part of a program carried out by the Geological Survey of Canada. The survey was flown at a nominal 1,000 feet above ground level (where terrain permitted), and flight lines were spaced at about 1/2 mile intervals. Map 1413G (Geological Survey of Canada, 1962) shows elliptical magnetic anomalies with a general alignment of their long axis parallel to the length of the belt. Only the Arctic Chief, however, coincides with the crest of an anomaly (about 100 gammas above background).

Sue 9-16 (northern belt)

The Sue 9 to 16 claim group, staked in 1963 by New Imperial Mines Limited, is approximately 1 3/4 miles south of the Pueblo Mine. Aeromagnetic map 1413G (Geological Survey of Canada, 1962) has a broad circular anomaly over this area, which is about 1 mile across and 200 gammas above background. The claims were tested with a ground magnetometer survey, a self-potential survey, and two rotary drill holes. The two geophysical surveys showed coincident anomalies, but the second drill hole, which hit bedrock through 205 feet of overburden, encountered artesian water and amygdaloidal basalt (Miles Canyon Basalt of Quaternary age) containing magnetite. The basalt is thought to be responsible for the magnetic anomaly.

Arctic Chief (central belt)

The Arctic Chief is at an elevation of about 2,700 feet above sea-level at the head of McIntyre Creek. It is accessible by a rough road 3 miles long from mile 913.4 on the Alaska Highway.

The orebody lies on the west side of a northerly trending limestone body intruded by altered quartz diorite of variable composition. The granitic rocks near the Arctic Chief are strongly mineralized over a width of 400 feet for a length of 1,000 feet along the limestone-quartz diorite contact. The mineralization gradually diminishes away from the orebody. Bornite and chalcopyrite occurs as lenses and as disseminated grains in a massive magnetite lode. Two adits connected by a 50-foot winze have exposed two lenses of magnetite that may be connected. The main lens, as exposed in the upper adit, which is about 65 feet below the surface, is about 250 feet

long and 25 to 40 feet wide. Two shipments made in 1904 and 1907 totalled 223 tons and exceeded an average of 5 per cent copper. The silver tenor of the ordinary shipping ores averages about 2 ounces to the ton; and assays of 147 ounces to the ton have been obtained from a tetrahedrite vein, a few inches to a couple of feet in width, intersected in the lower level.

In 1963, New Imperial Mines Limited diamond drilled 37 holes totalling 8,540 feet on this property. Overburden at the drill sites varied from 6 to 30 feet in depth. Estimated tonnage of the property is 400,000 (Dr. A.C. Skerl, personal communication).

Best Chance (central belt)

The Best Chance, elevation approximately 2,800 feet, lies about 1 mile north of the Arctic Chief, from which it can be reached by a rough road. It has the largest surface showing of cupriferous magnetite so far discovered in the belt. The outcrops of ore measure 360 feet in length, with a maximum width of 65 feet and an average width of about 30 feet, and project above the surface as a miniature range of low hummocky iron-garnet hills, from 6 to 20 feet in height.

Ore lies along a quartz diorite-limestone contact and both rocks are intensely altered near the contact. The zone of skarn is barely 50 feet thick. It is composed principally of andradite, diopside, actinolite, epidote, chalcopyrite, and magnetite. The copper minerals, which are associated with the magnetite, consist mostly of bornite and chalcopyrite, and minor carbonates and oxides.

Early development consisted of three shallow shafts and three open cuts. As previously noted, Imperial Mines and Metals drilled 11 holes totalling approximately 2,200 feet in 1956.

In 1963, New Imperial Mines Limited drilled 9 holes totalling 3,499 feet. Overburden at the drill sites was 6 to 20 feet deep. Estimated tonnage of the property is 300,000 (Dr. A.C. Skerl, personal communication).

Valerie (southern belt)

The Valerie, elevation approximately 2,800 feet, lies about 3 miles southeast of the Arctic Chief. It is accessible by a rough road 3 miles long from mile 910.2 on the Alaska Highway. The Valerie is the only claim in the southern part of the belt upon which much development work has been done.

The western part of the Valerie is underlain by limestone, and the eastern part by hornblende granite (?), passing in places into a diorite. The orebodies developed along the ragged contact between these rocks.

The workings consist of a 92-foot inclined shaft that affords a depth of 84 feet. From the foot of the shaft exploratory drifts, totalling 270 feet in length, have been run in various directions, partly in ore and partly in more or less altered limestone and diorite. Besides the main shaft, two other shafts, each about 20 feet in depth, have been sunk on promising outcrops of ore.

Copper minerals are irregularly distributed along the limestone-granodiorite contact and occur as massive lenses separated by lean stretches. The ores have no bornite, but consist of chalcopyrite and derived carbonates and oxides. Other minerals are arsenopyrite, magnetite, diopside, garnet, and calcite. About 40 tons of selected ore, obtained from the surface workings, are said to have averaged 18 per cent copper.

In 1963, New Imperial Mines Limited conducted a ground magnetometer and self-potential survey on the property. Four areas showed a coincidence of anomalies from both geophysical methods. Three drill holes totalling 643 feet were drilled on the property. No tonnage from this property is included in the overall tonnage of the belt.

Cowley Park (extreme southern belt)

The Cowley Park Group (site of the Sue 1-4, and Cowley Creek properties) lies at an elevation of approximately 2,450 feet, and is about 7 miles southeast of the Valerie. It is accessible by a 1/2 mile road from mile 2 on the Carcross Road.

Kindle (1963) shows the prospects to be in an east-west trending outcrop of Lewes River Group limestone, which is about 1/2 mile in length and completely surrounded by granitic rocks.

In 1963, New Imperial Mines Limited mapped the geology and ran a self-potential survey on the property. Ten diamond drill holes totalling 996 feet were drilled with a small, portable diamond drill. Bornite, chalcopyrite, and molybdenite were the main "ore" minerals encountered. No tonnage from this property is included in the overall tonnage of the belt.

Little Chief (southern belt)

The Little Chief, elevation approximately 2,800 feet, lies about 1/2 mile north of the Valerie, and is accessible via the same road.

The principal showing outcrops as a nearly solid cupriferous magnetite mass, over 100 feet long, and fully 50 feet wide. The magnetite has developed in highly crystalline limestone along a hornblende granite contact.

As previously noted, geological mapping and magnetometer survey was done on the property in 1962 by New Imperial Mines Limited. In 1963, the company drilled 13 holes totalling approximately 3,550 feet. Estimated tonnage of the property is 900,000 (Dr. A.C. Skerl, personal communication).

CARCROSS AREA

Montana Mountain

Giant Yellowknife Mines Limited (approximately: 60°02'N, 134°41'W)

Reference: Wheeler (1961, pp. 119-131).

Giant Yellowknife Mines Limited conducted a geological evaluation of most of the many properties in the Montana Mountain area. A five-man crew worked most of the season in this area. Work included general prospecting, geological mapping, and sampling of showings. In particular, the Venus mine and related properties, held by J.L. Phelps and J.D. Scott, were extensively examined. Wheeler (1961) summarized the geology and development of the properties in the area.

Jean Group (New Imperial Mines Limited) (60°04'N, 134°42'W)

References: Bostock (1941, p. 26); Wheeler (1961, p. 127); Skinner (1961, p. 38; 1962, pp. 35-36); Green and Godwin (1963, p. 26).

New Imperial Mines Limited holds the Jean group of 25 mineral claims, of which three are owned by M.R. and H.M. Watson of Carcross. The claim group, accessible by a 10 mile truck road, is situated about 7 miles south of Carcross on Montana Mountain.

The company optioned the gold, silver, lead property in 1960, and during 1961 and 1962 drove a 226-foot adit on the Jean claim in an attempt to intersect a northwesterly trending gold-bearing quartz vein. The vein outcrops above the adit on a talus slope and occurs in the southwestern part of a granodiorite stock.

In the first half of September 1963, the company diamond drilled one 40-foot horizontal hole from the end of the adit, but the vein was not intersected. In addition, a small amount of hand trenching was done on the surface showing of the vein, and minor bulldozer stripping was done on the nearby Gladys claim. Four men were employed on the project.

WATSON LAKE MINING DISTRICT

PELLY MOUNTAINS AREA

Ketza River

Ketzakey Silver Mines Limited (61°34'N, 132°13'W)

References: Skinner (1961, pp. 39-40; 1962, p. 36).

In the Ketza district, Ketzakey Silver Mines Limited hold 44 claims that include the Ketzakey silver-lead showing (Skinner, 1961; 1962). The property, about 30 miles south-southeast of Ross River, lies parallel to the Ketza River and straddles Cache Creek.

From 16 August to 15 September, W.J. Hay, representing the majority stockholder interest in the company engaged Alrae Exploration Limited of Vancouver to examine the property and nearby claims held by G. Fairclough of Carmacks, Y.T. An access road to the area was commenced preparatory to an exploration program planned for the Ketzakey and Fairclough properties in 1964. The road leaves the Watson Lake-Ross River development road about 8 miles southeast of the Canol Road and follows, in part, an earlier road to the property. About 10 miles of new construction to near the bend of Ketza River was completed.

Barite Mountain

P. Versluce (61°50'N, 133°00'W)

References: Kindle (1946, pp. 23-26); Wheeler, Green and Roddick (1960a).

P. Versluce holds three claims on Barite Mountain near Mile 118 on the Canol Road. During the summer of 1963, a tote road, about 1 2/3 miles in length, was built from the Canol Road to the showing. About 3 tons of barite were mined. The property was visited by Green in September.

Barite-bearing veins were discovered by Kindle's field party during reconnaissance mapping of the Canol Road. Kindle (1946, pp. 25-26) reported that the barite veins range from 1 foot to 10 feet in width, and are most abundant between elevations 4,800 and the top of the mountain at an elevation of 6,100 feet. They include more than a dozen strong veins, one of which, between elevations 5,950 and 6,100 feet, occurs in a zone of brecciated limestone 30 feet wide partly replaced by barite. Kindle estimated that about 50,000 tons of proved barite were present. Presumably much of the tonnage would be within the brecciated zone described.

The present exploration was confined to the base of two draws at an altitude of about 5,000 feet, as the mountain face rises too abruptly above this to permit extension of the road to a higher elevation. In this area, steeply dipping carbonate and quartzite (unit 4, Wheeler, Green, and Roddick, 1960a) appear to be thrust on shale and greywacke (unit 5), which strikes northwest and dips moderately to the southwest. Scattered barite veins to 3 feet wide were observed in one of the draws a few hundred feet above the base of the carbonate. The barite mined was hand sorted from talus near the probable location of the thrust. The potential of the deposit appears limited, as the barite veins are narrow, widely scattered, and occur on a steep mountain face.

McConnell River

Pelly Minerals Syndicate (61°36'N, 132°37'W)

Reference: Wheeler, Green, and Roddick (1960a).

In 1963, Pelly Minerals Syndicate - interests held by Canex Aerial Exploration Limited, Kerr-Addison Gold Mines Limited, Noranda Exploration Company Limited, and Homestake Mining Company - worked mainly near the head of McConnell River on a gold, silver, lead property about 27 miles south-southwest of Ross River. A group of 16 claims that covered the property was held by the syndicate, but by the end of 1963 all but 6 claims had lapsed. Access to the property is by foot or packhorse up McConnell River from a small lake (locally referred to as Grayling Lake), suitable for small float-equipped aircraft, which is 7 miles south of the property.

Three to five men, working from 30 June to 20 July 1963, examined a showing on the Cone No. 1 claim and some showings on the Cone No. 11 claim (lapsed November 1963). Work included hand trenching and pitting, magnetometer surveying, and sampling. In addition, prospecting was done in the general vicinity of the property and east toward Ketza River.

The main showing, visited by the writers in early September 1963, is trenched over an area about 35 to 70 feet. Sulphide mineralization apparently forms a sheet or lens-like mass that is up to 10 feet thick and possibly as much as 80 feet long (Dr. A.E. Aho, personal communication). The sulphides are within an altered volcanic unit (Wheeler, Green, and Roddick, 1960a, unit 6c). Locally white, coarsely crystalline marble is exposed in the trenches. The marble, likely replaced by the sulphides, probably occurs as lenses in the volcanic unit. Sulphide minerals in the showing, associated with a rusty gossan of iron oxide and manganese oxide, are mainly massive pyrrhotite, pyrite, and galena. One galena-rich grab specimen, taken by the writers, assayed*: 0.02 ounces of gold and 26.7 ounces of silver to the ton, 79.0 per cent lead, and 0.2 per cent zinc.

Four small showings, not examined by the writers, that occur on the Cone No. 11 claim, are gossans or sulphide lenses 3 feet or less in width, in shear zones (Dr. A.E. Aho, personal communication). The sulphides are similar to those at the Cone No. 1 showing.

PELLY PLATEAU AREA

Bruce Lake

Newmont Mining Corporation of Canada Limited (61°48 1/2'N, 132°02'W)

References: Wheeler, Green, and Roddick (1960 a, b); Geological Survey of Canada (1963 a, b).

Following publication of Geological Survey of Canada aeromagnetic maps (1963 a, b) of the area, Newmont Mining Corporation of Canada Limited did additional airborne work in conjunction with Sherritt Gordon Mines Limited and recorded 494 claims in the area. The exploration was sparked by the knowledge of nickel-bearing float in the area and the suggestion from the airborne work that a large area of basic rock overlain by flat-lying volcanic rock was present. During the summer of 1963, a crew of up to 8 men prospected and did

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

magnetometer and electromagnetic work on the claims. The Watson Lake-Ross River development road passes through the claims on the south side of Pelly River.

Outcrops are found along Pelly River, Horton Creek, and on a few high knobs. Elsewhere, most of the area is heavily mantled by glacial drift. Bedrock consists of cherty quartzite, phyllite, and marble of unknown age (unit A, Wheeler, Green, and Roddick, 1960a, b), which has been intruded by ultrabasic rocks (unit D, not shown in this area in the original mapping); and, in part, overlain by flat-lying Tertiary volcanic rocks (unit 11).

Ultrabasic rocks, varying from pyroxenite to serpentinite, outcrop in one or two places along Horton Creek and on both sides of Pelly River upstream from Horton Creek. The pyroxenite is dark grey to black with grains of clinopyroxene to 1 cm in length. In some specimens, the pyroxene is partly altered to either secondary amphibole or serpentine. One nickel-bearing specimen had a matrix of fine amphibole and contained considerable pyrrhotite. The serpentinite is almost completely altered to dense, fine serpentine and only traces of the original minerals remain. The serpentinite may have formed from pyroxenite or possibly peridotite.

The results of the exploration were discouraging in that much of the area is deeply covered by overburden or Tertiary volcanic rocks, the ultrabasic rocks do not appear to be as extensive as suggested by the airborne work, and the nickel content of the sulphide-bearing ultrabasic rock occurring both in place and as float is very low.

Traffic Mountain

Canadian Yukon Mining Company Limited (62°15'N, 130°42'W)

References: Skinner (1962, p. 41); Green and Godwin (1963, pp. 30-31).

The company was inactive in this area in 1963, and late in the year abandoned their claims.

LIARD PLAIN AREA

Tom Lake

Frances River Syndicate Property (60°32'N, 128°52'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).

Frances River Syndicate, backed by Canex Aerial Exploration Limited, Newconex Canadian Exploration Limited, Kerr-Addison Gold Mines Limited, and Anglo-Huronian Limited, holds 336 claims covering lead-zinc showings that are about 33 miles north-northwest of Watson Lake and 8 miles northwest of Tom Lake. During 1963 the property was reached either by a 12-mile access road from the Watson Lake-Ross River development road or by float plane via a small unnamed lake that is about 3 miles west of the showings. In the 1963 field season the syndicate established a camp on the above property, and up to 13 men were employed from 31 May to 25 July. In addition, three prospecting crews worked in both the southeastern corner of the Yukon and the Dawson area.

Two main lead-zinc showings about 2 miles apart along a ridge were found in 1962 as zones of float and frost heave. These showings are separated by a deep gulley. Trenching on these showings late in 1962 suggested large lead-zinc deposits. Early in 1963, however, geological mapping, trenching, and diamond drilling, under the direction of Canex Aerial Exploration Limited, indicated that the deposits were not persistent along strike or in depth, and that the potential tonnage was limited (The Northern Miner, 11 July 1963, p. 13). The diamond-drill program consisted of one hole with a length of 388 feet on the north showing and six holes with a total length of 1,452 feet on the south showing.

Most of the property is underlain by grey- to buff-weathering phyllite or argillite associated with bands of grey argillaceous limestone. The lithology looks similar to that at Tintina Silver Mines property (Green and Godwin, 1963, pp. 26-29) about 45 miles to the north-northwest, and to that at the Luck Group (Green and Godwin, 1963, pp. 31-32), about 60 miles to the southwest. At the Tintina property, Wheeler, Green, and Roddick (1960b) have mapped limestone (unit 1c) of Early Cambrian age and lustrous phyllite (unit 2) of Middle and Late Cambrian age (?). At the Luck Group, Poole, Roddick, and Green (1960) have mapped a limestone with minor dolomite, slate, and phyllite (unit 3b) of possible Early Cambrian age.

The south showing, elevation 4,650 feet, was exposed in a large cut and had an apparent length of about 150 feet trending S70°E and a width of about 30 feet. The mineralization consisted of galena and light brown sphalerite in a skarn developed along a phyllite-limestone contact. This contact could be traced southwest along the hillside for about 1,000 feet, but the skarn appeared to be developed only near the showing. One skarn-rich grab specimen assayed*: trace gold and 0.38 ounces of silver per ton, 3.1 per cent lead, and 2.0 per cent zinc. One galena-rich grab specimen assayed*: trace gold and 15.5 ounces of silver per ton, 76.4 per cent lead, and 4.5 per cent zinc.

The north showing, elevation 4,850 feet, was exposed in a number of cuts, in one of which the mineralized zone appeared to strike northerly and dip 65 degrees to the west, roughly parallel to the foliation of the enclosing phyllite. The zone appeared to be up to 25 feet thick with mineralization similar to that of the south showing. Some limestone was observed in the cuts, but it may be present in the form of thin discontinuous lenses rather than as a thick limestone band. Only locally was the mineralization along a limestone-phyllite contact. One galena-rich grab specimen assayed*: trace gold and 2.46 ounces of silver per ton, and 25.0 per cent lead, and 19.9 per cent zinc. A white quartz porphyry dyke or sill was noted near the north showing.

A deeply incised lineament lies just to the west of the south showing, extends north to within half a mile of the north showing, and may continue through the latter. It may represent either a meltwater channel or a fault, although no evidence of the latter was observed where the structure is well exposed near the south showing.

QUIET LAKE AREA

Quiet Lake

Conwest Exploration Company Limited (Molly Group) (61°10'N, 132°25'W)

References: Wheeler, Green, and Roddick (1960a); Skinner (1961, pp. 41-42); Green and Godwin (1963, p. 30).

Late in the 1962 field season, the company staked the Molly group of 72 claims covering a molybdenite showing. Work carried out during the summer of 1963 consisted of trenching, diamond

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

drilling, and detailed mapping of the prospect. A crew of about 20 men was employed. Results proved discouraging and work was suspended early in August, 1963. The main showing is at an altitude of about 5,500 feet and is on the south side of a small valley tributary to McNeil River. The camp, located on a small bench in this valley, was supplied by a helicopter based at Quiet Lake on the Canol Road, about 22 miles to the west.

The main showing occurs near the contact of metamorphic rocks of unknown age (unit A, Wheeler, Green, and Roddick, 1960a) with granodiorite (unit 9). The metamorphic rocks consist of a limestone, perhaps 50 feet thick, which has been irregularly altered to: (i) diopside-garnet skarn, (ii) wollastonite-garnet skarn, and which contains thin bands of finely banded green diopside hornfels and purplish brown biotite hornfels probably formed from siliceous limestone and argillite respectively. This band is overlain by a finely banded unit, probably more than 1,000 feet thick, composed of green diopside hornfels, purplish brown biotite hornfels, and irregular stringers of limestone. This unit probably formed from a limy argillite and appears similar in original lithology to unit 2 of Middle and Late Cambrian age as mapped by Wheeler, Green, and Roddick (1960a). Molybdenite occurs mainly in the diopside-garnet and the wollastonite-garnet skarns formed from the limestone band. These have been traced for about 800 feet trending northeast and dipping moderately to the southeast beneath the finely banded overlying rocks. The overall structures of the metamorphic rocks appear simple, but complex crumpling on a minor scale was observed in outcrops of the finely banded hornfels unit. Seventeen diamond drill holes with a total length of 2,500 feet were drilled to test the showing at depth.

The north showing occurs on a ridge about 3,400 feet northwest of the main showing. There, trenching exposed disseminated molybdenite in a thin band of "hybrid granite" or "meta-diorite", composed of plagioclase feldspar and diopside, developed at the contact between the granodiorite and the overlying diopside skarn and hornfels. The altered limestone band of the main showing is not present. Specimens from this showing contain considerable cream-coloured powellite, formed through the alteration of molybdenite.

The north showing is similar in type to the molybdenite showing about 25 miles to the northwest, which was explored by Canol Metal Mines Limited in 1959 and 1960 (Skinner, 1961, pp. 41-42).

CASSIAR MOUNTAINS AREA

Logjam Creek

Logjam Creek Property (60°01'N, 131°35'W)

References: Poole, Roddick, and Green (1960); Skinner (1962, p. 36).

The Logjam Creek property, consisting of 11 claims, is owned by W. McKinnon, of Teslin, Yukon. The silver-lead-zinc showings, discovered by McKinnon in 1945, were diamond drilled by Hudson Bay Explorations and Development Limited in 1945 and 1946. In 1961, the property was optioned to Kootenay Base Metals Limited, who carried out some trenching. In 1963, W. McKinnon and T. Kitchen built a tote road to the south showing and did limited development work on the latter. The road is about 13 miles long and leaves the Alaska Highway near Mile 753. Green visited the property in September 1963, in the company of Mr. McKinnon.

Bedrock in the area consists of altered cherty rocks of Late Devonian and Early Mississippian age (unit 8, Poole, Roddick, and Green, 1960), which have been intruded by a sill-like body of fine-grained hornblende-biotite diorite (unit 14c).

On the main showing, veins Nos. 1 to 9 occur within the diorite and most are exposed on a steep north face above the head of a tributary of Smart River. Veins Nos. 1, 2, and 6 strike between N 50°E and N 70°E, and No. 5 strikes between N 10°E and N 25°E; all dip steeply to vertical. They consist of rusty zones to a few feet in width and up to 500 feet in length locally containing lenses and ribs of quartz and varying amounts of arsenopyrite, pyrite, and galena and sphalerite. A grab specimen from No. 5 vein, rich in galena and boulangerite[a], assayed[b]: 0.84 ounces of gold per ton, 177.5 ounces of silver per ton, 20.6 per cent lead, and 1.7 per cent zinc. Exploration of the showing has proven difficult as the veins do not continue into the sedimentary rocks beneath the diorite and the slope is too steep to permit setting up a drill on the diorite. Consequently, most of the diamond drilling was inconclusive and much of the work to date consists of surface sampling. Underground work will probably be required to obtain suitable drill sites.

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[a]Identified by X-ray powder photograph.

[b]Assayed by G. Spalding, Whitehorse, Y.T.

The south showing, about 1/2 mile southwest of the main showing, is in a saddle at the head of a tributary of Logjam Creek. Bedrock, consisting of chert, argillite, quartzites, and minor limestone (unit 8, Poole, Roddick, and Green, 1960), contains thin veinlets, pods, and disseminations of galena and sphalerite with minor pyrrhotite and pyrite. The mineral zone has been traced for about 150 feet by a series of open-cuts. One specimen rich in galena assayed: 0.02 ounces of gold per ton, 52.8 ounces of silver per ton, 46.7 per cent lead, and 16.9 per cent zinc. Another specimen assayed: 0.1 ounces of gold per ton, 4.14 ounces of silver per ton, 1.1 per cent lead, and 8.2 per cent zinc.

NAHANNI MINING DISTRICT (DISTRICT OF MACKENZIE)

SELWYN MOUNTAINS AREA

Upper Flat River

Canada Tungsten Mining Corporation Limited (61°57 1/2'N, 128°15'W)

References: Green and Roddick (1961); Brown (1961); Skinner (1961, pp. 43-46; 1962, pp. 41-43); Green and Godwin (1963, pp. 34-37); White (1963, pp. 390-393).

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

During 1962, a permanent camp, and a 300-ton-per-day mill were completed and over 92,000 tons of ore grading 2.85 per cent tungsten trioxide and 0.45 per cent copper were mined and stockpiled at the mill. Milling commenced in November, 1962. Ore reserves at the end of 1962 were estimated at 1,163,000 tons averaging 2.47 per cent tungsten trioxide and 0.45 per cent copper.

Mining at the open-cut was suspended on 20 July 1963 by which time some 43,445 tons of ore had been mined. The mill continued in operation until 1 September 1963. The company has produced 1,258.19 tons of concentrate from 71,824 tons milled, which will be used to supply potential customers with material for evaluation and trial use.

MACKENZIE MOUNTAINS AREA

Little Dal Lake

Redstone Mines Limited (62°41'N, 126°38'W)

References: The Northern Miner (14 November 1963, p. 13); Baragar and Hornbrook (1963, pp. 35-37); Green and Godwin (1963, pp. 37-40).

Redstone Mines Limited holds three prospecting permits (covering the area from 62°30'N to 63°15'N latitude and 126°30'W to 127°00'W longitude) and 329 mineral claims, 228 of which lie within the permit areas. During the 1963 field season, the company prospected within and to the north of the permit areas, and diamond drilled the Plateau Lake copper showing (formerly referred to as the Munro showing; Baragar and Hornbrook, 1963; Green and Godwin, 1963). Transportation was supplied by helicopter and float-equipped aircraft, the latter based at Watson Lake, Yukon. Up to 35 men were employed.

The Plateau Lake copper prospect is on the east face of the ridge east of Little Dal Lake (referred to as Plateau Lake in company reports). Copper mineralization, which has been traced over 4 miles, occurs mainly in three persistent beds of green-weathering, carbonate-rich rock near the top of a section about 1,000 feet thick composed of brilliant purple-weathering mudstone and siltstone. Where measured (Green and Godwin, 1963) the sequence consisted of upper green beds (15 feet), intermediate purple beds (40 feet), a middle green bed (7 feet), intermediate purple beds (42 feet), and a lower green bed (6 feet). Locally, as many as five green beds may be present. Some copper minerals also occur in a fault zone and in carbonate rocks overlying the purple mudstone and siltstone unit. The latter unit strikes north and dips steeply west. It appears to be underlain by grey-weathering carbonate, similar to that of Ordovician to Silurian age, and overlain by approximately 750 feet of platy, grey- to brown-weathering carbonate, chiefly limestone, which is in turn overlain, apparently conformably, by purple-weathering conglomeratic mudstone and iron-formation of probable Early to Middle Cambrian age. However, it is probable that the structure in this area is complicated by thrust faulting or isoclinal folding and the apparent section may not be valid.

When visited by Green in late July 1963, a drill camp had been established in a saddle about 2 miles southeast of Little Dal (Plateau) Lake at an altitude of about 5,000 feet. Drilling was under-way at the face of the ridge, about one-quarter mile to the east, where copper mineralization was present in both the green-weathering

carbonate rich beds and a fault zone. At the end of the ridge, about 1 mile south of the drill camp, a number of cuts exposed chalcopyrite in black limestone overlying the purple mudstone and siltstone unit.

Later in the year the company reported (Northern Miner, 14 November 1963, p. 13) that a program involving 17 diamond drill holes with a total length of 5,312 feet had been completed with encouraging results. Ten of the holes tested two zones, the H-C and the Ridge, for a strike-length of 2,200 feet in the vicinity of the drill camp, three holes tested the North End zone, about 3 miles north of the Ridge zone, for a strike-length of 1,100 feet, and four holes, one of which was not completed, tested the green, carbonate-rich beds in the 3-mile interval between the zones. Drilling in this interval must be done on the face of the slope where it is difficult to find drill sites from which the mineralization can be tested at depth.

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).

The Yukon Consolidated Gold Corporation Limited was formed in 1923 from eight companies with interests in the Klondike area. The company operated six electrically driven dredges and two bulldozer-sluicing plants in the Klondike area in 1963. The company holds most of the placer ground in the district (802 claims and two hydraulic leases). This is on Hunker and Bonanza Creeks, southern tributaries of Klondike River, and on Dominion, Sulphur, and Quartz Creeks, northern tributaries of Indian River. A 100-mile network of roads connect all operations with Dawson and with the company's office, shops, gold room, etc., at Bear Creek, 8 miles east of Dawson. The company also operates a 15,000-hp hydroelectric plant on Klondike River about 4 miles below the junction of the north and south forks of the river. This plant supplies power to the city of Dawson, and drives the dredges and other mining equipment.

Available figures on operations of the company (from Financial Post Survey of Mines, 1964, p. 97) are as follows:

Year	Cubic Yards Treated	Value of Gold (and Silver) Recovered
1932-59	178,430,885	47,049,249
1960	4,517,964	2,182,134
1961	4,041,022	1,925,552
1962	4,477,386	1,647,985
Total	191,467,257	52,804,920

Most of the following information concerning the 1963 operations of the company was supplied by Mr. A.G. Barrett, manager, Dawson. The cooperation of the company is gratefully acknowledged.

General

In 1963 the Yukon Consolidated Gold Corporation employed a maximum labour force of 320 men (260 seasonal), dredged a total of 4,730,385 cubic yards of gravel, and produced 41,971 ounces of fine gold and 8,988 ounces of silver with a value of $1,482,894. Proven gravel reserves written off during 1963 were 3,504,395 cubic yards, and proven gravel reserves at the end of 1963 were 10,415,023 cubic yards valued at $4,533,721 (43.53 cents per cubic yard).

Mining Operations

Dominion Creek

Dredge No. 6 (7-cubic-foot buckets) is working down lower Dominion Creek about 2 miles south of Granville. In 1963 this dredge operated from 9 May until 16 November, mined 1,101,694 cubic yards at a cost of 25.9 cents per cubic yard, and recovered 7,413 ounces of fine gold and 1,501 ounces of silver valued at $261,351. Work started on the dredge and site on 5 April and finished on 21 November. The stripping plant ahead of the dredge removed from 18 May to 24 October 451,870 cubic yards of muck at a cost of 13.6 cents per cubic yard. Work on the plant started 13 April and finished 17 November. No thawing was done ahead of the dredge in 1963.

Dredge No. 10 (7-cubic-foot buckets) is working down middle Dominion Creek about 1 1/2 miles south of the mouth of Jensen Creek. In 1963 this dredge operated from 1 May to 16 November, mined 923,225 cubic yards at a cost of 30.8 cents per cubic yard, and recovered 7,635 ounces of fine gold and 1,536 ounces of silver valued

at $268,813. Work started on the dredge and site 3 April and finished 20 November. No thawing or stripping was done ahead of the dredge in 1963.

Dominion Creek Benches

Bulldozer mining operation No. 15 is on the left limit bench of middle Dominion Creek about 2 1/2 miles above Jensen Creek. During 1963 the plant operated from 26 May to 25 September, mined 138,449 cubic yards of gravel at a cost of 52.5 cents per cubic yard, and recovered 3,509 ounces of fine gold and 685 ounces of silver valued at $122,883. Work started on the plant and site 13 April and finished 15 October.

Bulldozer mining operation No. 16 is on the left limit bench of middle Dominion Creek about 1/2 mile above Jensen Creek. During 1963 the plant operated from 17 July to 11 October, mined 113,105 cubic yards of gravel at a cost of 82.4 cents per cubic yard, and recovered 2,947 ounces of fine gold and 583 ounces of silver valued at $104,432. Work started on the plant and site 27 April and finished 15 October. The stripping plant operated from 15 May to 2 October and removed 457,464 cubic yards of overburden at a cost of 9.6 cents per cubic yard. Work started on the plant and site 13 April and finished 11 October.

Dredge No. 12 (2 1/2-cubic-foot buckets) was located last winter on the left limit bench of middle Dominion Creek about 1 1/2 miles above Jensen Creek. In 1963 this dredge, working downstream, operated from 30 May to 31 October, mined 237,015 cubic yards at a cost of 71.4 cents per cubic yard, and recovered 4,377 ounces of fine gold and 873 ounces of silver valued at $154,748. Work started on the dredge and site 6 May and finished 3 November. The thawing plant ahead of the dredge operated from 15 May to 17 September and thawed 545,492 cubic yards of gravel at a cost of 8.6 cents per cubic yard. Work on the plant and site started 13 April and finished 15 October. No stripping was done ahead of the dredge in 1963.

Sulphur Creek

Dredge No. 8 (7-cubic-foot buckets) is working up Sulphur Creek about 2 miles northwest of Granville. In 1963 this dredge operated from 29 April until 16 November, mined 931,866 cubic yards of gravel at a cost of 24.9 cents per cubic yard, and recovered 4,754 ounces of fine gold and 963 ounces of silver valued at $167,387. Work started on the dredge and site 5 April and finished on 23 November. The stripping plant ahead of the dredge removed from 20 May to

4 October 521,807 cubic yards of muck at a cost of 9.0 cents per cubic yard. Work on the plant started 13 April and finished 15 October. No thawing was done ahead of the dredge in 1963.

Dredge No. 9 (5 3/4-cubic-foot buckets) is working upstream on upper Sulphur Creek about 2 miles south of the mouth of Green Gulch. In 1963 this dredge operated from 9 May to 15 November, mined 386,640 cubic yards of gravel at a cost of 52.6 cents per cubic yard, and recovered 4,678 ounces of fine gold and 945 ounces of silver valued at $164,737. Work started on the dredge and site 1 April and finished 18 November. The thawing plant ahead of the dredge operated from 24 May to 24 September and thawed 828,203 cubic yards of gravel at a cost of 9.9 cents per cubic yard. Work on the plant and site started 13 April and finished 22 October. No stripping was done ahead of the dredge in 1963.

Hunker Creek

Dredge No. 11 (7-cubic-foot buckets) is working down Hunker Creek, about 1 1/2 miles below Last Chance Creek. In 1963 this dredge operated from 29 April to 16 November, mined 898,391 cubic yards of gravel at a cost of 26.1 cents per cubic yard, and recovered 6,658 ounces of fine gold and 1,402 ounces of silver valued at $238,543. Work started on the dredge and site 5 April and finished on 19 November. The thawing plant ahead of the dredge operated from 11 May to 24 September and thawed 1,282,482 cubic yards of gravel at a cost of 7.3 cents per cubic yard. Work on the plant and site started 13 April and finished 11 October. No stripping was done ahead of the dredge in 1963.

Exploration in Yukon

The program in 1963 consisted mainly of an investigation of J. Meloy's property near the head of Casino Creek (see entry under Casino Creek area, earlier in this report), and of the Spotted Fawn Group (64°22 1/2'N, 138°42'W) in the Little Twelve Mile River area.

Ballarat Mines Limited

References: Skinner (1961, p. 10; 1962, p. 10); Green and Godwin (1963, pp. 47-48, 50-53).

Ballarat Mines Limited, owned by G.D. Franklin, of Seattle, Washington, and H. Schmidt of Munroe, Washington, is the second largest producer in the Dawson area with a total 1963 production

in excess of 5,000 ounces of crude gold. During 1963, the company worked full seasons on both Eldorado and Dominion Creeks. The Quartz Creek property worked in 1962, was not mined in 1963. A total of 11 men worked with Franklin and Schmidt during the 1963 season.

Eldorado Creek (63°53'N, 139°16'W)

On Eldorado Creek, the company owns claims 29, 30, and 43-0A, leases claims 28, and 31 to 46A from the Yukon Consolidated Gold Corporation, and 47 to 56 from J. Castonguay and D.M. Campbell.

In 1963, the company mined ground on claims 35 to 38 and put in one cut at the mouth of Gay Gulch. About 68,400 cubic yards were mined over the period from 7 June to 15 September 1963. Over the same period 80,000 cubic yards were stripped on claims 38 to 46-A. Equipment used includes two D-8 bulldozers, a sluice-box, and a pump and monitor mounted together on a sled.

The ground has been extensively worked in the past (once underground and some of it twice by open-cut methods) resulting in the intermixing of gravel and muck.

Dominion Creek (63°49'N, 138°40'W)

On Dominion Creek the company owns creek claim No. 13 Below Lower Discovery, has a 1 1/4 mile lease above claim No. 9 Above Discovery, and leases 48 claims from the Yukon Consolidated Gold Corporation below the 1 1/4 mile lease. Since 1959, the company has operated a bulldozer-sluicing plant on the left limit bench of Dominion Creek.

During the 1963 season, 166,700 cubic yards of gravel were sluiced on claims 1, 2, and 3 Above Discovery and, late in the season, on claims 37 and 39 Below. A total of 200,000 cubic yards of muck were stripped.

Equipment used in this sluicing operation included two bulldozers, and a sluice-box supplied with water by a monitor directed into the dump-box. The sluice-box is 40 feet long by 49 inches wide; mercury is kept in the lower 15 feet of the box.

A new sprinkler-stripping method of muck removal on the left limit bench of claims 37 and 38 Below Discovery was also developed over the season to remove a section of muck that was up to

30 feet deep and underlain by about 4 feet of gravel. The sprinkler-stripping method is fundamentally simple and consists of a grid of irrigation sprinklers that spray water on the frozen muck. The water thaws the frozen muck and flushes it away in a muck-saturated stream.

Equipment used by the company for the sprinkler-stripping method included the following:

(1) a water pump, which delivered 3,000 gallons per minute at approximately 30 pounds per square inch,

(2) a pipeline main in 11 inch, 10 inch, and 6 inch diameters,

(3) aluminum irrigation sprinklers (Rainbird Nos. 70-B and 80-B).

An area of about 300,000 square feet was stripped with a rectangular grid of 60 sprinklers that were spaced about 30 feet apart on sprinkling lines. Sprinkling lines, fed from the main pipeline, were spaced about 50 feet apart.

To set up a sprinkler-stripping operation to remove muck probably requires the following three conditions:

(1) Drainage for the sprinkled water must be available; hence, the set-up on the bench above Dominion Creek was ideal.

(2) The muck must be saturated with water; the black silty, organic muck on Dominion Creek is full of ice lenses.

(3) There should be no slide rock or other material that might blanket the muck and protect it from the action of the sprinkled water; locally difficulty was encountered with slabby slide rock on Dominion Creek, but this was removed by directing extra water to the area and by a small amount of bulldozer work.

Advantages of the sprinkler-stripping operation include:

(1) Only one man is required to look after the entire operation.

(2) The operation may be left unattended overnight.

(3) Drains keep flowing and do not become blocked as they often do in hydraulic stripping when blocks of frozen muck dam the drains.

(4) Light, portable aluminum pipe and directional sprinklers facilitate water flow adjustments so that maximum thawing and transporting efficiency can be won from the water.

(5) The sun warms the sprayed water and the exposed muck and, consequently, is utilized in the thawing.

The company believes that this method is a very economical and rapid method of stripping muck. This is borne out by the 1963 operation which, for mining in 1964, stripped 300,000 square feet of ground in about 40 days. The sprinkler method is probably applicable elsewhere.

Bonanza Creek

Cripple Hill Mining Company Limited (64°00 1/2'N, 139°21'W) 116

References: Skinner (1962, p. 8); Green and Godwin (1963, pp. 44-45).

The Cripple Hill Mining Company Limited, owned by P. Foth and R.E. Troberg, has 6 creek claims on Bonanza Creek, 1 on Trail Gulch, 3 hill claims on Cripple Hill, and 1 on Trail Hill (all part of the old Bronson and Rae Concession) about 2 1/4 miles up the Bonanza Creek Road. Foth and Troberg, with three hired men, hydraulic naturally thawed white channel gravels through bedrock cuts to the sluice-boxes. In addition, the rims of the bench are scraped into the sluice-box with the bulldozer.

The company's first two years of mining, 1961 and 1962, yielded about 1,260 ounces of crude gold from Cripple Hill claims Nos. 77 and 78 Below Discovery. A cut on claim 77 (150 feet by 150 feet by 50 feet high) and a cut on claim 78 (200 feet long by 150 feet deep by 100 feet high) yielded about 652 ounces of crude gold. Three types of gold may be distinguished by differences in its colour. On the average, however, gold is ragged, dark orange-yellow, and runs about 805 in fineness.

Equipment includes a D-6 bulldozer, 3 monitors, and 3 sluice-boxes, which discharge over the 220-foot high bench into Bonanza Creek. In 1963, only two of the three monitors and sluice-boxes were used. Water, a major cost, is supplied from Bonanza Creek by a 12-inch, 400 hp electric pump, which delivers 4,500 gallons per minute at 40 to 50 psi to a monitor.

A.T. Fry (63°57'N, 139°22'W)

References: Skinner (1961, p. 9; 1962, p. 9); Green and Godwin (1963, pp. 45-46).

A.T. Fry owns two creek claims on Boulder Creek and two on Monte Cristo Creek, but operates mainly on his three hill claims on King Solomon Hill, which is on the left limit of Bonanza Creek, 6 miles up Bonanza Creek Road.

From September 1959 till October 1962, Fry has produced about 919 ounces of crude gold. In 1963, approximately 30,000 cubic yards that were mined from 1 May to 5 October yielded 262 ounces of crude gold.

The operation on King Solomon Hill is in White Channel gravels on a bedrock terrace that is about 190 feet above Bonanza Creek. In 1963, Fry worked a hydraulic pit in the gravels (same locality as 1962), and a clean-up operation around the rim of the terrace. In addition, Fry has an operation on Monte Cristo Creek, which is worked when water is abundant.

Equipment used includes three wooden sluice-boxes, a monitor, and a RD-6 and D-7 bulldozer. Water is supplied to King Solomon Hill by pipeline, but owing to a water shortage, continuous sluicing is not possible. With the aid of a storage tank, however, Fry is able to work for short periods at a time; in 1963, sluicing time over the summer averaged only 3 1/2 hours a day.

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).

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 the 1963 season the Boutilliers operated a hydraulic plant in White Channel gravels on Adams Hill whenever water was available, and worked on Adams Creek with a bulldozer sluicing plant when there was no water on the hill.

On Adams Hill approximately 5,000 bedrock square feet were mined from April to the end of September, 1963, yielding 143 ounces of crude gold. From claim 8 on Adams Creek 5,000 bedrock square feet were mined over approximately 30 days yielding 83 ounces of crude gold.

Victoria Gulch

E. Lesaux and F. Perret (63°55'N, 139°12'W)

References: Skinner (1962, p. 10); Green and Godwin (1963, p. 47).

E. Lesaux and F. Perret operate a bulldozer-sluicing plant at the mouth of Victoria Gulch, a tributary of Upper Bonanza Creek. Claims 42 and 43 Above Discovery on Bonanza Creek are leased from the Yukon Consolidated Gold Corporation.

They worked on the claims from mid-April to early October and sluiced from May 15 to September 20. An area of about 16,000 square feet was mined and 206 ounces of crude gold were produced. Equipment includes two TD-18 bulldozers.

The property was visited by Green in early October. The cut is located in Victoria Gulch in a small area missed by the dredge operating on Upper Bonanza. The valley floor is about 150 feet in width at this point and the depth to bedrock is about 16 feet. The ground being mined was originally extremely rich and has all been worked previously by underground operations. Bedrock in the cut is soft quartz-chlorite schist and about 6 inches are mined. The operation uses water from Victoria Gulch and was severely restricted in the middle of the season because of the limited supply of water available from this source.

W. Christianson (63°54'N, 139° 12 1/2'W)

Using a rocker, W. Christianson recovered about 50 ounces of crude gold from Victoria Gulch at the mouth of 7 Pup. The gold is reported to have come from a paystreak missed by earlier miners.

Eldorado Creek

Ballarat Mines Limited

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

Hunker Creek and Tributaries

The Yukon Consolidated Gold Corporation

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

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).

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, main tributary of lower Hunker Creek.

In 1963, the Bremners with one hired man continued working a hydraulic pit in White Channel gravels on Discovery Hill. They recovered 158 ounces of crude gold.

I. Norbeck (63°58'N, 139°58 1/2'W)

References: Skinner (1961, p. 10; 1962, p. 11); Green and Godwin (1963, pp. 48-49).

I. Norbeck owns a placer prospecting lease (covering claims 34, 35, 35a, and 35b Below Discovery) on Hunker Creek about 3/4 mile below Gold Bottom Creek. He operates a hydraulic-sluicing plant at Temperance Hill on a low-level bench on the left limit of Hunker Creek on claims 35 and 35a.

In 1963, an 850-foot by 50-foot arcuate strip (adjacent to the one mined in 1962) was mined on the low-level bench, which is about 10 feet above the level of Hunker Creek. Approximately 120 ounces of crude gold were recovered. Typical gold occurs as fine grains concentrated near bedrock. Other heavy minerals include: silver, magnetite, ilmenite, cassiterite, monazite, and zircon.

During the spring run-off, water is brought 3 miles from Gold Bottom Creek along a canal to the property. During the remainder of the season water is pumped from Hunker Creek with a 10 by 10 inch centrifugal pump, rated at 3,600 gallons per minute, that is driven by a 171 horsepower General Motors Twin diesel. Other equipment includes several monitors, a TD-18 bulldozer, and a 30-foot by 36-inch sluice-box with a 24-foot dump-box. Forty to 70 feet of black organic muck, containing abundant remains of Pleistocene

animals and ice lenses up to 15 feet thick, overlies 5 to 10 feet of poorly sorted gravel. Abundant old workings are very evident. These have resulted in areas where muck is resting directly on bedrock, and in local mixing of the gravel and muck. Bedrock is mined to a depth of about 3 feet and is composed of platy quartz-chlorite schist.

F. and G. Caley (63°59'N, 139°04'W)

Partners F. Caley and son G. Caley own one bench claim on Paradise Hill. In 1963 some work, from mid-April to mid-May, was done preparing ground for sluicing in the spring of 1964. Very little water is available on the hill and, consequently, advantage has to be taken of the run-off in the spring.

Gold Bottom Creek

O. Lunde (63°55'N, 138°59'W)

References: Skinner (1961, p. 12; 1962, p. 14); Green and Godwin (1963, pp. 49-50).

O. Lunde owns claims 9 to 17 and operates a bulldozer sluicing plant on Gold Bottom Creek. In his first year of production, 1962, Lunde produced 225 ounces of crude gold. In 1963, he mined about 35,000 bedrock square feet from May to October, which yielded 260 ounces of crude gold. Mining was done on the right limit and centre of Gold Bottom Creek on claims 10 and 11. For 1964, 12,000 bedrock square feet were prepared.

B. Bratsburg (63°54'N, 138°59'W)

References: Skinner (1961, p. 10; 1962, pp. 11-12); Green and Godwin (1963, p. 50).

B. Bratsburg owns the upper 500 feet of Discovery claim and claim Nos. 3 to 12 Above Discovery, all on Gold Bottom Creek. His camp is on Discovery claim and may be reached by a 4.8 mile road along the right limit of Gold Bottom Creek.

In 1956 and 1957, and from 1960 to 1962 Bratsburg mined his present holdings and produced about 1,162 ounces of crude gold. Previous operators appear to have worked the creek very thoroughly. Gold, concentrated at bedrock is coarse (about 5 per cent nuggets, some with adherent quartz) and ranges in fineness from 780 to 800.

In 1963, Bratsburg mined 15,000 cubic yards of gravel from the right limit of the upper end of claim 5 and the lower end of claim 6; 150 ounces of crude gold were produced. Preparatory work was started at the beginning of June and sluicing was done from the end of June to early September.

Equipment includes a D-8 bulldozer, and a 36-foot by 36-inch sluice-box with a 20-foot dump-box. A dam on the upper end of claim 6 supplied water to the sluice-box through a short canal.

When visited by Godwin during the dry period at the end of August, the dam stored enough water for 1 1/2 hours of sluicing per day. When water is available, stripping of muck is facilitated with an automatic gate-equipped dam.

Dominion Creek and Tributaries

The Yukon Consolidated Gold Corporation Limited

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

Ballarat Mines Limited

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

Caribou Creek

A. Burgelman (63°49'N, 138°49'W)

References: Skinner (1961, p. 11; 1962, p. 12); Green and Godwin (1963, p. 52).

Mr. and Mrs. A. Burgelman have creek claims Nos. 2, 3, 5 to 10, and 20 on Caribou Creek, which is one of the larger right limit tributaries of Upper Dominion Creek. In 1963, a bulldozer-sluicing plant was operated on the left limit of the upper part of claim No. 7 (approximately the same locality as 1962). In addition, an automatic gate-equipped dam was installed to start the thawing and stripping of claims 1 to 3.

Mr. and Mrs. Burgelman have worked the creek since 1958. From 1958 to 1962 production totalled 489.58 ounces of fine gold plus 124.0 ounces of crude gold. In 1963, approximately 5,000 bedrock square feet were mined, yielding 153 ounces of crude gold (133.54 ounces of fine gold). Typical gold is bright yellow and occurs as spongy nuggets up to 1/2 ounce, which often have adherent quartz; 15 to 20 per cent of the gold occurs as smooth fine grains and suggests that two types of gold occur on the property. The gold averages about 840 in fineness. The creek gravel is 6 to 8 feet thick and is generally overlain by 15 feet of muck. Equipment includes a D-6 bulldozer, a monitor, and a 20-foot by 30-inch sluice-box with a 20-foot dump-box.

Gold Run Creek

J. Lamontagne and E. Schink (63°43'N, 138°39'W)

Reference: Green and Godwin (1963, pp. 51-52).

Partners Lamontagne and Schink lease claims 36 to 51 excluding 45, on Gold Run Creek. These claims belong to and have been test-drilled by the Yukon Consolidated Gold Corporation Limited. The property is accessible from the Dominion Creek road along the left limit of Gold Run Creek.

Production on Gold Run Creek in 1962, the first year of the partners' operation, was 162 ounces of gold from claim 36. During 1963, approximately 115,000 cubic yards that yielded 1,918 ounces of crude gold (1,844 ounces of fine gold) were mined from the left limit of claims 36 to 38.

In 1963, work on the property started in mid-April and sluicing was carried out from mid-July to the beginning of September. Stripping, in preparation for the 1964 season, was done from claims 39 to 41.

Equipment includes two D-6 bulldozers, a sluice-box, and a sled-mounted number 2 monitor and pump. Two dams are used to store water. The main dam is on claim 42, just below 42 Pup, and the lower, smaller dam is on claim 39. Water is directed to the sluice-box by a canal. In 1963, the water supply was good in July, but in August and September it was necessary to store water an average of 2 days for 1 1/2 days of sluicing.

The ground has been extensively worked in previous hand operations resulting in a section that is mixed gravel and muck; locally all the gravel has been removed and the muck is directly on

bedrock. The gravel contains only a few cobbles, which are generally less than 6 inches in maximum diameter. The fineness of this gravel results in a large proportion of the tailings being carried down the bedrock drain leaving a correspondingly smaller amount to be stacked with a bulldozer. Bedrock is quartz-mica schist, which has locally decomposed to greenish micaceous clay. One foot to 2 feet of bedrock is mined. The surface of the bedrock is very irregular, and, as a result, previous operators did not mine some pockets of gravel. Typical gold, concentrated near bedrock, is smooth, fine to coarse in size, and averages 849 in fineness.

Sulphur Creek

The Yukon Consolidated Gold Corporation

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).

A. Sundt owns a 1/2-mile placer prospecting lease and 4 claims on Little Blanche Creek (a tributary of Quartz Creek), and 8 claims on Quartz Creek. In 1963 he operated a bulldozer sluicing plant on the left limit of Quartz Creek on claims 2 Below A. Mack's Discovery, and on 6A and 7 immediately above Mack Fork.

Approximately 35,000 bedrock square feet were mined from June to October 1963. About 300 ounces of crude gold were produced.

L.M. Fuhr (63°49'N, 139°04'W)

References: Skinner (1962, p. 14); Green and Godwin (1963, p. 53).

L.M. Fuhr owns a 1/2-mile placer prospecting lease on the right limit near Number 7 camp, and claims 3 to 18 Below A. Mack's Discovery on Quartz Creek. He operates a bulldozer sluicing plant.

Fuhr, with one hired man, mined approximately 20,000 bedrock square feet from 1 June to 20 October 1963, which yielded about 213 ounces of crude gold.

Eureka Creek

Eureka Placers Yukon Limited (63°34'N, 138°51'W)

References: Skinner (1962, p. 13); Green and Godwin (1963, pp. 54-55).

Eureka Placers Yukon Limited (owned by G. Shaw, H. Hanulik, J. Buss, and Dr. J. Rooks) own 2 Discovery claims, 26 claims on the right fork Above and Below Discovery on Eureka Creek, and a 3-mile placer prospecting lease on the left fork of Eureka Creek. The property is about 12 miles from Granville along a good access road.

In 1963, N. Ross and a helper mined the top half of the lower mile of the 3-mile lease. This is on the left fork of Eureka Creek about 1/2 mile above the fork. Approximately 32,000 cubic yards of gravel were mined from 1 May to 10 October 1963. About 1,023 ounces of crude gold were produced.

Equipment includes a D-7 and a D-8 bulldozer, and a 30-foot by 48-inch sluice-box with a 20-foot dump-box. Water supplied along a ditch to the sluice-box, was stored in an earth-dammed pond.

Gravels are clayey, poorly sorted, and contain tabular boulders to 1 foot maximum diameter, composed of grey micaceous quartzite and quartz mica schist, which locally is decomposed to micaceous clay.

Ross believes the pay streak to be in the order of 30 feet wide. A 100-foot width, however, is mined. Typically the section is composed of 8 feet of gravel overlain by 5 feet of muck. After stripping, an 8-foot thickness, including 3 feet of bedrock, was mined. Individual cuts vary greatly in value because the ground has been extensively worked in the past.

Northern Yukon Services Limited (63°35'N, 138°51'W)

References: Skinner (1961, p. 12; 1962, p. 14); Green and Godwin (1963, p. 55).

Northern Yukon Services Limited is owned by M.D. Cole of Dawson. The company operates a sluicing plant on Eureka Creek on ground sublet from G. Shaw, H. Hanulik, J. Buss, and Dr. J. Rooks. The property is accessible from Granville via the road to Eureka Placers Limited.

Two D-8 bulldozers are used in conjunction with a 1 1/2-yard dragline, which is used to pile tailings and dig drainage ditches. Other equipment includes an automatic gate-equipped dam, and a sled-mounted monitor and pump.

From May to late August the company mined the left limit of the left fork on Discovery claim and started mining claim 15 Below Discovery. Total recovery was 1,030 ounces of crude gold; 500 ounces from 60,000 bedrock square feet on claim 15, and 530 ounces from 60,000 bedrock square feet (gravel section averaging about 6 feet deep) on Discovery claim. Claims 15 to 20 Below Discovery were stripped and a drainage ditch 2,500 feet long was excavated to these claims. The section exposed in the ditch is 15 to 20 feet thick. An automatic gate-equipped dam was being used to assist in thawing and the company expects to have about 300,000 square feet prepared for mining in 1964.

The following section was exposed on Discovery claim when visited by Godwin in early August:

	Thickness in feet	
	Unit	Total from base
Old tailings	4	18
Grey black, silty, organic muck. Undecomposed wood occurs throughout this unit	2	14
Poorly sorted cobble gravel. Cobbles, locally with a common horizontal orientation, are generally platy, subrounded, less than 6 inches in maximum diameter, and composed of massive grey quartzite. Boulders are uncommon. Several silt lenses, in the order of 4 inches thick, occur in this unit. Matrix is composed of sand and silt. Toward the bottom of the unit the matrix comprises about 60 per cent of the unit. Gold is concentrated near bedrock	11	12

	Thickness in feet	
	Unit	Total from base
Bedrock is quartz mica schist. Locally the schist is decomposed to micaceous clay. Unit is excavated to a depth of about 1 foot	1	1

All Gold Creek

K. and S. Placers Limited (63°56'N, 138°37 1/2'W)

References: Skinner (1962, p. 14); Green and Godwin (1963, p. 56).

K. and S. Placers Limited, owned by M. Kinakin and W. Scott of Dawson, operated a bulldozer-sluicing plant on All Gold Creek about 1/2 mile upstream from the settlement of Flat Creek on the Dawson-Mayo Road. The company leases Discovery claim and claims 1 to 10 Above from DeCoursey-Brewis Minerals Limited.

During 1963, approximately 40,000 cubic yards were mined with a TD-18 bulldozer over the period June 27 to early October, yielding 820 ounces of crude gold. One man was employed in addition to the owners.

When visited by Green in early October, the company was mining on claim 5 Above. The valley of All Gold Creek is very wide at this point, rising gently on the right limit. The operators are able to mine a width of about 250 feet before the overburden on this limit becomes too deep to handle economically. The operators report that the average depth to bedrock on the creek is about 12 feet, composed of 6 feet of cobble gravel overlain by silt, fine sands, and a minor amount of organic material. All the overburden is frozen. The gravels are poorly sorted. Most cobbles are 6 inches or less in maximum diameter, although a few boulders to 1 foot were observed. Most boulders are composed of quartz-feldspar-biotite gneiss. Bedrock varies from fresh quartz-feldspar-biotite gneiss to clayey material, which appears to have formed through decomposition of the gneiss. In addition, small areas of white clay may have formed from altered volcanic rocks. The operators report that only the areas underlain by fresh gneiss contain pay and that the early mining on the creek consisted of shafting in search of these areas. The gold recovered is very fine and flaky.

Klondike River Valley

D.M. Strachan (63°56 1/2'N, 138°37 1/2'W)

D.M. Strachan of Dawson holds two placer claims along the south side of the Klondike River valley just west of the settlement of Flat Creek. During 1963, he stripped vegetation and some muck from a poorly defined bench about 100 feet in width and 30 feet above the Stewart Crossing-Dawson Road. The operation necessitated rerouting the latter road for about three tenths of a mile. At the western end of this stripping a small cut of about 8,000 bedrock square feet has been made by a monitor using water pumped from the Klondike River. The section exposed in the cut consists of 10 feet of coarse river gravels overlain by up to 30 feet of muck containing some rusty sand and fine gravel lenses, all frozen. Bedrock is soft, graphitic quartz-mica schist. No production has been reported.

Germaine Creek

A.R. Lindsay and J. Werbiski (64°03'N, 138°55'W)

Reference: Green and Godwin (1963, p. 56)

Partners Lindsay and Werbiski have a 1-mile placer prospecting lease on Germaine Creek. The property is readily accessible from about mile 95 on the Stewart Crossing - Dawson Road.

In the first year of mining, 1962, 233 ounces of crude gold were produced. In 1963, approximately 9,000 bedrock square feet were mined over the period from the beginning of June to the end of September. Production figures are not available. Typical gold is worn, flat, and flaky, and cassiterite of the wood-tin variety is abundant. The mining was done on the left limit bench about 50 feet above Germaine Creek both parallel to the creek and away from it (behind the 1962 cuts). Difficulty with frozen ground was encountered.

Equipment includes a TD-18 bulldozer, a T-6 gas bulldozer, a 4-inch Fairbanks Morse pump, and a 54-foot long by 2-foot wide sluice-box with pole riffles and a 12-foot long overhead dump-box and grizzly.

The muck rapidly increases in thickness from 4 feet at the rim of the bench to 15 feet in from the rim. It overlies about 10 feet of boulder gravel, which locally has a stratified appearance, as emphasized by silt lenses and cobbles with a common horizontal orientation. The matrix of the gravel is sandy and contains little clay.

Boulders in the gravel include: quartz pebble conglomerate (grit), blue-grey quartzite, diorite, syenite, and bull quartz. Rock types represented in the boulders are prominent northeast of Tintina Trench (Green and Roddick, 1962) and were probably derived from that area. The bedrock includes dark brown shale, and Tertiary(?) white quartz porphyry that is locally decomposed to clay.

CLEAR CREEK AREA

Clear Creek

G. Heitman and C. Janus (63°47'N, 137°17'W)

References: Skinner (1962, p. 16); Green and Godwin (1963, p. 57).

Partners G. Heitman and C. Janus operate a bulldozer sluicing plant on a 2-mile placer prospecting lease held in H. Netzel's name. The property, below the main fork on Clear Creek, is accessible by a road, 25 miles long, that leaves the eastern side of the Stewart Crossing - Dawson highway near Barlow Lake.

Clear Creek Placer Company Limited dredged the creek from 1943 to 1954. During 1961 and 1962, G. Heitman and H. Netzel produced 800 ounces of crude gold. In 1963 preparatory work was started about the middle of May. Sluicing from the end of June to mid-October produced 658 ounces of crude gold from about 40,000 cubic yards of gravel. Mechanical trouble with the equipment, however, slowed down the operation.

Equipment includes a 32-foot by 36-inch sluice-box with a 14-foot dump-box, an HD-14, a D-8, and a D-6 bulldozer. In addition to the partners, two men were employed. Two operating advantages on the creek are: (i) an ample supply of water, and (ii) unfrozen gravels in the upper part of the lease.

When visited by Godwin at the beginning of August, the right limit of the lease was being sluiced. The gravels exposed by the cut were mixed with several lenses of black, silty organic muck, suggesting that the section had been disturbed. Bedrock exposed was platy, chloritic quartz mica schist that was mainly decomposed to blue micaceous clay. The bedrock surface was very irregular.

Left Clear Creek

F. and G. Caley (63°51'N, 137°18'W)

Partners F. Caley and son G. Caley hold a 1-mile and a 5-mile placer prospecting lease, and operate a sluicing plant on Left Clear Creek. The lower 1-mile lease starts about 3 1/2 miles upstream from the junction of Left Clear Creek with Clear Creek. The property is accessible by a road, 25 miles long, that leaves the eastern side of the Stewart Crossing - Dawson highway near Barlow Lake. Work on the leases began in 1961 and production, combined with that of 1962, was 189 ounces of crude gold.

When visited by Godwin at the beginning of August, 1963, G. Caley and a helper were working the right limit of the 1-mile lease on the creek where ground had been missed by Clear Creek Placer Company Limited, which dredged from 1943 to 1954. The right limit of the 1-mile lease and the lower part of the 5-mile lease, mined from 1 August to 15 October 1963, yielded 12 ounces of crude gold from about 27,000 cubic yards. In addition, about 47,500 cubic yards were stripped in preparation for 1964.

In general, the section mined contains about 7 feet of cobble gravel that is overlain by about 2 feet of organic muck. Cobbles in the gravel are commonly 6 inches in maximum diameter, but boulders up to 3 feet in maximum diameter occur. Cobbles are generally subrounded and platy. One to 1 1/2 feet of bedrock are generally mined. Bedrock is platy quartz mica schist that is usually decomposed to a micaceous clay.

Equipment includes a 27-foot by 42-inch sluice-box with a 12-foot dump-box, two D-7 bulldozers, a 3-ton fuel truck, and a 6-inch pump that is used for stripping in conjunction with an automatic gate-equipped dam.

SIXTYMILE RIVER AREA

Sixtymile River and Miller Creek

O. and D. Medby (64°00'N, 140°48'W)

References: Skinner (1961, p. 13; 1962, p. 15); Green and Godwin (1963, pp. 56-57).

O. Medby holds a 1-mile placer prospecting lease on the Sixtymile River, the lower part of which is at the Miller Creek - Sixtymile River fork. His wife, D. Medby, holds a 3-mile placer prospecting lease on Miller Creek, the lower part of which is 1,000 feet from the baseline of the Sixtymile River. The properties may be reached by a 16-mile road that leaves the southern side of the Sixtymile Road at mile 49.

O. Medby and a helper sluiced on the right limit of the upper end of the 1-mile lease on the Sixtymile River. During 1963 they recovered 117 ounces of crude gold. Equipment used in this operation included a monitor, a sluice-box 40 feet long by 24 inches wide with a 16-foot dump-box, and a D-6 bulldozer. The following section was exposed:

	Thickness in feet	
	Unit	Total from base
Black, organic soil and vegetation.....	2	73
Brown cobble gravel. This unit is marked by a common horizontal orientation of the abundant schist pebbles and cobbles. Matrix is sand, which contains more silt at the top of this unit than at the bottom. Near the top of this unit occur several blue silt and black organic layers up to 3 feet thick. The lower 10 feet of this unit are rust stained	67	71
Grey, clayey cobble gravel. Cobbles are composed of altered volcanic bedrock, rotten granitic rock, well rounded plates of schist, and minor, well rounded, equidimensional, rusty quartzite. The matrix is mainly micaceous clay and silt	1	4
Altered volcanic bedrock. Blocky fracture results in some silt along fractures. Bedrock is generally excavated to a depth of 3 feet	3	3

From September 1962 to September 1963, J. Holstrom sublet the 3-mile lease on Miller Creek and drift mined on the left limit near the middle of the lease. Wood-fired steam equipment, including a steam hoist and steam points, was used to sink a shaft 40 feet deep and drift about 40 feet in the permafrost. In 1963, 25 ounces of crude gold were recovered by Holstrom. When visited by Godwin at the beginning of August the following section was exposed by the workings:

	Thickness in feet	
	Unit	Total from base
Black, organic muck.....	20	40
Brown cobble gravel. Locally, the gravel has rusty bands. Matrix is sandy and contains little silt. The roof of the drift is in this unit and about 7 feet above bedrock.....	15	20
Brownish, grey silty cobble gravel. This unit is distinct from the overlying unit because it contains abundant silt in the matrix. Cobbles are commonly horizontally lain plates of schist, and locally some are white quartz. The gold is throughout this unit, but is concentrated on the bedrock	5	5
Bedrock	0	0

In general, the gold is found in a narrow width of gravel that is immediately above bedrock and marked by a silty and clayey matrix. The gold is coarse, deep yellow, and roughly flattened. Up to 30 per cent of the recovered gold is nuggets; the largest nugget found by O. Medby weighed 7 ounces. Heavy minerals include: galena, scheelite, magnetite, and cinnabar.

KIRKMAN CREEK 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).

L.M. Ross operates a bulldozer-sluicing plant on Kirkman Creek, a westerly flowing tributary of Yukon River, about 90 miles upstream from Dawson. Access is by float plane from Dawson or by river-boat from Dawson or Minto and thence via a 7-mile truck road up Kirkman Creek.

Ross owns creek claims 14 to 19 Below Upper Discovery and two 1-mile leases lower on the creek; he leases from 7 Above to 6 Below Upper Discovery from Ballarat Mines Limited. Ross has operated on Kirkman Creek since 1957 and has produced about 2,600 ounces of crude gold from 1957 to 1963, inclusive. During 1963, Ross and one helper mined approximately 85,000 cubic yards and produced 527 ounces of crude gold. Two D-8 bulldozers were used.

The operation was visited by Green in early June at which time Ross was installing his sluicing plant on 7 Below. The valley of Kirkman Creek in this area is V-shaped with a gentle gradient and a narrow valley floor.

An area about 150 feet in width and 1,200 feet long had been prepared for mining and Ross reported that in this area the creek bed contained about 4 feet of gravel overlain by 22 feet of muck, both frozen. The gravel contains slabby boulders of metamorphic rock, a few of which are up to 2 feet in maximum diameter, in a fine sandy matrix. Bedrock in the cut is a hard quartz-amphibole-biotite gneiss. The gold produced varies between 868 and 896 in fineness, much of it is coarse, and nuggets to 1 1/4 ounces have been recovered. Gold with adherent quartz is common. Other heavy minerals include magnetite, garnet, and pyrite.

THISTLE CREEK AREA

W.E. Edwards (63°04 1/2'N, 139°18'W)

Reference: Skinner (1962, p. 16).

W.E. Edwards operates on Thistle Creek, a westerly flowing tributary of the Yukon River, about 80 miles upstream from Dawson. Access is by float plane from Dawson or by riverboat from Dawson or Minto and thence via a 7-mile truck road to the property.

Edwards holds two placer prospecting leases on the lower part of Thistle Creek and is operating on a 5-mile lease assigned by R. Burian. The latter extends upstream from the mouth of Scotch Gulch and some dredging has been done on the upper 3 1/2 miles by Yukon Gold Placers Limited. Edwards has worked on the creek since 1961, but no production has been reported. Equipment includes a sluice-box, automatic gate, and two AC bulldozers.

When visited by Green early in June, Edwards and one helper were preparing to install a sluicing plant on the right limit of Thistle Creek about 1 mile upstream from Scotch Gulch. The valley at this point is V-shaped with a flat floor about 1,000 feet in width. Preparatory stripping had been done on an area of about 25,000 square feet using water from an automatic gate. Edwards reports that the depth to bedrock in the area prepared is variable, but averages about 16 feet comprised of 12 feet of gravel and 4 feet of overlying muck, both frozen. Most of the boulders in the gravel are tabular and less than 1 foot in maximum diameter. Bedrock is soft chlorite-rich schist.

HENDERSON CREEK AREA

R. Burian (63°26'N, 139°08'W)

Mrs. R. Burian of Stewart, Y.T. owns a 1-mile placer prospecting lease on Henderson Creek, about 12 miles from its mouth.

In 1963 the Burian family started mining the creek. They mined upstream across a 250-foot width from the bottom of their lease, which is immediately above Golden Gate Creek. Approximately 38,400 cubic yards were sluiced from early June to 15 September, yielding 58 ounces of crude gold. Sluicing did not start until mid-August and the operation was hampered by frozen ground.

Equipment includes a TD-18 bulldozer, and a 19-foot by 35-inch wooden sluice-box.

Where mined, the section averages about 10 feet of gravel overlain by 3 feet of muck. Old workings are present on the lease.

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. 18; 1962, p. 15); Green and Godwin (1963, pp. 57-58).

Spruce Creek Placers Limited, owned by F.M. Wilson, J.M. Acheson, and W.L. Drury, leased 22 claims from the E.H. Barker estate on Haggart Creek, between Dublin Gulch and Fifteen Pup. They have also staked a 1-mile placer lease along the left limit bench below Dublin Gulch. The property is accessible by a 29-mile road from Proctor's Sawmill, which is beside the Mayo-Elsa road.

Managed by Acheson, Spruce Creek Placers have mined the ground since the end of September 1961. Production in 1961 and 1962 was about 919 ounces of crude gold. Total production for 1963 from April 30 to 5 October was 1,171 ounces of crude gold (fineness, 882 to 890) won from 45,173 cubic yards of gravel. This work also involved 46,600 cubic yards of stripping and 15,000 cubic yards of drainage-ditch excavation. Equipment includes a TD-18 and two D-8 bulldozers, a sluice-box, a 1 1/2-yard dragline, and a monitor and pump mounted together on a sled.

In 1962, a prospect adit that gave encouraging values was driven downstream from the bulldozer-sluicing plant. This was on the left limit of the creek where in 1961, W. Malacky exposed a deep section. In 1963, the company excavated a deep drain to this ground, stripped 11,650 cubic yards, and mined 14,050 cubic yards from the above area, and produced 489 ounces of crude gold. When visited by Godwin at the end of July, the following section was exposed in the drainage ditch:

	Thickness in feet	
	Unit	Total from base
Black silty organic muck	5	25
Rusty boulder gravel. Boulders are generally rounded and equidimensional with local flat faces. Boulders of granite, quartzite, schist, and porphyritic volcanic rock were noted. Near the top of this unit,		

	Thickness in feet	
	Unit	Total from base
a layered appearance occurs due to silt lenses and manganese stained bands. The matrix is composed of granule and pebble gravel that locally contains cobbles. Locally, sand lenses occur that are composed predominantly of schist particles. One pan from this unit yielded 6 very fine colours of gold	11	20
Grey brown cobble gravel. Cobbles are generally subrounded and irregular in shape. Matrix consists of sand that contains little silt or clay. One pan from this unit yielded 4 fine colours of gold	3	9
Grey brown pebble gravel. The gravel is bonded with abundant silt and locally contains cobbles. One pan from this unit yielded 4 fine colours of gold	2 1/2	6
Light brown boulder and cobble gravel. Boulders, generally porphyritic volcanic rock, are irregularly shaped, well rounded and up to 1 1/2 feet in maximum diameter. Matrix, composed of sand and gravel, has a washed appearance because it lacks clay or silt. One pan from this unit yielded 6 fine colours of gold.....	1 1/2	3 1/2
Bedrock - platy quartz sericite schist. Locally the schist has decomposed to micaceous clay. Foliation in the schist strikes S40°E, and dips 60 degrees north. About a 2-foot depth of this bedrock was excavated. One pan from this 2-foot section yielded 15 to 20 colours of gold	2	2

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).

F. Taylor owns 5 claims 0.6 miles above the mouth of Dublin Gulch and ground sluices on the left limit of the gulch immediately below the lower left-limit pup.

Taylor has mined the ground intermittently since 1936, producing about 6,641 ounces of crude (?) gold. Silver and tungsten have also been produced. During 1963, Taylor, with the aid of his two sons, mined approximately 30,000 cubic yards from late May to October, which yielded 710 ounces of crude gold. Associated heavy minerals include: hematite, scheelite, ferberite, arsenopyrite, jamesonite, garnet, and cassiterite.

Equipment used includes an automatic gate-equipped dam, a 977 Traxcavator, and a 48-inch by 30-foot sluice-box.

When visited by Godwin in late July, Taylor was mining a cut on the extreme left limit of Dublin Gulch that exposed the following section:

	Thickness in feet	
	Unit	Total from base
Vegetation and organic rich soil.....	3	56
Medium brown clayey cobble gravel. Cobbles are subangular, platy, and composed mainly of schist and quartzite. Locally grey organic silt lenses occur. One pan from the lower 5 feet of this unit yielded no gold.....	15	53
Banded, dark grey organic silt. Bands, ranging from 1/2 to 6 inches in thickness, are caused by variations in the content of organic material. Locally there are wood fragments, lenses of peat, rust stains, and sand and gravel lenses. Along strike the bands are discontinuous and pinch and finger out. One pan from this unit yielded no gold	9	38

	Thickness in feet	
	Unit	Total from base
Brown boulder gravel-fill(?). Boulders and a few cobbles make up about 65 per cent of this unit, which includes: (a) well rounded, irregularly shaped, granite; locally, many of these boulders and cobbles are rotten; (b) well rounded quartzite; (c) subrounded platy schist; and (d) minor, well rounded, blocky cobbles of white quartz. The matrix is composed of grey silt and rusty sand containing abundant mica. One foot from the top of this unit occurs an 1/2 foot thick band of the overlying silt unit. Near the bottom of this unit, boulders are mainly granite and up to 3 feet in maximum diameter. Three pans, each across 2 feet, were taken from the top, middle, and bottom of this unit, and yielded 1, 4, and 8 colours of gold respectively	26	29
Shattered bedrock. Angular plates 1 to 6 inches across are separated by sand and silt, and are oriented erratically. One pan from this unit yielded 9 colours of gold	1	3
Bedrock - platy quartz sericite schist. About 2 feet of this schist was excavated	2	2

Double S Placers Limited (64°02'N, 135°49'W)

References: Skinner (1961, p. 14; 1962, p. 17); Green and Godwin (1963, pp. 58-59).

Double S Placers Limited, owned by G. Smashnuk, was inactive in 1963.

JOHNSON AND HIGHET CREEKS AREA

Highet Creek

E.C. Bleiler (63°46'N, 136°11'W)

References: Skinner (1961, pp. 15-16; 1962, p. 19); Green and Godwin (1963, pp. 60-61).

E.C. Bleiler owns 36 placer claims and a 1-mile lease on Highet Creek. With his son he operates a hydraulic-sluicing plant about 1/2 mile above his camp; the latter is at the mouth of Dredge Creek and 13 miles along the Highet Creek road from the Mayo-Elsa road.

Bleiler has recovered 530 ounces of crude gold from Highet Creek from 1958 to 1962. During 1963, approximately 20,000 cubic yards were mined from 18 June to 3 October, yielding 400 ounces of crude gold. Equipment includes a sluice-box and grizzly, a 955H Traxcavator, a TD-14 bulldozer, and a monitor.

The right limit of the upper part of 79 above was worked this year. The first cut in 1963 was in the creek, but a flash flood silted it in on July 12. The operation, consequently, was moved to the right limit bench adjacent to this cut.

When visited by Godwin at the end of July the following undisturbed section was exposed in the bench cut:

	Thickness in feet	
	Unit	Total from base
Medium brown boulder gravel. Boulders, comprising approximately 30 per cent of the unit, are generally subangular, platy, and up to 2 feet in maximum diameter. Locally, especially near the bottom of this unit, the boulders have a common horizontal orientation. Matrix is predominantly clayey sand that contains abundant schist pebbles. In the middle of this unit, a laminated lens of brownish grey silt occurs that swells locally to a 5 foot thickness. One pan from the silt yielded no gold, but contained some other heavy minerals. At the base of the gravel unit, manganese stain on the boulders is pronounced. One pan from the lower 6 feet of the gravel gave good gold colours ...	14	16

	Thickness in feet	
	Unit	Total from base
Bedrock - quartz chlorite schist and blue micaceous clay. Foliation in the schist strikes S30°E, and dips 75 degrees southwest. One pan yielded a value of about 50 cents in bright yellow, flattened gold. About 2 feet of bedrock was excavated	2	2

Johnson Creek

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

References: Cairnes (1916, pp. 25-26)*; Skinner (1961, p. 16; 1962, p. 19); Green and Godwin (1963, pp. 61-62).

Barduson Placers Limited, owned by J. Sandanger, and H. Barchen, operate a sluicing plant on Johnson Creek (about 1/4 mile below Sabbath Creek). The property is joined to E. Bleiler's camp by about 6 miles of rough road.

From 1958 to 1962 about 2,274 ounces of crude gold were produced. During 1963 approximately 30,000 cubic yards were stripped and 35,000 cubic yards were sluiced from 5 June to 15 October, yielding about 950 ounces of crude gold. Equipment includes a D-6 and D-8 bulldozer, and a sluice-box.

The company mined the far left limit of claim 1 Above Discovery; this is on the left limit side of ground mined last year. Cairnes (1916, pp. 25, 26) described the Johnson Creek gravels as follows:

> "The deposits exposed in these workings are largely of glacial origin, and consist mainly of coarse gravels containing numerous large boulders, and cemented by a clayey matrix. These deposits exhibit in most places very imperfect sorting, and many of the gravel boulders are on edge. In places, close to bedrock, finer, heavier, more regular gravels occur which are gold-bearing."

*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 398-399).

BEAR CREEK AREA

J.J. Van Bibber (63° 39 1/2'N, 136°22'W)

J.J. Van Bibber holds a 2-mile placer prospecting lease on the left fork of Bear Creek. In September 1963 he put in a small bulldozer cut that yielded about 35 ounces of crude gold.

MAYO LAKE AREA

Davidson Creek

E. Friesen and S. Mosich (63°43'N, 135°24'W)

Reference: Skinner (1962, p. 20).

Partners E. Friesen and S. Mosich have a working agreement with A. Pelland, who owns 5 claims and a 2-mile placer prospecting lease on Davidson Creek. The property is accessible by a 5-mile cat road from a ford on Mayo River that is 1 1/2 miles below the Mayo Lake dam.

In 1963, Friesen and Mosich worked the left limit of Discovery claim, which is immediately above the main canyon of Davidson Creek. This area had previously been worked by Pelland who, in 1960 and 1961, produced a total of 83 ounces of crude gold (Skinner, 1962, p. 20). G. Rick, and partners D. Furguson and S. Hardy worked the area for a number of years around 1938 (H. Bostock, personal communication).

Friesen and Mosich started work on the creek 4 July 1963. Consequently, when visited by Godwin at the end of July, only the first cut had been excavated and it exposed the following section:

	Thickness in feet	
	Unit	Total from base
Moss, roots, and black organic soil	1	10 1/2
Dark, brownish grey boulder gravel. Diorite boulders comprise about 50 per cent of this unit and are usually 2 to 3 feet, and occasionally up to 5 feet, in maximum diameter. Some well		

	Thickness in feet	
	Unit	Total from base
rounded, spherical cobbles occur. Matrix consists of gravel, sand, and some clay. Wood fragments and peat occur in the bottom foot of this unit. At the contact with the underlying unit boulders are flat lying. One pan from this unit yielded no gold, but did yield some pyrite and magnetite	5	9 1/2
Dark grey sand. The sand appears washed and is composed of flaky schist grains (locally 1/2 inch across), and contains little silt or clay. One pan yielded 8 fine colours of gold	1/2	4 1/2
Light brown silty cobble clay. Well rounded platy cobbles and the occasional boulder comprise about 20 per cent of this unit. One pan yielded 5 colours of gold, and associated magnetite, some of which was octahedral	2	4
Bedrock - shattered, platy, graphitic quartz mica schist. Foliation is approximately horizontal. Silty material from the overlying unit has settled about 4 inches into the bedrock. One pan yielded no gold, but several pyrite cubes, 2 mm. across, were found. Bottom of this section marks the bottom of the cut and is about 7 feet below the level of Davidson Creek	2	2

The boulders in the upper unit make mining difficult. Gold appears to be concentrated in the 2-foot section of silty boulder clay that occurs immediately above bedrock. The ground has the advantages of generally having a year-around supply of water, and of having only local areas of frozen gravel.

During the 1963 season, Friesen and Mosich mined and sluiced approximately 2,500 cubic yards of gravel that yielded about 67 ounces of crude gold. A washout just before clean-up on 25 September disrupted the sluice-box and resulted in a loss of some of the gold. Equipment used includes a 955 Traxcavator, and a 30-foot sluice-box with an 18-foot dump-box.

Gold consists of very flat flakes that are generally less than 2 mm. in maximum diameter. Other heavy minerals include: pyrite, magnetite, hematite, ilmenite, barite, garnet, scheelite, and zircon.

J. Waugh (63°42'N, 135°23'W)

J. Waugh holds a 1-mile placer prospecting lease, approximately 1 mile above A. Pelland's Discovery claim, on Davidson Creek.

From 15 July to 31 August 1963, Waugh, with one assistant, recovered 14 ounces of crude gold. Equipment includes a D-8 bulldozer, and a 25-foot long steel sluice-box with a 15-foot hopper.

When visited by Godwin at the end of July, Waugh was set up below a cliff of schist on the right limit of the creek where Waugh believed the gold was concentrated. He has mined upstream from the bottom end of his lease. On the lower end of his lease an old cut, about 25 to 30 feet long, indicated previous mining. To avoid the problem of putting large boulders through the sluice-box (see previous section re Pelland's Discovery claim) the top of the gravels was stripped removing the concentration of boulders. Gold, concentrated near bedrock, is flaky and similar to that found downstream on Pelland's ground.

WHITEHORSE MINING DISTRICT

KLUANE LAKE AREA

Burwash Creek

Burwash Mining Company Limited (61°23'N, 139°15'W)

References: Skinner (1961, pp. 17-18; 1962, pp. 20-21); Green and Godwin (1963, p. 63).

Burwash Mining Company Limited owns 22 claims, and operates a sluicing plant on claim 13, which is 5.8 miles from the Alaska Highway along the Burwash Creek road.

From 1945 to 1962 the company has recovered about 20,137 ounces of crude gold. In 1963, H. Besner, president and operations manager of the company, directed three men working one shift a day. They mined approximately 50,000 cubic yards from 6 June to 10 October, yielding 1,060 ounces of crude gold and 16 ounces of platinum.

Equipment includes a 3/4-cubic-yard Bucyrus-Erie diesel shovel and two D-8 bulldozers. The diesel shovel moves the gravel onto a grizzly over a 50-foot sluice-box, and the bulldozers are used for stripping overburden and stacking tailings.

CARMACKS AREA

Nansen Creek

T. Wheeler (62°06'N, 137°12'W)

Reference: Green and Godwin (1963, p. 64).

T. Wheeler operates, on a part time basis only, a bulldozer-sluicing plant on a 1-mile lease on the east fork of Nansen Creek. In 1963, because of difficulty in getting equipment to the property, sluicing was carried out for only 18 hours. Twenty-three ounces of crude gold were produced.

COAL MINING

WHITEHORSE MINING DISTRICT

CARMACKS AREA

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

References: Cairnes (1910, pp. 52-53); Bostock (1936a, pp. 59-62; 1938, p. 13; 1939, p. 17; 1941, pp. 26-27); Wheeler (1961, p. 74); Skinner (1961, p. 30; 1962, p. 30); Green and Godwin (1963, p. 65).

The Yukon Coal Company Limited, which is owned by Territorial Supply Company Limited, a subsidiary of United Keno Hill Mines Limited and Cassiar Asbestos Corporation Limited, operates the Tantalus Butte coal mine under management of United Keno Hill Mines Limited. The mine is at Carmacks, about 100 miles north-northwest of Whitehorse. The Tantalus Butte mine has operated since about 1923, except for the years 1939 to 1948. The Yukon Coal Company was formed in 1947 and the mine reopened in 1948. Production by Yukon Coal Company Limited from 1948 to 1963 inclusive was 109,943 tons. Annual production during this period has varied from less than 4,000 tons to a maximum of 14,113 tons in 1954. In 1963, production was 8,232 tons, which, with the exception of about 144 tons, was used by United Keno Hill Mines Limited at Elsa and Calumet. A maximum crew of 10 men is employed.

The main entry, elevation 2,056 feet and about 350 feet above the Yukon River, follows the main coal seam northward for 2,300 feet. The seam dips about 55°W. When visited late in 1963, most of the production was coming from a south-raking block that is bounded by northeast-trending, steep southeasterly dipping faults, which cross the main entry about 1,300 and 1,800 feet from the portal. The seam within this block averages about 11 feet in thickness. It has been developed by six counter entries above the main entry and raises, some of which reach the surface. Mining, using the room and pillar method, was being carried out from a number of counters. Exploration was also being carried out beyond the northern fault.

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

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