GEOLOGICAL SURVEY OF CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PAPER 65-19

THE MINERAL INDUSTRY OF YUKON TERRITORY AND SOUTHWESTERN DISTRICT OF MACKENZIE 1964

L. H. Green

Price, 75 cents

1965

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Available by mail from the Queen's Printer, Ottawa,
from Geological Survey of Canada,
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Price 75 cents Cat. No. M44-65/19

Price subject to change without notice

ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, Canada
1965

CONTENTS

	Page
Abstract	v
Introduction	1
Transportation	1
Mineral production of Yukon	2
Lode exploration in Yukon	6
Placer exploration in Yukon	7
Mineral production and exploration, Nahanni Mining District, District of Mackenzie	7
Lode mining and exploration	7
Mayo Mining District	7
Galena and Keno Hills and adjacent areas	7
Snake River area	22
Dawson Mining District	23
Fifteenmile River area	23
Fortymile area	25
Whitehorse Mining District	28
Dawson Range area	28
Dezadeash area	35
Ross River area	36
Glenlyon Range area	38
Whitehorse area	40
Wheaton River area	42
Watson Lake Mining District	42
Pelly Mountains area	42
Pelly Plateau area	43
Rancheria River area	44
Frances Lake area	45
MacMillan Pass area	47
Mackenzie (N.W.T.) and Mayo Mining Districts	48
MacMillan Pass area	48
Nahanni Mining District	50
Selwyn Mountains area	50
Mackenzie Mountains area	51
Placer mining	52
Dawson Mining District	52
Klondike area	52
Clear Creek area	65
Sixtymile River area	66
Kirkman Creek - Stewart River area	67
Arctic Coast area	69
Mayo Mining District	70
Haggart Creek and Dublin Gulch area	70
Highet and Johnson Creeks area	73

CONTENTS (cont.)

Page

Duncan Creek area 78
Whitehorse Mining District 80
Kluane Lake area 80
Dawson Range area 81
Coal mining 82
Whitehorse Mining District 82
Carmacks area 82
References 85
Index of operations and locations 90

Table I. Representative transportation costs for Yukon Territory, 1964 3

II. Mineral production of Yukon Territory 4

III. Yukon placer gold production, 1964 5

IV. Mineral claims recorded, Yukon Territory 6

ABSTRACT

The paper deals with developments in the mineral industry of Yukon Territory and southwestern District of Mackenzie during 1964. It is the fifth 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 1964, the estimated value of mineral production of Yukon was $15,210,744. Most of this was from silver, lead, and zinc produced by United Keno Hill Mines Limited, the sole lode mine in the Territory.

In lode exploration, development work in a number of properties gave promising results, particularly on Cassiar Asbestos Corporation Limited's Clinton Creek asbestos property and New Imperial Mines Limited properties in the Whitehorse Copper Belt. Brief descriptions of most active and a few inactive lode properties are given.

In placer mining, production in 1964 increased slightly over previous years. The Yukon Consolidated Gold Corporation continued dredging operations in the Klondike area and a number of independent operators were active throughout the Yukon.

MINERAL INDUSTRY OF YUKON TERRITORY AND SOUTHWESTERN DISTRICT OF MACKENZIE, 1964

INTRODUCTION

This is the fifth of an annual series of papers on developments in the mineral industry of Yukon Territory and the southwestern District of Mackenzie. Much of the report is based on visits by the author 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 author is 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.

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 to 1963 by Green and Godwin (1963, 1964).

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-round 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 governments participate in construction costs of roads to potential resource-exploiting projects, including mining, forestry, and agriculture.

Operators of fixed-wing aircraft maintain bases at Whitehorse, Watson Lake, Dawson, and Mayo, and light aircraft, either float-, ski-, or wheel-equipped, are available throughout the year. One helicopter operator maintains a year-round base at Whitehorse, but in the middle of the 1964 field season all machines were under contract. However, most of the companies and individuals using the machines were extremely cooperative in releasing them for short jobs on an hourly basis. In recent years, the use of helicopter transport has played an increasingly important role in exploration and has made it possible for operations to be extended into areas formerly considered virtually inaccessible.

A comparison of transportation costs 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 1962 to 1964, is given in Table II.

The only lode producer in the Yukon during 1964 was United Keno Hill Mines Limited on Galena and Keno Hills. In the 15 month period ending 31 December 1964, the company sold silver-lead-zinc concentrates valued at $14,609,549 before the deduction of smelter charges, freight, and marketing expenses. The Yukon Coal Company Limited, which is affiliated with the above company, produced 7,220 tons of coal from their mine at Carmacks.

TABLE I

Representative Transportation Costs for Yukon Territory, 1964

RAIL AND BOAT (container ship every 2 weeks)

Ore and Concentrates - Whitehorse to North Vancouver
Commodity Rate on 30,000 lb. carloads

Lead or Zinc Concentrates	$16.00 per ton
Asbestos Fibre	18.25 per ton

Mining Equipment and Supplies - North Vancouver to Whitehorse
Commodity Rate on 10,000 lb. carloads $2.98 per 100 lbs.

TRUCK

Basic rates, Whitehorse from Edmonton and Vancouver

Pounds	100	5,000	10,000
From Edmonton			
(Dollars per 100 lbs.)	6.90	5.50	5.35
From Vancouver			
(Dollars per 100 lbs.)	6.50	5.50	5.00

(Commodity rates in effect for many items)

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

Express rates, Whitehorse from Edmonton and Vancouver

Pounds	1-2	2-10	10-20	40-50	90-100
From Edmonton					
Dollars	1.75	2.25	3.00	5.60	12.50
From Vancouver					
Dollars	2.85	3.50	5.30	9.20	18.75

AIR - (daily except Sunday)

Air Express and Air Freight, Whitehorse from Edmonton and Vancouver

	Edmonton to Whitehorse	Vancouver to Whitehorse
Air Express		
Minimum	$ 1.50	$ 1.50
Dollars per lb.	.43	.49
Air Freight		
Minimum	5.25	5.25
Dollars per lb.	.21	.21
Dollars per 100 lbs.	18.00	18.00

CHARTER AIRCRAFT

Type	Rate per Hour	Rate per Mile
Fixed Wing		
Cessna 180	$ 60.00	$ 0.55
Beaver	80.00	0.77
Helicopter		
Bell G-2	103.00	Not applicable
Hiller 12-E	130.00	Not applicable

TABLE II

Mineral Production of Yukon Territory[a]

Mineral		1962	1963	1964[b]	Cumulative Total (1886 to Dec. 31, 1964)
Gold	fine oz.	54,805	55,211	57,075	11,006,904
	$	2,050,255	2,084,215	2,154,581	258,046,915
Silver	fine oz.	6,482,244	6,106,037	5,584,497	137,289,964
	$	7,551,814	8,450,755	7,818,296	109,140,114
Lead	lb.	16,290,125	16,978,607	18,927,109	446,185,278
	$	1,615,980	1,867,647	2,543,803	47,829,317
Zinc	lb.	11,888,876	11,850,706	14,291,939	217,112,122
	$	1,438,554	1,514,520	2,025,168	28,804,500
Cadmium	lb.	134,493	135,885	192,522	2,439,391
	$	231,328	326,124	577,566	4,587,947
Copper	lb.	429,000			14,372,285
	$	132,990			3,101,783
Tungsten	lb. (WO_3)	3,580[e]			32,169
	$	1,611			27,499
Platinum	fine oz.				19[c]
	$				1,553[c]
Coal	tons	7,649	8,231	6,792	261,917
	$	115,198	123,675	91,330	2,412,505
Total	$	13,137,730	14,366,936	15,210,744	453,952,133

[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.

[e] From Canada Tungsten Min. Corp., District of Mackenzie.

Placer gold production in 1964 is listed in Table III, which is compiled from information supplied by operators and by Mining Recorders' reports. Most of the production was by the Yukon Consolidated Gold Corporation. This company operated 6 dredges and a bulldozer sluicing plant in the Klondike area, and produced 43,639 ounces of fine gold and 8,817 ounces of silver worth $1,540,567. Other small-scale placer operations throughout the Yukon produced about 18,110 ounces of crude gold. Many placer operators receive assistance under the Emergency Gold Mining Assistance Act.

TABLE III

Yukon Placer Gold Production, 1964

District	Area	Number of Operators	Approximate Production of Crude Gold (ounces)
Dawson	Klondike: Y.C.G.C.*	1	53,702
	Other	19	11,611
	Clear Creek	1	1,057
	Sixtymile River	3	200
	Kirkman Creek and Stewart River	3	1,128
Mayo	Haggart Creek and Dublin Gulch	2	1,720
	Highet Creek and Johnson Creek	3	923
	Duncan Creek	1	294
Whitehorse	Kluane Lake	1	946
	Dawson Range	2	128
Other			103
Total		36	71,812

*The Yukon Consolidated Gold Corporation, Limited.

LODE EXPLORATION IN YUKON

The year was an active one, but differed from previous years in that most companies directed their efforts towards the examination of previously known deposits rather than the prospecting of new areas. In addition to the companies, small syndicates and individuals were active.

In the Dawson area, Cassiar Asbestos Corporation Limited continued an extensive exploration program on their Clinton Creek asbestos deposit and late in the year announced that 12,300,000 tons of ore had been indicated by their work. In the Whitehorse area, New Imperial Mines Limited carried out diamond drilling throughout the year and early in 1965 announced that 3,300,000 tons of copper ore had been indicated. In the Carmacks area, Discovery Mines Limited (formerly Ormsby Mines Limited) continued underground exploration and the installation of a surface plant, and Mount Nansen Mines Limited prepared for an underground program. In the Mayo area, United Keno Hill Mines Limited reported encouraging results for the second year of their expanded exploration program. In the same district, Peso Silver Mines Limited carried out two underground operations. In the Ross River area, a number of companies carried out exploration programs in the vicinity of the Vangorda lead-zinc deposit.

The most interesting new discovery, first found in 1963, consists of a number of lead-zinc showings staked by Norquest Joint Venture in the Frances Lake area. These appear to be replacement deposits formed in limy bands within a sequence of gneisses. The showings are in an area not previously known to contain showings of this type.

TABLE IV

Mineral Claims Recorded, Yukon Territory

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

Mining District	1960	1961	1962	1963	1964
Dawson	244	202	135	283	48
Mayo	165	618	1269	347	607
Watson Lake*			758	1046	349
Whitehorse	928	1642	1002	1052	1819
Total	1337	2462	3164	2728	2823

*District established 27 April 1962.

PLACER EXPLORATION IN YUKON

Very little exploration was done for new placer deposits during 1964, and many of the operators, including the Yukon Consolidated Gold Corporation Limited, are nearing the end of operations on their present ground. Aside from dredging operations on the more important creeks, the introduction of the bulldozer-sluicing plant in the late 1930's made it possible to mine many areas formerly considered uneconomic. However, new ground suitable for the installation of bulldozer-sluicing plants is becoming increasingly difficult to obtain, particularly in the Klondike area, and, barring an increase in the price of gold, the number of operations of this type will probably decrease in the next few years. Developments that could make additional ground economic for mining may include new methods of materials-handling, the use of sprinkler systems for thawing and removal of deep sections of frozen muck, and the exploration of remote areas using new techniques of winter road building and of rapid drilling, such as the overburden drill.

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

Canada Tungsten Mining Corporation Limited reopened their tungsten property in the Flat River area during the year. The company mined 59,764 tons from the open-cut between late June and mid-September and had milled 33,543 tons at year-end. Redstone Mines Limited continued exploration of a bedded copper deposit discovered in 1962 near Little Dal Lake.

During 1964, 356 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 AND ADJACENT AREAS

(Silver-Lead-Zinc)

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

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

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 15 month period ending 31 December 1964 was $14,609,549. 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 31 December 1964 was 2,480,639 tons of ore, from which 91,701,669 ounces of silver, 331,609,723 pounds of lead, 245,303,748 pounds of zinc, and 3,256,125 pounds of cadmium, valued at about $135,517,500 were recovered. As of 31 December 1964 the company owned 683 and in part owned 13 mineral claims, all located in the Galena Hill-Keno Hill area. Employees at this date totalled 579 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 34,925 dry tons in the 15 month period ended 31 December 1964, 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 15 month period ending 31 December 1964, the production came from the Hector-Calumet, Elsa, Keno, and Silver King mines with minor ore from Onek, Galkeno, and Comstock-Keno and other properties. The following summary of operating results is taken from the Annual Reports of the Company:

	12-Month Period Ended 30 September		15-Month Period Ended 31 December
	1962	1963	1964
Dry tons milled	184,123	186,721	227,845
Daily milling rate in tons	504.4	511.5	497.5
Mill heads:			
Silver (oz./ton)	40.55	34.03	33.37
Lead (%)	5.84	5.44	6.38
Zinc (%)	4.42	4.69	4.92
Metal production			
Silver (oz.)	7,000,837	5,978,075	7,270,911
Lead (lb.)	17,587,767	16,751,012	26,304,902
Zinc (lb.)	13,885,884	14,759,821	19,965,295
Cadmium (lb.)	184,364	199,708	245,453
Metal sales[a]	$9,635,252	$10,110,038	$14,609,549
Source of ore treated in mill			
Hector Mine (%)	8.98	64.96	53.81
Calumet Mine (%)	63.03		
Elsa Mine (%)	20.20	15.44	13.00
Keno Mine (development) (%)	5.87	6.73	19.85
Silver King Mine (development) (%)	1.84	10.80	10.45
Galkeno Mine (development) (%)	0.08	0.08	0.25
No Cash (development) (%)		1.00	
Comstock Keno (development) (%)		0.99	2.07
Onek			0.48
Ore reserves			
Tons	445,630[b]	493,955[b]	459,000
Silver (oz./ton)	38.41	34.58	34.10
Lead (%)	7.12	6.59	6.90
Zinc (%)	5.08	5.50	6.20

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

[b] Exclusive of the Onek property for 1962 and 1963.

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 15 month period ending 31 December 1964 this consisted of a total of 17,852 feet of drifting and crosscutting, 5,859 feet of raising, 505 feet of shaft sinking, 18,811 feet of underground diamond drilling and 5,261 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 15 month period — 6,045 feet of drifting and crosscutting, and 3,345 feet of raising was carried out mainly on the lower levels.

The Keno Mine, near Keno Summit, was brought into production in October 1963 after a number of years of development work. In the Keno Summit area, three parallel longitudinal vein faults strike east-northeast and dip steeply south and are referred to from north to south as the Main Break (Fault), the No. 6, and the No. 14 or Porcupine. Numerous transverse vein faults that strike northeast and dip steeply southeast occur between the Main Break and the No. 6 longitudinal fault; these have been referred to as the No. 2, 3, 4, 5, 7, 8, and 9 vein faults (Boyle, 1956, Fig. 7). 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 Pocupine, 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. In June 1964, the company let a contract to sink an internal shaft to establish 3 levels below the 700 level adit. At year-end, the shaft had reached a depth of 338 feet and the stations for two levels had been established. Development work carried out during the 15 month period ending 31 December 1964 above the 700 level — 3,459 feet of drifting and crosscutting, 1,108 feet of raising — was largely directed towards preparation for mining on the No. 9 vein.

At the Elsa mine (United Keno Hill Mines Limited, 1961) a vein system has been traced for 2,300 feet laterally. Among the more important veins are the 2 vein (striking N70°E and dipping 65°S), the 5 vein (striking N60°E and dipping steeply south), the 15 vein (striking N10°E and

dipping 30°W), and the 17 vein (striking N20°E and dipping 60°S). 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 15 month period — 2,162 feet of drifting and crosscutting, and 610 feet of raising — was carried out mainly on the 17 vein.

At the Onek mine, located near the village of Keno Hill, rehabilitation of old workings started early in 1964. During the year, the 400 level adit and some of the underground workings were rehabilitated and mining commenced above the 400 level. The mine last operated in 1952, at which time declining metal prices forced closure. Reserves at that time were stated as 123,491 tons, averaging 10.27 ounces of silver per ton, 4.4 per cent lead, and 13.0 per cent zinc. The Onek system (Boyle, 1956, pp. 29-31) consists of a principal vein fault, striking N45°E and dipping steeply SE, with subsidiary intersecting and subparallel vein faults and fractures. The main fault has been traced underground on the 400 level for about 1,300 feet along the strike. The vein, containing sphalerite, galena, and siderite, is often richest at the intersection of the branching subsidiary faults. When visited by the writer in October 1964, the 428 stope, near the Fisher shaft, showed a vein about 8 feet wide with a band of steel galena about 18 inches wide in the centre and much sphalerite and siderite on the footwall side. New development work carried out during the 15 month period ended 31 December 1964 included 51 feet of drifting and 49 feet of raising.

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 15-month period, consisting of 413 feet of raising, was carried out for the purpose of stope development.

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 15 month period consisted of 2,279 feet of drifting and crosscutting mostly on the Sime vein on the 400 level.

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° 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. Late in 1963, the 500 adit, intended to cut the No Cash vein about 250 feet below the 225 level was started and at the end of 1964 had been advanced 3,686 feet.

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. Development work carried out in the 15 month period ending 31 December 1964 included 63 feet of drifting and crosscutting and 290 feet of raising.

Surface exploration carried out during the year, mainly on Galena Hill, included detailed prospecting, soil sampling, geophysical surveys, overburden drilling and diamond drilling. Two overburden drills, operating mainly in the vicinity of the Silver King and Elsa mines, completed about 105,000 feet of drilling. The drill holes were completed to bedrock and the cutting 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

(Silver-Lead)

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

References: Boyle (1957, p. 29); Green and Godwin (1964, p. 14).

Jersey Consolidated Mines Limited, which succeeded Jersey Yukon Mines Limited on 11 May 1964, holds 54 claims on Galena Hill including the Eagle property and the adjoining Manzana claim. The main Eagle showing is at an elevation of about 4,300 feet.

During the 1964 season, the company built a switch-back road about 1.5 miles in length from the Galkeno road to the property, did bull-dozer trenching, and put in 28 diamond drill holes with a total length of about 6,561 feet. Up to 11 men were employed. The property was visited by the writer in mid-October 1964.

The Eagle vein strikes about N60°E and dips 55°SE. In 1963, the vein was stripped for about 700 feet and one small lens of galena-rich rock exposed (Green and Godwin, 1964). In 1964, two trenches were put in to intersect the vein about 200 and 300 feet northeast of the 1963 cut, but the vein was not located. Twelve short diamond drill holes were drilled in vicinity of the pod of galena-rich rock exposed in the open-cut and 5 long holes were drilled to explore at depth both the Eagle vein itself and for other vein faults parallel to it. One of the five holes (No. 13) cut a mineralized zone between 140 and 150 feet (Northern Miner, 3 September 1964) and the sludge samples from 136 to 143 feet were reported to assay 54.9 ounces of silver per ton, 12.8 per cent lead, and 4.2 per cent zinc.

Keno Hill

(Silver-Lead)

Gold Queen Property (Rio Plata Silver Mines Limited) (63°57'N, 135°10'W)

Reference: Boyle (1956, Map 55-30).

Rio Plata Silver Mines Limited holds 13 claims, including the Gold Queen property, in the Silver Basin area of Keno Hill. The claims were purchased in late 1962 from Yukeno Mines Limited. In 1964, Rio Plata Silver Mines Limited made an agreement with Peso Silver Mines Limited under the terms of which the latter company was to undertake development work on Rio Plata's properties on Keno and Galena Hills.

The Gold Queen property is accessible by a rough road, about 2 miles in length, that leaves the Keno Summit area near the No. 9 property, skirts the face of Monument Hill, extends along the ridge separating Faro and Silver Basin Gulches, and then crosses the steep face of Silver Basin Gulch to the property, which is at an elevation of about 5,000 feet. The showing was visited by the writer in October 1964.

The showing occurs in blocky, thick-bedded, blue-grey quartzite, one of three bands of quartzite that Boyle (1956, p. 8) refers to as the Caribou Hill quartzite. The quartzite is similar in lithology, but apparently stratigraphically below the Central Quartzite formation that crosses Keno and Galena Hills. Near the showing, the quartzite has a strong bedding plane foliation, which strikes S60°E and dips 35°SW.

The showing occurs in a fault that strikes about N60°E and dips 60°SE. Old workings appear to consist of a short adit, now caved, and ground sluicing in a draw about 150 feet to the southwest. During the 1964 season, a bulldozer cut was put in above the old adit and two small pits sunk in the floor of the cut. The draw that has been ground sluiced is about 5 feet wide, and on the southeast side exposes a slickensided face of quartzite with a thin and irregular veneer of siderite and galena that is seldom more than one inch thick. A sample from this veneer containing galena assayed*: 123.1 ounces of silver per ton, 17.8 per cent lead, and 0.7 per cent antimony.

The bulldozer cut and the small pits in the floor of it expose quartzite containing veins and irregular patches of siderite, some of which contains visible tetrahedrite. The amount and thickness of siderite appears to be variable. A composite sample of siderite with visible tetrahedrite taken in place from the floor of a pit assayed*: 33.2 ounces of silver per ton, 0.2 per cent lead, and 0.3 per cent antimony. In addition, a few of the larger blocks of siderite lying in the floor of the cut and on the spoil pile contained tetrahedrite in blebs up to 5 mm. in diameter. A composite sample of this material assayed*: 929.3 ounces of silver per ton, 0.4 per cent lead, and 3.9 per cent antimony. As exposed, the vein appears narrow, but silver values are high and the presence of blocks of barren siderite to 3 feet in diameter in the spoil pile and dump from the adit indicates that the vein may widen in places.

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

Bunker Hill

(Silver-Lead)

Homestake Group (Lustre Yukon Mines Limited) (63°54 1/2'N, 135°12 1/2'W)

References: Cockfield (1930, p. 10; 1931, p. 9)*; Bostock (1939, p. 14); Boyle (1956, Map 55-30).

The Homestake group of 19 claims and 3 fractions is held by R.G. Lee and associates, including Lustre Yukon Mines Limited. The group is reached by a rough road, about 1.7 miles in length, which leaves the road to the Mount Keno property and fords Lightning Creek near the

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 604-605 and 616 respectively).

mouth of Thunder Gulch. The showings are at an elevation of about 4,500 feet.

The property is an old one and was visited by Cockfield in 1929 and 1930, and Bostock (1939) reported that a few tons of galena ore running 200 ounces of silver to the ton had been shipped from the property in the past. The group was optioned to United Keno Hill Mines Limited in 1962, but the option was dropped late in the same year. In recent years, considerable bulldozer trenching has been done on the property. The author visited the group in October 1964.

The host rock of the showing is mapped (Boyle, 1956) as massive grey quartzite of the main band that crosses Keno and Galena Hills. Some thick-bedded quartzite was observed on the group, but near the showings thin-bedded rocks occurring within the quartzite unit and consisting of grey and black phyllite and thin bedded quartzite, predominate. Foliated greenstone (altered diorite or gabbro) also occurs.

Work has been done on two vein fault systems about 700 feet apart. On the western one, workings described by Cockfield (1930 and 1931) consisted of two shafts, 32 and 42 feet deep, with a short drift at the bottom of the deeper shaft, none of which were accessible at that time, and a number of open-cuts. Vein material is reported to have been siderite with galena and tetrahedrite. No further work appears to have been done underground subsequent to Cockfield's visits. The dump from the shafts contains much siderite, some of it in blocks to more than 1 foot in diameter. A small amount of galena is also present in the siderite. Outcrop is poor in the vicinity of the shaft, but the presence of a considerable amount of foliated greenstone, both in blocks on the surface and on the dump, suggests that the shaft was sunk along a siderite-bearing vein in altered greenstone.

The eastern vein fault has been exposed in a bulldozer trench about 600 feet long and trending N55°E. Near the northeast end, the southeast side of the cut exposes a foliated greenstone, about 25 feet thick, which overlies phyllite and massive quartzite and is overlain by grey and black phyllite with a few quartzite beds and a thin discontinuous band of brown weathering, white limestone. The northwest side of the cut partly exposes a similar greenstone about 80 feet to the southwest of that on the opposite side, suggesting a left-hand displacement on the fault. Rocks exposed on both sides of the cut exhibit a well-developed bedding plane foliation, which strikes about S60°E and dips 15 to 30 degrees south. Mineralization was observed on the southeast wall and in the floor of the cut. On the southeast wall, a rust- to yellow-weathering quartz vein, parallel to the cut, is exposed for about 65 feet and extends from near the base of the greenstone into the overlying phyllitic rock. The vein is not fully exposed, but is probably 1 foot or more thick. It carries scattered

sulphide minerals including pods of jamesonite and lesser amounts of arsenopyrite, sphalerite, and galena. A grab sample of material from the vein assayed*: 1.30 ounces of gold and 25.2 ounces of silver per ton, 39.7 per cent lead, 1.5 per cent zinc, and 4.4 per cent antimony. The owners report that erratic assays to as high as 13.5 ounces of gold per ton have been obtained from this vein. In the floor of the cut about 60 feet southwest of the quartz vein, thin stringers of galena occur on the fault contact between phyllite on the southeast side and altered greenstone on the northwest side. Disseminated galena and reddish brown sphalerite also occur in the greenstone near the contact. A grab sample of the latter assayed*: 0.005 ounces of gold and 37.9 ounces of silver per ton, 11.4 per cent lead, and 2.7 per cent zinc. Blocks of galena to 1 foot in diameter are piled along the side of the cut in this area and are presumed to have come from the fault. A composite sample from these assayed: 0.01 ounces of gold and 104.4 ounces of silver per ton, 73.0 per cent lead, and 0.6 per cent zinc. No mineralization was observed in the remainder of the cut to the southwest although a considerable part of the latter does not appear to have reached bedrock.

It is perhaps significant that the bulk of the mineralization observed on the group occurs where one or both walls are in greenstone.

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

Mount Haldane

(Silver-Lead-Zinc)

Lookout (Mount Haldane) Property (63°52'N, 135°53'W)

References: Cockfield (1919, pp. 4B-6B; 1920, pp. 5B-6B)*.

During 1964, Silver Titan Mines Limited optioned 21 claims covering the Lookout property from M.H. Ewing and E.C. Bleiler, both of Mayo, Yukon. The property, at an elevation of about 3,600 feet, is located on Mount Haldane (Lookout Mountain) in the valley of Bighorn Gulch, a north-flowing tributary of South McQuesten River. The property may be reached by an access road about 7 miles in length that leaves the Mount Haldane road near the head of a tributary of Ross Creek or by a short, steep,

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*Reprinted in Geological Survey of Canada Memoir 284 (Bostock, 1957, pp. 464-466 and 486-487, respectively).

trail, about 1 1/2 miles in length, that leaves the same road about 1/2 mile to the east and crosses the westernmost spur of the mountain.

The showing is an old one and was explored prior to the main discovery on Keno Hill. When visited by Cockfield in 1919 (1920, pp. 5B-6B) about 930 feet of underground work had been completed from three adits and a fourth level developed from the lower adit. The upper adit was 50 feet in length and ended in a winze following the vein and 25 feet deep. The second adit, 39 feet below the upper and 90 feet to the north, reached the vein at 59 feet and followed it to beneath the winze, at which point a raise had been driven to within 6 feet of the latter. The third adit, 125 feet below the second and 320 feet to the north, reached the vein at 135 feet and followed it for 305 feet. The fourth level was reached by a winze, 55 feet measured along the slope, sunk on the vein from the third level 40 feet from the point where the adit cuts it and an incline, 90 feet in depth, sunk from 100 feet farther along the vein. The fourth level was driven from a point on the incline to the winze and extended north a few feet. Cockfield reported (1920) that the vein follows a well defined but irregular fracture in quartzite and quartz mica schist, striking from N25°W to N5°E and dipping 45°W to 55°W*. The hanging wall is generally well defined and marked by gouge, frequently showing an inch or more of impure graphite. The workings lie within the oxidized zone and the vein filling consists of manganese oxides, limonite, galena, secondary lead minerals, and quartz. The galena occurs in small streaks and masses, and Cockfield (op. cit.) reported several zones where hand-sorting could produce a shipping grade of ore, probably the largest of these being in the incline. Assays of five samples across unstated widths were given (op. cit.). Nos. 1 to 4 were taken in the incline at 10 foot intervals, 2 above and 2 below the 4th level, and No. 5 from the fourth level 10 feet from the incline.

No.	Gold oz. per ton	Silver oz. per ton	Lead per cent
1	0.02	43.48	29.80
2	0.01	34.34	28.20
3	Trace	37.20	40.60
4	0.03	45.57	36.60
5	Trace	28.80	23.20

*Bearings given by Cockfield have been corrected to astronomic. The direction of dip given by him appears to be in error and has been corrected.

Subsequent to Cockfield's visits little work appears to have been done on the property other than that the underground workings have been re-opened and sampled from time to time.

Work done by Silver Titan Mines Limited during 1964 consisted of reconstruction of the road to the property, erection of a small camp, geochemical prospecting, an extensive program of bulldozer stripping on the northeast face of Bighorn Gulch, re-opening the second, third, and fourth levels, and one diamond drill hole. A crew of up to 14 men was employed. The property was visited by the writer early in October, at which time a small crew was engaged in re-opening the old workings. The company reported (The Northern Miner, 24 December 1964, p. 15) that re-sampling of a part of the third adit indicated a shoot, referred to as the "A" vein, averaging 27.4 ounces of silver per ton, 2.0 per cent lead, and 0.7 per cent zinc across 2 feet for a length of 20 feet, with one end open, and of the winze a shoot referred to as the "B" vein, averaging 22.6 ounces of silver per ton, 18.0 per cent lead, and 1.2 per cent zinc across 3.2 feet, with the vein open at depth.

The Lookout showing occurs near the top of a thick section of massive blue-grey quartzite similar to that on Keno and Galena Hills. A major north-trending fault, presumed to lie just to the east of the workings, has displaced the quartzite containing the showing to the north (Green and Godwin, 1964, p. 16) and the vein fault may be related to this major structure. The bulldozer stripping on the northeast side of Bighorn Gulch was done over a difference of elevation of about 1,000 feet, mainly on the east side of the major fault. This slope is mantled by a thick layer of blocky quartzite talus, and many of the cuts did not reach undisturbed bedrock. The company reports (The Northern Miner, 24 December 1964, p. 15) that stripping about 2,500 feet north of the workings, exposed a 50-foot length of oxidized vein material with an average assay of 4.4 ounces per ton of silver, 0.6 per cent lead, and 1.8 per cent zinc across 25 feet. Farther up the slope, at an elevation of about 3,900 feet, early prospectors drove a small adit on a showing known as the Johnson vein. The adit is now caved, but the dump contains much oxidized material, part of which contains some galena. A picked composite sample of this material assayed*: 0.14 ounces of gold and 139.4 ounces of silver per ton, 60.5 per cent lead, and 0.5 per cent zinc.

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

South McQuesten River Valley

(Silver-Lead-Zinc)

Shanghai Property (63°56'N, 135°39'W)

References: Bostock (1947); Green and Godwin (1963, p. 9; 1964, p. 16).

The Shanghai property, on ground held by Silver Titan Mines Limited, is being developed by Peso Silver Mines Limited under an agreement with the former company. The property, located on the north slope of South McQuesten River valley, is reached by a road about 3 1/2 miles in length that leaves the Haggart Creek road about 4.2 miles from Proctor's sawmill.

Late in 1963, a small prospect adit was commenced to explore a fault zone beneath a bulldozer trench where a silver-rich grab sample had been obtained in late 1962 (Green and Godwin, 1963). Early in 1964, Peso Silver Mines established a camp and collared an adit at an elevation of about 2,250 feet, some 250 feet below the prospect adit. The adit intersected a vein zone about 350 feet from the portal and at year-end had been driven about 1,300 feet along it. An underground diamond drilling program of 13 holes with a total length of 1,690 feet and a surface program of 1 hole with a total length of 280 feet was also completed. Up to 30 men were employed.

Outcrop is poor along much of the north side of the valley of South McQuesten River, but near the showing there are a number of outcrops of quartzite west of the vein lineament and one east of it. On the lineament itself, where the high-grade float was found, a bulldozer cut was put down about 30 feet without reaching bedrock before it was abandoned because of sloughing. Underground the lithology of massive grey quartzite, chloritic and graphitic phyllite is similar to that of the massive quartzite member on Keno and Galena Hills and Bostock (1947) has included both in the same map-unit. The rocks show a strong foliation, in most places parallel to bedding, the foliation striking about N50° to 60°E and dipping about 35°NW. The vein zone had been traced about 700 feet when the workings were visited early in October, 1964. The zone has a general strike of about N50°E and a dip of 70°NW to vertical. As exposed in the face of the main drift at that time the zone had a massive quartzite hanging wall, marked by a strong graphitic slip, adjacent to which a band about 1 foot thick showed strong shearing and quartz lenses elongated parallel to the hanging wall contact. The remaining 6 feet exposed consisted of a breccia of fragments of massive quartzite

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

cemented by white quartz and minor calcite and mineralized with sphalerite and pyrite. Some of the quartz is in fine needle-like crystals. Siderite, typical of the deposits of the district, was lacking in the specimens collected. The sphalerite is lustrous, dark brown, and often coarsely crystalline and the pyrite frequently occurs in bright crystals to about 5 mm. The footwall of the zone was not exposed at the face, but the thickness is reported to be up to 20 feet. A specimen of the sphalerite-rich material taken near the face assayed*: 0.01 ounces of gold and 0.60 ounces of silver per ton, 0.02 per cent lead, and 17.5 per cent zinc. The company reports (The Northern Miner, 3 September 1964, p. 13) that the drift cut a length of 170 feet, averaging 8.2 feet wide, with an average grade of 1.08 ounces of silver per ton, 13.6 per cent zinc, 0.4 per cent lead, and 0.5 per cent copper.

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

Haggart and Secret Creeks

(Silver-Lead-Antimony)

Peso Silver Mines Limited (Rex Property) (64°00'N, 135°54'W)

References: Green and Roddick (1962); Skinner (1962, pp. 33-34); Green and Godwin (1963, pp. 14-15; 1964, p. 16).

During 1964, Peso Silver Mines Limited carried out an extensive underground exploration program on the Rex property. The property, about 2 1/2 miles east-southeast of the main camp near the Peso No. 1 vein, is reached by a road from the camp, which in turn is about 26 miles by road from the main Mayo-Elsa road.

Prior to the 1964 work, the Rex property had been explored by surface work, diamond drilling, and a shallow shaft. The adit, at an elevation of 3,550 feet and about 300 feet below the surface outcrop, intersected the Rex vein about 900 feet from the portal. The vein was explored for about 750 feet to the west and for 600 feet to the east. The total underground program involved about 3,500 feet of cross-cutting, drifting, and raising, and 31 diamond drill holes with a total length of about 3,500 feet. Up to 60 men were employed during the peak period and a small crew continued work until late October 1964.

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

Country rock of the showing is buff weathering, grey phyllitic quartzite and dark grey to grey-green phyllite of probable Precambrian age (Green and Roddick, 1962). The rocks are strongly foliated parallel to the bedding and show evidence of considerable shearing, although less deformed than rocks of similar lithology on the main Peso showing nearby. The Rex vein trends about N70°E and dips between 50° and 55°N. In the underground workings the vein appeared to have a strong, well defined footwall shear, but subsidiary subparallel breaks occur in the hanging wall.

When visited in mid-June 1964, the footwall shear was exposed in the main drive about 400 feet west of the intersection of the main crosscut. Here, the footwall rocks consisted of interbedded grey quartzite, with beds 2 to 3 inches thick, separated by bands of dark grey phyllite, 1 inch to 2 inches thick. The main shear was marked by a band of rubbery gouge about 1/2 inch thick, and the footwall rocks for about 4 feet below showed minor subparallel shears and some evidence of deformation. The zone itself consisted of a breccia of fragments of quartzite and phyllite mineralized with dark brown siderite, pyrite, and jamesonite. Hanging wall rocks were not exposed in the face, but nearby they consist of light grey phyllitic quartzite. A grab sample from the face, composed mainly of siderite darkened by fine needles of arsenopyrite(?) plus minor tetrahedrite and fine pyrite assayed*: 0.04 ounces of gold and 224.0 ounces of silver per ton, 8.9 per cent lead, 0.2 per cent zinc, 6.86 per cent antimony.

At the same date, the intersection between a shear about 50 feet in the hanging wall from the main footwall shear and a shear trending about N40°E was exposed in the 74 raise, about 270 feet west of the main crosscut. The face, about 70 feet above the level, showed from footwall to hanging wall, chloritic phyllite containing some pyrite, a 1/2 inch zone of black rubbery gouge in part with a pyrite-coated surface, 6 feet of breccia composed of fragments of chloritic phyllite and phyllitic quartzite cemented with siderite, minor bull quartz and sulphide minerals, and a hanging wall of chloritic phyllite. The gouge appears to be blackened by a high content of fine sulphide minerals, chiefly pyrite. Late in the season, the 74 raise was extended to within about 20 feet of the mineralized zone on surface, which assayed (Peso Silver Mines Limited, Annual Report 1963, p. 7) 0.01 ounces of gold and 44.0 ounces of silver per ton, 7.79 per cent lead, and 4.35 per cent antimony, over a length of 250 feet and an average width of 5.2 feet. When the writer visited the property early in October 1964, the face of the raise, about 300 feet above the level, showed from footwall to hanging wall; dark grey phyllite, a zone about 50 inches thick, the lower third of which contained siderite with some sulphide minerals and the remainder an altered breccia streaked with limonite and containing minor sulphides, and a hanging wall of grey phyllite.

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

In general, the shear in the footwall of the Rex vein appears to be much more continuous, contains more gouge, and shows more evidence of deformation along it than the subsidiary breaks in the hanging-wall. Some of the larger of the latter appear to turn into and join the main zone. Erratic mineralization occurs along the breaks, particularly at junctions between two subparallel breaks. Minerals identified in the veins are siderite*, quartz, jamesonite*, boulangerite*, galena, tetrahedrite*, pyrite, arsenopyrite*, and sphalerite. The siderite varies from light amber to an adamantine grey; the darker colour is produced by fine needles of arsenopyrite*, and possibly other minerals, within the siderite crystals. Jamesonite occurs as dense matted areas of fine crystals and probably as fine hair-like crystals, although one specimen of the latter was found to be boulangerite*. Tetrahedrite occurs as irregular grains to about 5 mm in diameter in the silver-rich parts of the vein. Fine grains of pyrite are common throughout much of the vein. Fine grains of pyrite are common throughout much of the vein. Tiny crystals of arsenopyrite* were identified in a jamesonite lens and are probably common to most of the high-jamesonite portions. Minor amounts of lustrous dark brown sphalerite are present.

Bindheimite*, a hydrous antimonate of lead, is widespread in the surface cuts on the Rex vein. Very minor amounts of a medium to dark green, nickel-bearing mica, were encountered both in the underground workings and the diamond drilling.

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*Identified by X-ray Diffraction Laboratory, Geological Survey of Canada.

SNAKE RIVER AREA

(Iron)

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

References: Bamber et al.(1963); Green and Godwin (1963, pp. 15-18; 1964, pp. 16-17).

Crest Exploration Limited, a wholly-owned subsidiary of the Standard Oil Company of California, holds 433 claims and 94 fractional claims in Yukon and 190 claims in the Mackenzie Mining District of Northwest Territories covering a major sedimentary iron deposit. The property is accessible from a 4,300 foot airstrip (65°21 1/2'N, 133°20'W) in the valley of Snake River, which is connected to the main camp (about 9 miles southeast of the airstrip) by road. While the camp was in operation transportation was supplied by a company aircraft operating from Whitehorse, Y.T. The nearest lake (65°28'N, 133°49'W) suitable for use

by float-equipped aircraft is about 20 miles northwest of the camp.

During the summer of 1963, a crew of up to 70 men was engaged in diamond drilling, sampling, claim surveys, and geological mapping. Until mid-August 1964 a crew of up to 9 men, supported by one helicopter, was engaged in mining 5 additional 2-ton bulk samples for metallurgical tests and in claim tagging and posting "J" forms. During the latter period, there were a large number of visitors to the property, including representatives from a Japanese Trading Company and several North American steel companies.

The deposit consists of unaltered hematite and jasper iron-formation occurring near the base of the Rapitan Group, a thick sequence of conglomeratic mudstone of probable Precambrian age. Most of the iron-formation occurs within a stratigraphic interval of about 400 feet, and, in the better part of the deposit, the upper 250 feet consists essentially of iron-formation with a few thin beds of clastic sediments. The iron-formation contains 40 to 50 per cent iron. A potential tonnage of many billions of tons is present and one open pit location alone is estimated to contain well over 1 billion tons, one half of which is completely exposed.

DAWSON MINING DISTRICT

FIFTEENMILE RIVER AREA

(Silver)

Silver City Property (64°18 1/2'N, 139°52'W)

References: Cockfield (1928, pp. 8A-10A)*; Green and Roddick (1962); Green and Godwin (1963, p. 20; 1964, pp. 18-19).

Silver City Mines Limited (N.P.L.), formed by some of the backers of the 1962 and 1963 work, has optioned 7 claims from J. Risco of Dawson, Yukon, covering the original showing and holds an additional 41 claims in the area. The showing, on the north bank of the river, is about 2 1/2 miles downstream from the mouth of Fifteenmile River. The property is an old one and has been prospected intermittently since about 1900. Cockfield (1928, p. 9A) reported that a shipment of 5 tons was made from material that occurred as float on the beach of the Camp Bird claim, the site of the present work.

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

During the summer of 1964, a crew of 4 men continued the hydraulic operation commenced in 1963, in an attempt to locate the source of the silver-bearing float. In the course of this work the adit driven in 1962 and 1963 was destroyed, but an earlier adit, driven by Risco about 300 feet above the river, and two adits near river level were exposed. None of the above was visible when the author visited the property in mid-July, but the owners report that they were able to examine one of the adits near river level later in the season. An estimated total of 75,000 cubic yards of overburden was removed in the hydraulic operation.

The area being explored lies on a steep slope above the Yukon River and is heavily mantled by talus. When visited, only the upper end of the cut, about 400 feet above the river, had reached bedrock, consisting of basic or ultrabasic rocks that had been altered to a rusty-weathering rock composed principally of dolomite, but containing some ankerite and streaks of green, nickel-bearing material, probably mica. On the slope above, this outcrop appears to be overlain by about 300 feet of grey phyllite, followed by about 100 feet of limestone and associated limy shale, and followed in turn by about 100 feet of altered greenstone. The rocks appear to strike northeast and dip to the northwest at about 30 degrees. On the hillside to the west of the cut a large buff exposes buff-weathering quartz carbonate rock underlain by grey phyllite and in fault contact with altered greenstone. The quartz carbonate rock consists of irregular bands of sugary white dolomite, somewhat finer grained ankerite (?, refractive iron-bearing dolomite* ankerite (?) refractive index No. about 1.715) and streaks of green, nickel-bearing material, probably mica. A specimen of the rock assayed*: trace of gold, 2.68 ounces of silver per ton, 1.3 per cent lead, and 0.1 per cent zinc.

Near river level, a small cut to the east of the main cut exposes similar quartz carbonate rock, apparently in place. Sulphide minerals were not observed in the material in place, but small amounts of scattered sulphide minerals, chiefly galena and sphalerite, were observed in loose material, presumably hand-sorted, along the sides of the cut.

Two specimens reported to have been selected from the hydraulicked material differed only from the outcrops on the hillside and in the lower cut in that they contained numerous lenses, up to about 10 mm in diameter, of galena and, less commonly, argentiferous tetrahedrite*. These assayed*: (i) 0.02 ounces of gold and 127.3 ounces of silver per ton, 3.8 per cent lead, and 0.2 per cent zinc and (ii) 0.005 ounces of gold and 47.1 ounces of silver per ton, 7.2 per cent lead, and 0.6 per cent zinc.

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

The quartz carbonate rock on the property is very similar to that observed at the Caley and Clinton Creek asbestos properties, about 10 miles to the west and 28 miles to the northwest, respectively, except that the iron-bearing carbonate is dolomite* rather than magnesite*. As at these properties, it is believed to have originated through the alteration of ultrabasic rocks, although the latter were not observed on the Silver City property. Sulphide minerals were not observed in the quartz carbonate rock on the asbestos properties, but they are also absent in much of the quartz carbonate rock on the Silver City property. Further exploration work should concentrate on tracing the quartz carbonate rocks on the property and determining the extent and distribution of sulphide minerals within them.

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*Identified by X-Ray Diffraction Laboratory, Geological Survey of Canada.

FORTYMILE AREA

(Asbestos)

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

References: Green and Roddick (1962); Green and Godwin (1964, pp. 19-21).

Cassiar Asbestos Corporation Limited holds 175 claims covering the property, discovered in 1957. The company did exploration work on the property in 1957 and 1958 and from 1963 on. During the 1964 season up to 41 men were employed in an exploration program involving diamond drilling, re-sampling of the underground workings, stripping, and geologic mapping. Early in 1965, the company announced (The Northern Miner, 4 March 1965, p. 1) that the property would be brought into production by 1968.

In the earlier work, a road about 26 miles in length was built to the property from near mile 37 on the Sixtymile road; the road follows the ridge line west of Mickey Creek to the valley of the Fortymile River, fording the river and then following the valley of Clinton Creek. Heavy winter snow on the Sixtymile road, difficulties with the ford on Fortymile River, and soft spots in the valleys of Fortymile River and Clinton Creek have limited the use of this road for heavy hauling. Nevertheless, in the spring of 1964 supplies were moved to the property by a winter tractor train over this route. In addition some supplies were freighted by river to Clinton Landing using the river freighter Brainstorm and barges. An airstrip, suitable for use by DC3 aircraft, is located on a ridge about 2 miles north of

the main camp in the valley of Clinton Creek. Float-equipped aircraft can land near the ford on Fortymile River, about 5 miles from the main camp, when the river is high, otherwise the landing is on the Yukon River at the abandoned town of Fortymile.

Late in 1964, the company announced (The Northern Miner, 10 December 1964, p. 1) that the continuity of the main (or Porcupine Hill) orebody explored in 1957 and 1958 had been established and that the extension of this orebody to the southwest had been explored by diamond drilling. A preliminary estimate of the ore outlined to date is 12,300,000 tons, with 6 to 7 per cent fibre, a current value of $12.32 per ton, and a waste to ore ratio of 2.4 to 1. Potential mill products from the property would be mainly of a cement fibre grade.

The continuity of the original 5,000,000 ton orebody was established by means of 29 horizontal drill holes with a total length of 4,310 feet drilled from the underground workings and three vertical holes with a total length of 1,337 drilled from the surface.

The extension of the main orebody to the southwest indicated by geophysical and geological surveys in the 1963 field season was tested by 10 vertical diamond drill holes with a total length of 5,897 feet drilled on 200 foot centres. In the drilling it was traced for 700 feet with an average horizontal width of 400 feet and was still open to the southwest. A hole, 512 feet in length, drilled 1,100 feet from the last intersection is reported (op. cit.) to have cut ultrabasic rock at a depth of 350 feet and passed through 122 feet containing 7.5 per cent fibre before it was lost due to caving. This suggests that the apparent plunge of 10 to 15 degrees to the southwest may flatten and that the intervening area could contain a sizeable area suitable for an open-pit operation.

The Clinton Creek property occurs in one of a number of small bodies of ultrabasic rock that occur in metamorphic rocks of the area (Green and Roddick, 1962). Enclosing metamorphic rocks observed on the property include shiny black phyllite, grey argillite, and brown weathering, micaceous, gritty quartzite. The body containing the showing is probably little more than a mile in maximum diameter. Typically, the serpentine is lustrous, green to grey-green, with numerous polished slip surfaces. Nearly all of the asbestos occurs as cross-fibre veins, generally 1/4 inch or less wide. Carbonates, present as thin veins and coating fracture faces, include calcite and dolomite. Part of the body has been altered to a buffy brown weathering quartz-carbonate rock composed of iron-bearing magnesite* (refractive index No. about 1.700), quartz, and lesser amounts

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*Identified by X-Ray Diffraction Laboratory, Geological Survey of Canada.

of white dolomite, and magnetite. In some specimens of this rock, the outline of replaced asbestos fibre is still visible.

(Asbestos)

Foxy Group (Asbestos Corporation (Explorations) Limited) (64°29'N, 140°44'W)

References: Green and Roddick (1962).

Asbestos Corporation (Explorations) Limited holds the Foxy 7 and 9 to 12 group of mineral claims located about 3 miles north of the Clinton Creek asbestos property adjacent to the landing strip for the latter. In June 1964, 2 diamond drill holes with a combined length of 990 feet were drilled on Foxy 11 claim. Both holes cut serpentinized ultrabasic rocks with traces of asbestos.

Cassiar Creek

(Asbestos)

Caley Property (64°18'N, 140°12'W)

References: Green and Roddick (1962); Green and Godwin (1964, p. 22).

Canadian Johns-Manville Company Limited optioned the Caley property from F. Caley and associates of Dawson, Yukon, in September 1963. The property, consisting of 51 claims, is located on the west side of Cassiar Creek about 2 miles from the mouth and is reached by an access road, about 9 miles in length, that leaves the Sixtymile road near mile 29.

The property, originally staked in 1956, was optioned to Conwest Exploration Company Limited, and subsequently transferred to Cassiar Asbestos Corporation Limited in September 1957. In 1959, Cassiar Asbestos Corporation Limited carried out extensive surface stripping, drove 2 northwest-trending adits totalling 1,180 feet, and shipped a 3 1/2-ton sample to Cassiar, B.C. for mill tests. The company dropped their option in 1963, at which time Canadian Johns-Manville Company Limited optioned the property. During the 1964 field season, the latter company employed a crew of up to 10 men in a program of geological and geophysical work and diamond drilling of 12 holes with a total length of 2,000 feet. The writer visited the property in mid-July.

The main ultrabasic body on the property is partly exposed in a bluff on an otherwise timbered slope on the west side of Cassiar Creek valley. Numerous bulldozer cuts have been made across the body, and the surface expression of the ultrabasic and associated quartz-carbonate rock appears to be about 1,500 feet along and 3,000 feet up the slope. To the southwest, the ultrabasic is bounded by graphitic quartz-mica and chlorite schists, but to the northeast outcrop is lacking. Magnetometer work suggests that the ultrabasic terminates abruptly to the west, and the company geologist has interpreted this as a thrust zone. Results from the drilling suggest that the ultrabasic is a thin zone, 200 feet or less in thickness, forming a veneer on the hillside and underlain by a distinctive cataclastic talc schist underlain by minor basalt and normal schist.

Typical serpentine is a medium to dark green rock, chiefly antigorite, cut by light green bands of cross-fibre asbestos, generally 1/4 inch or less in width. Shiny slickensided surfaces are common. Much of the ultrabasic body has been replaced by rusty-weathering, light grey-brown quartz carbonate. In some specimens the outline of replaced asbestos fibre is still visible. The carbonate, of the magnesite group*, contains considerable iron, and spectrographic analyses of quartz-carbonate rock made for the company indicate a calcium content between 2 and 7 per cent and a magnesium content of 10 to 14 per cent. The N_o index refraction for the mineral is about 1.700.

In addition to work on the Caley property, the company did some work on a small ultrabasic body overlooking the Yukon River about 7 miles to the east and about 1 mile east of Woodchopper Creek.

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*Identified by X-Ray Diffraction Laboratory, Geological Survey of Canada.

WHITEHORSE MINING DISTRICT

DAWSON RANGE AREA

Freegold Mountain

(Gold)

Laforma Property (Discovery Mines Limited) (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; 1964, pp. 25-26).

Discovery Mines Limited, formed by amalgamation of Consolidated Discovery Yellowknife Mines Limited and Ormsby Mines Limited on 5 March 1964, holds 32 leased claims covering the Laforma property on Freegold Mountain. Access to the property is via a 41-mile road from Carmacks, Yukon.

Ormsby Mines Limited purchased the property in 1960 from W.J. Langham, G. Fairclough, and the late E. Forrest. A number of showings are known on the property, but most of the underground work has been done on the G-3 zone, a gold-bearing shear, which strikes N25°E and dips steeply northwest, and a small amount on the Pal vein, which strikes northeast and dips steeply. At the time of the purchase, the underground development comprised 3 adits, No. 1, a short adit at an elevation of about 3,900 feet, No. 2, at about 3,625 feet, and No. 3 at about 3,545 feet. A small mill built near the portal of the 2nd level was operated in 1939 and 1940 by T.C. Richards of Whitehorse, Yukon. During this period, about 1,414 tons of ore were milled with a production of about 1,437 ounces of gold, exclusive of that contained in 52 tons of concentrate shipped in 1940 (Bostock, 1941, p. 25 and private report by A.P. Beavan, 1951).

During the field seasons from 1961 to 1963, Ormsby Mines Limited re-opened the road to the property, drove the 4th level, elevation 3,350 feet, to the junction of the G-3 zone and Pal vein and followed the former for a distance of about 1,000 feet, carried out diamond drilling on both surface and underground, and did a limited amount of surface exploration. The camp was not equipped for winter operation and closed in mid-December, 1963.

The camp was re-opened in April 1964 and operations continued for the remainder of the year. Underground work during the year consisted of extending the 4th level to 1,120 feet along the G-3 zone, a raise between the 4th and 2nd levels, two raises to sublevels driven below the 3rd level at an elevation of about 3,500 feet, and re-opening and extending the 2nd level along the G-3 zone. This underground work involved a total of 1,254.5 feet of drifting, 614.0 feet of crosscutting, and 952.5 feet of raising. Underground diamond drilling comprised 17 holes with a total length of 3,186 feet. In addition to the underground program, a large trailer-type camp was set up and a number of permanent buildings including a combined warehouse and office, steam-heating plant, carpenter shop, and crusher building, were erected. Major improvements were made on the road to the property. Up to 48 men were employed. Early in 1965, the company announced (The Northern Miner, 28 January 1965, p. 7) that the ore estimate for the G-3 zone above the 4th level was 77,000 tons, proven and probable, averaging 0.71 ounces of gold per ton, all taken over a 4-foot mining width. Most of the ore is above an oreshoot cut on the 4th level, centered about 800 feet north of the G-3-Pal intersection, that assayed 1.29 ounces of gold per ton

over a length of 372 feet and a width of 4.0 feet. Below this oreshoot, six diamond drill holes covering a vertical range of 380 feet averaged 0.90 ounces of gold per ton over an average true thickness of 4.4 feet.

The G-3 zone consists of a highly sheared band, often up to 8 feet in width, containing some vein quartz and marked by an extensive clay alteration. The zone is strong throughout most of its length and can generally be followed without difficulty in the underground workings. It has now been followed for about 1,160 feet on the 2nd level and 1,120 feet on the 4th level, as well as in raises and sublevels between these two. Near the junction with the Pal vein, the hanging wall of the G-3 zone is dense white quartz porphyry, but elsewhere with the exception of small areas of andesite porphyry, both walls are in altered granitic rocks, chiefly quartz monzonite and granodiorite. Some of the richer portions of the zone contain up to 4 feet of broken, brownish stained, vein quartz. Much of this quartz is crystalline, and drusy cavities are common. Much of the brown stain appears to be caused by iron-stained clay minerals associated with the quartz. Grey quartz, darkened by fine pyrite and arsenopyrite, is present along parts of the vein. Scattered specks of very fine free gold occur in the brownish quartz and to a lesser extent in the grey quartz. The vein quartz is bounded by sheared and altered granitic rocks, frequently containing fine crushed fragments of quartz similar to the vein quartz. An extensive clay alteration is present along the G-3 zone and to a lesser extent elsewhere in the granitic rocks.

Five specimens showing a clay alteration were examined by the Petrological Sciences Division of the Geological Survey of Canada:

Specimen
GC62-142III

Location:	4th level, G-3 zone, 34 feet from intersection with Pal vein.
Lithology:	Waxy altered rock originally granitic?
Clay Mineralogy:	Illite, with kaolinite and small amounts of chlorite and montmorillonite.

GC62-142IV

Location:	4th level, G-3 zone, 34 feet from intersection with Pal vein.
Lithology:	Altered quartz-porphyry.
Clay Mineralogy:	Illite, with kaolinite and a trace of chlorite.

GC62-142XII

Location:	4th level adit, country rock, 125 feet from junction of G-3 zone and Pal vein.
Lithology:	Altered granitic rock with both feldspars and mafic minerals altered to secondary minerals.
Clay Mineralogy:	Illite, with chlorite and small amounts of kaolinite and montmorillonite.

GC62-142XXV

Location:	4th level adit, country rock, 1,090 feet from junction of G-3 zone and Pal vein.
Lithology:	Altered pale greenish granitic rock, mafic minerals altered to fine chlorite.
Clay Mineralogy:	Illite with chlorite.

GC63-429III

Location:	4th level, Footwall vein about 20 feet in footwall from G-3 zone.
Lithology:	Altered, granitic rock on footwall of vein, feldspars and mafic minerals completely altered to secondary minerals.
Clay Mineralogy:	Illite with kaolinite and small amounts of chlorite and montmorillonite.

While the clay alteration is most pronounced along the G-3 zone there appears to be no essential difference between clay minerals present in the zone and those exposed in altered portions of the 4th level adit at some distance from the zone. The clay alteration may postdate the mineralization. Possible supporting evidence for this was observed on the face of the 301 sublevel, north of the 412 raise, where a clay mineral, probably allophane (refractive index about 1.470), appears to be depositing at the present time on altered granitic rocks of the G-3 zone.

Throughout most of the workings only one vein is present in the G-3 zone, but in the earlier workings on the 2nd level, near the junction of the Pal vein, as many as three veins were encountered. On the 4th level, the Footwall vein, parallel to the G-3 and about 20 feet in the footwall, was drifted for about 120 feet in 1963. During 1964, this vein was traced by a raise for 40 feet, at which point it thinned and disappeared. It may join the main G-3 zone below the 4th level.

Nansen Creek

(Silver-Gold)

Mount Nansen Mines Limited (62°03 1/2'N, 137°10 1/2'W)

References: Bostock (1936a); Green and Godwin (1963, pp. 23-24; 1964, pp. 26-28).

Mount Nansen Mines Limited, presently controlled by Peso Silver Mines Limited, was originally formed in 1963 by members of the former Mount Nansen Exploration Syndicate to explore the Webber silver-gold showing discovered by G.F. Dickson for the Syndicate in 1962. The Webber showing is located on the ridge between Nansen and Victoria Creeks, about 15 miles south of the Laforma property and 30 miles west of Carmacks. Other similar showings on the property include the Cabin vein, about 2,000 feet west of the Webber vein, and the Heustis vein, about 3,000 feet southeast on the head of Dome Creek, a tributary of Victoria Creek. At year-end Mount Nansen Mines Limited held 269 claims in the area.

During the year, Peso Silver Mines also acquired control of Brown-McDade Mines Limited, which holds 30 claims covering the nearby Brown-McDade gold property, about 2 miles southeast of the Webber showing on a tributary of Victoria Creek.

Late in 1964, Mount Nansen Mines Limited completed a winter road to the property. The road, about 41 miles in length, follows the flank of Miller's Ridge above Rowlinson Creek for 20 miles and then the chain of lakes to Victoria Lake, from where it climbs the ridge between Victoria and Nansen Creeks to the Brown-McDade camp and the new camp in the valley of Webber Creek. An alternate road, 12 miles in length and with grades suitable for heavy hauling, leaves the first road at the abandoned airport on Victoria Creek and follows the valleys of Nisling River and Nansen and Webber Creeks to the new camp. Previous to the construction of these roads supplies were hauled to the property over winter roads leading from the road to the Laforma property or from the Aishihik airport road. During the summer months, access to the property is provided by a rough road, 7 miles in length, from Victoria Lake, which is suitable for float-equipped aircraft. The airstrip near Victoria Lake is soft and unusable during the summer.

The Webber showing was discovered by Whitehorse prospector, G.F. Dickson, in 1962. Work done during that year consisted of bulldozer stripping and preliminary sampling. During 1963, exploration work done by Mount Nansen Mines Limited, under the supervision of Newmont Mining Corporation of Canada Limited, consisted of extensive bulldozer stripping

on both the Webber vein and other showings, geochemical surveys, and a limited amount of diamond drilling on the Webber vein.

During the summer of 1964, Dickson with a crew of 6 men carried out a bulldozer-stripping program on the Webber, Heustis, Cabin, and Brown-McDade veins. The program was successful in extending both the Webber and Brown-McDade veins. Late in the summer a drilling program using an Atlas Copco overburden type drill was carried out and 131 holes with a total length of 10,557 feet were drilled on the Webber and Heustis veins. Late in 1964, a winter road was completed to the property, portal sites established for underground work on the Webber and Heustis veins, and a new camp established in the valley of Webber Creek. When visited early in 1965, the adit of the Webber vein had been driven for 250 feet. The adit is at an elevation of 4,265 feet and is up to 250 feet below the surface trenches. At this time, a crew of about 20 men was employed.

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 gneisses 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, rhyolite or 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.

By late 1964, the Webber vein zone had been stripped and sampled for a length of about 1,300 feet. Values for the new sampling have not been announced, but are understood to be comparable to those obtained in 1963 (Green and Godwin, 1964, p. 28). The latter work outlined three zones: (i) 34.0 feet in length with an average width of 3.8 feet and an average grade of 56.58 ounces of silver and 0.44 ounces of gold per ton; (ii) 70.0 feet in length with an average width of 4.5 feet and an average grade of 60.92 ounces of silver and 0.65 ounces of gold per ton; and (iii) 81.0 feet in length with an average width of 4.2 feet and an average grade of 19.68 ounces of silver and 0.47 ounces of gold per ton. Rather than a single vein as suggested in the 1963 work, the Webber vein appears to consist of a zone of subparallel veins, which may be spaced over an interval of up to 50 feet across the strike. The general trend of the zone is N35°W, but the zone has a number of sharp kinks. A zone about 450 feet in length striking about N45°W joins the main zone about 300 feet from the south end of the sampled area. In most of the trenches country rock adjacent to the vein cannot be identified as it is decomposed and highly stained by secondary oxides while the vein material stands out as a brown- to

green-stained, quartz-rich rib. Frequently the quartz is dark grey from contained fine-grained sulphide minerals.

In the underground workings, both gneissic rocks of the Yukon group and rhyolite (units 1 and 13 of Bostock, 1936a, respectively) appear to be present. In general, rocks believed to be altered rhyolite contrast to the gneiss in having (i) a fine-grained to aphanitic groundmass with or without phenocrysts, (ii) a distinctive pale brown to straw yellow colour, and (iii) a porous or punky texture. Viewed in index oils, powders of rhyolite frequently show a fine intergrowth, probably originally quartz and feldspar, in marked contrast to the altered remnants of the larger orthoclase feldspar grains still visible in the gneissic rocks. A short crosscut about 200 feet from the portal exposes altered quartz-orthoclase gneiss with grains to 5 mm. As this is traced towards the vein it becomes heavily iron- and manganese-stained and individual grains can no longer be distinguished. The vein material itself consists of: fine-grained quartz; an intergrowth, very fine grained and probably originally quartz and feldspar; scorodite (a hydrous ferric arsenate); and minor amounts of finely crystalline sulphide minerals. Often sufficient scorodite is present to colour the vein material pale green. In the author's opinion, this vein material may be composed of secondary quartz developed in a sheared and altered rhyolite. Near the crosscut, the opposite wall of the vein is a pale brown rock composed essentially of a fine-grained intergrowth and is believed to be an altered rhyolite.

Sulphide minerals observed in the vein both on surface and underground are characteristically finely crystalline and include: pyrite, arsenopyrite, galena, and a number of silver-bearing minerals. Of the latter group, andorite* and acanthite* were identified in specimens collected from the surface and argentiferous tetrahedrite* from the underground workings. Alteration of galena to anglesite* was observed in material from the surface cuts.

Casino Creek

(Silver-Lead)

Casino Creek Property (62°43'N, 138°49'W)

Reference: Green and Godwin (1964, pp. 22-24)

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*Identified by X-Ray Diffraction Laboratory, Geological Survey of Canada.

Late in 1964, L.I. Proctor of Whitehorse, Yukon purchased 16 claims covering this showing from J. Meloy, of Kirkman Creek, Yukon. Two bulldozers were taken to the area by way of a ferry on the Yukon River and an existing 15 mile road from the mouth of Britannia Creek. An air-strip, suitable for wheel-equipped light aircraft, was built on the ridge to the northeast of the showing.

The property was visited in mid-summer in the company of J. Meloy. At that time considerable bulldozer stripping had been done on the main showing (Bomber showing of Green and Godwin, 1964 but also referred to as the Airport showing) by the Yukon Consolidated Gold Corporation, Limited who held the ground under option in 1963. Four veins are present, referred to as numbers 1 to 4 from northeast to southwest respectively. No. 1 vein to the northeast is the strongest and a short shaft has been sunk on it (Green and Godwin, 1964). Most of the stripping was done on the Nos. 3 and 4 veins, each of which was exposed for about 100 feet. However, the stripping did not reach unaltered country rock and secondary minerals have replaced most of the sulphide minerals in the veins. A sample of altered rock from the No. 4 vein, composed mainly of crystalline quartz and a heavy coating of light buff cerussite without visible galena assayed*: 0.06 ounces of gold and 40.0 ounces of silver per ton, 49.9 per cent lead, and 0.2 per cent zinc. Proctor reports that five representative samples of galena ore taken from the shaft on the No. 1 vein assayed an average of 166.8 ounces silver per ton and 66.24 per cent lead.

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

DEZADEASH AREA

Sockeye Lake

(Copper)

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; 1964, p. 29).

Johobo Mines Limited, owned by H. Johannes, H.E. Boyd of Whitehorse, and H. Honing of Leofnard, Saskatchewan, has a 58-claim copper property 2 miles southeast of Sockeye Lake and 18 miles south of

Haines Junction. The property was optioned by General Enterprises Limited of Whitehorse, Yukon, late in 1963. In the 1964 field season, the 18-mile access road from mile 143 on the Haines Road was re-opened and a limited program of electromagnetic and self-potential surveys followed up by bulldozer stripping was carried out. Several chalcopyrite- and bornite-bearing zones were uncovered, but were too narrow to be of economic interest.

ROSS RIVER AREA

Vangorda Creek and Swim Lakes

(Lead-Zinc)

Kerr Addison Mines Limited (62°13'N, 133°02'W)

References: Chisholm (1957, pp. 269-277); Roddick and Green (1961a); Green and Godwin (1964, pp. 31-32).

In addition to controlling interest in the lead-zinc property of Vangorda Mines Limited (for descriptions see Chisholm, 1957, and Green and Godwin, 1964) Kerr Addison Mines Limited holds 3 groups, totalling 82 claims, located between 4 and 11 miles southeast of the main property. The three groups, the Swim, BS, and JB, were staked in late 1963 and early 1964 following an airborne magnetometer survey carried out by the company in late 1963. The groups are all close to the main Swim Lake, which is suitable for use by float-equipped aircraft.

During the summer of 1964, a crew of up to 6 men were employed carrying out magnetic, electromagnetic, self-potential, and gravity surveys on the three groups. In addition, one diamond drill hole, 300 feet in length, was completed on the Swim group.

The only work on the main Vangorda property consisted of two NX diamond drill holes, each 250 feet in length, to obtain samples for mill tests.

(Lead-Zinc)

Dynasty Explorations (62°11'N, 132°54'W)

Reference: Roddick and Green (1961a).

Dynasty Explorations, a private group, carried out an extensive exploration program in the vicinity of the Vangorda Mines Limited deposit. At year-end, Dynasty Explorations held 805 claims, the majority of which were to the southeast of the Vangorda deposit. Exploration carried out during 1964 included geological mapping, geochemical surveys, geophysical surveys (including both ground and airborne magnetometer work), stripping, and diamond drilling. An extensive program of drilling, using an overburden type drill, is planned for early in 1965. Up to 20 men were employed during the 1964 season.

When visited, late in 1964, a diamond drilling program was underway to evaluate a magnetic anomaly on the Sea group of claims about 11 miles southeast of the Vangorda deposit. A total of 6 holes, with a total length of 1,500 feet, was drilled before the camp was shut down in mid-December. Surface bulldozer cuts near the drilled area contained considerable amounts of the secondary iron salt, melanterite*, which alters rapidly to rozenite* on exposure to air. In addition, a small amount of lead-zinc mineralization was uncovered.

The rocks cut in the drilling consist principally of dark to light grey, quartz-muscovite-chlorite phyllite. The rock has strong foliation and banding. The latter, which probably represents bedding, has frequently been folded into small S-shaped folds by movement along and adjacent to the folia ("Gleitbrett" structures). Fine cross-cutting quartz veinlets are common. Sulphide minerals, chiefly pyrrhotite, but with minor chalcopyrite, occur replacing coarser grained quartz-rich layers in the phyllite and to a lesser extent in the quartz veinlets.

The phyllite from the drill cores on the Dynasty property is similar to some of that on the Vangorda property, about 11 miles to the northwest, although considerable amounts of graphitic phyllite are also present at the latter. Both occur within a band, up to 8 miles in width, of altered quartzite, schist, and phyllite that extends northwest between Tintina Trench and granitic rocks to the northeast (Roddick and Green, 1961).

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*Identified by X-Ray powder photograph, X-Ray Diffraction Laboratory, Geological Survey of Canada.

(Lead-Zinc)

Dickson Yukon Syndicate (near 62°15'N, 133°12'W)

Reference: Roddick and Green (1961a).

Dickson Yukon Syndicate holds a number of claim groups, adjoining those of Vangorda Mines Limited on the northwest, east, and southeast. A total of 200 claims was staked in late 1963 and an additional 12 claims in the summer of 1964. At the end of 1964, the company retained 126 claims. Work done during the 1964 field season consisted of diamond drilling on the Lake group, southeast of the Vangorda showing, and preliminary geophysical (magnetometer), geochemical, and geological surveys on the Rose group, a large block of claims extending about 10 miles northwest of the Vangorda showing. A crew of up to 6 men was employed.

Diamond drilling on the Lake group consisted of 3 holes with a total length of 617 feet drilled to test a magnetic anomaly. The anomaly was found to be caused by magnetite-bearing rocks and no sulphides of potential economic interest were encountered. The three holes are located about 62°13 1/2'N, 133°09'W, some 2,500 feet east of Shrimp (or Jacknife) Lake, which is suitable for lightly loaded, float-equipped aircraft.

GLENLYON RANGE AREA

(Silver-Lead-Zinc)

Kerr Addison Mines Limited (Little Salmon Lake Property) (62°12'N, 132°09'W).

References: Cockfield (1929, pp. 1-10)*; Campbell (1960).

The property consists of 32 claims covering a lead-zinc showing (Carol 1-8 optioned from A. Kulan, of Whitehorse, Y.T., and Carol 9-32 held by Kerr Addison Mines Limited, but included in the option). The showing is an old one (Cockfield, 1928), and previous to the present work was explored in 1955 and 1956 by Prospectors Airways Company Limited, now merged in Kerr Addison Mines Limited. The property, 7 miles east of the east end of Little Salmon Lake, is reached by a trail about 1 1/2 miles in length that leads from the small lake about 1 mile north of Magundy River. With suitable wind conditions this lake can be used by float-equipped Beaver and Supercub aircraft. Work carried out in the 1963 field season consisted of magnetometer, electromagnetic and self-potential surveys, and in 1964 of 4 diamond drill holes, totalling about

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 586-595).

1,200 feet. When visited by the writer in late July 1964 a crew of 5 men were engaged in diamond drilling. The drill was moved to and from the property by helicopter. Results of the drilling were discouraging and the option was later dropped.

Two showings occur on a north-facing slope above a pot-hole lake — an upper vein deposit referred to as the Cliff showing and a lower contact deposit referred to as the Lake showing. The showings are about 150 feet apart in elevation.

The Cliff showing consists of a vein up to 3 feet in width that is exposed in a 30-foot cliff of thinly banded silicated rock. The vein strikes about S70°E and dips steeply southwest and the enclosing rocks strike S60°E and dip 35°SW. Vein matter consists of quartz with minor siderite, sphalerite, galena, and pyrite. A specimen rich in sphalerite assayed*: 0.02 ounces of gold and 0.86 ounces of silver per ton, 0.4 per cent lead, 22.5 per cent zinc, and a trace of copper. A sample of the same vein taken by Cockfield (1929, p. 9) across one foot of the best mineralized zone observed assayed: no gold, 23.53 ounces of silver per ton, 48.76 per cent lead, and 1.60 per cent zinc.

The Lake showing is exposed on the face of a small cliff above the pot-hole lake. Here, about 60 feet of quartz-feldspar porphyry is overlain by 20 feet of rusty weathering, magnetite-rich rock, which in turn is overlain by pale brown weathering silicated rock similar to that of the Cliff showing. No sulphide minerals were observed in the natural exposure, although much of the magnetite-rich rock contains abundant gypsum, suggesting that sulphide minerals have weathered out. A gypsum-rich specimen assayed*: 0.05 ounces of gold and 0.36 ounces of silver per ton, 0.3 per cent lead, 0.2 per cent zinc, and 0.37 per cent copper. The magnetite-rich rock is not exposed to the west, but a magnetometer survey indicated that it extended about 1,400 feet in this direction. Four drill holes were used to test the showing along this length. In general, the drill holes encountered a magnetite-rich zone about 20 feet thick underlain by quartz-feldspar porphyry. Most of the magnetite-rich rock contained some sulphide minerals, chiefly pyrrhotite and pyrite, and in the two eastern holes a zone up to 20 feet thick and rich in sulphide minerals occurs in altered rock between the magnetite-rich rock and unaltered porphyry. The sulphide minerals are up to 10 mm in grain size and include galena, sphalerite, pyrrhotite, pyrite, and chalcopyrite. In addition, some fluorite was observed. A small amount of a black amorphous substance present in Hole No. 1 at 138 feet was identified as anthraxolite by the Coal Research Laboratory of the Geological Survey.

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

The thinly banded silicated rock in the vicinity of the showings has irregular, contorted, green and white bands a few mm in thickness. The rock is essentially quartz-free and is composed of fine feldspar, chiefly orthoclase, and diopside. It may have originated through metamorphism of a limy tuff.

The quartz-feldspar porphyry shows a considerable colour variation between pink, light grey, and light green, the colour being controlled, in part, by the amount of alteration. It contains up to 15 per cent phenocrysts to 5 mm in size, including euhedral grey quartz, pink orthoclase, and white to pale green albite. The groundmass is composed of fine grains of the same minerals present in about equal amounts. The feldspar of both the phenocrysts and the matrix shows considerable alteration to indeterminate fine-grained minerals and, in addition, considerable secondary calcite is present in the matrix. One drill-hole cut a skarn band next to a quartz-feldspar porphyry contact. The skarn is composed of calcite and garnet, with minor amounts of chlorite, the latter in very fine ragged grains, and scheelite.

One specimen of the magnetite-rich rock was examined and found to contain dolomite and diopside in addition to the sulphide minerals.

Exposure in the area is not complete enough to determine the shape of the quartz-feldspar porphyry but, in the author's opinion, it is probably a sill and the magnetite-rich rocks are developed on the contact between it and a silicated rock, probably originally a limy tuff.

WHITEHORSE AREA

Whitehorse Copper Belt

(Copper-Iron)

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); Wheeler (1961, pp. 137-142); Green and Godwin (1964, pp. 33-39); Kindle (1964).

During 1964, New Imperial Mines Limited continued an extensive exploration program, begun in 1963, on a number of old properties in the Whitehorse Copper Belt. The deposits are of the contact metamorphic type and most occur along the contact between discontinuous bodies of limestone, of the Lewes River group of Upper Triassic age, and

granitic rocks of probable Cretaceous age. Recent descriptions of individual properties are given in Kindle (1964) and Green and Godwin (1964, pp. 33-39).

At year end, the company held 270 mineral claims and one crown-granted mineral claim. The company also held options on 81 mineral claims and 21 crown-granted mineral claims. Work done during the year consisted of diamond drilling (95 holes with a total length of 26,942 feet), surface stripping, a contracted Induced Polarization survey, and a mill-feasibility study. Up to 32 men were employed in the field.

Late in 1964, Sumitomo Metal Mining Company of Japan entered into an agreement with the company giving it the exclusive rights to negotiate financing, construction of a mill, and purchase of ore and concentrates (The Northern Miner, 10 September 1964, p. 3).

Early in 1965, the company announced (The Northern Miner, 11 February 1965, p. 12) that the following tonnages had been indicated by drilling up to 31 January 1965:

Deposit	Tons	Per Cent Copper
Positive		
Little Chief	1,150,000	1.20
Arctic Chief	400,000	1.30
Best Chance	300,000	1.00
War Eagle	450,000	1.40
Keewenaw	200,000	1.15
Cowley Park	75,000	1.00
Probable		
War Eagle	450,000	1.40
Keewenaw	200,000	1.15
Cowley Park	75,000	1.00
Total	3,300,000	1.22

The properties with known ore reserves are strung out over a distance of 15 miles along a northwest-trending belt that lies a few miles west of Whitehorse. It is proposed that all would be open-pit operations and that the ore would be trucked to a central mill. During 1964, exploration work was concentrated on the War Eagle, Cowley Park, Keewenaw, and Little Chief properties and, in addition, some work was done on the Copper King and Pueblo.

WHEATON RIVER AREA

(Antimony)

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

References: Cairnes (1961, p. 48)*; Bostock (1941, p. 35); Wheeler (1961, p. 132).

At year-end, the company held 48 claims in the Wheaton River-Annie Lake area. These include properties on Carbon Hill (Becker-Cochran, Fleming, Carbon, Empire, and Goddell's) and Chieftain Hill. Late in the 1964 field season, the company reopened an access road from the ford on the Wheaton River to the Becker-Cochran property, stripped the showing, and mined a bulk sample of about 12 tons for metallurgical tests (The Northern Miner, 8 October 1964, p. 13). The property was not visited by the writer.

WATSON LAKE MINING DISTRICT

PELLY MOUNTAINS AREA

Ketza River

(Silver-Lead)

Oxo Group (Oxso Silver Mining and Smelting Company Limited)
(61°31'N, 132°13'W)

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

Oxso Silver Mining and Smelting Company Limited holds the group of 10 claims. The group, first recorded in 1955, was previously held by the late E. Erickson and P. Versluce, both of Whitehorse. The main showing is located at an elevation of about 5,800 feet at the head of one of the branches of Cache Creek, a tributary of Ketza River. During the 1964 season, the company worked on a road from the Watson Lake-Ross River development road to the property, a distance of about 32 miles, but this was not completed. The nearest lake suitable for float-equipped aircraft is about 12 miles west of the showing. The property was visited in late July 1964.

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 423-424).

The main showing is a brown- to black-weathering, sulphide-rich lens, about 70 feet in length and 10 feet in width, occurring in Early Cambrian limestone (Wheeler, Green, and Roddick, 1960a). Bedrock exposed near the showing consists of somewhat platy, brown-weathering, grey limestone and minor phyllite. The showing does not appear to be related to the fault shown on the geological map (op. cit.). The showing has been explored by a number of trenches, most of which have not reached undisturbed bedrock but have uncovered blocks rich in pyrrhotite with minor pyrite, galena, and sphalerite. A chip sample from blocks in a 12-foot trench assayed*: 0.02 ounces of gold and 10.2 ounces of silver per ton, 12.7 per cent lead, 0.4 per cent zinc, and 0.03 per cent copper. Another grab sample from a single block assayed*: 0.005 ounces of gold and 4.88 ounces of silver per ton, 6.3 per cent lead, 0.1 per cent zinc, and 0.03 per cent copper. The mineralized area is bounded by unaltered limestone to the northwest, appears to pass into limestone with only minor sulphide minerals in the last trench to the northeast, but may extend under a grass covered area to the southeast. In the author's opinion, the showing is a lens parallel to the foliation of the enclosing limestone, is probably not much larger than the present exposure and only a few feet thick. The present showing does not appear to be of economic interest in view of the remote location, apparently limited size, and low assay returns.

A number of quartz veins carrying minor chalcopyrite were observed about 500 feet southwest of the main showing and float of similar material is common in this area. The veins appear to strike northwest and are up to a few feet in thickness. A specimen, selected for a high chalcopyrite content, assayed*: 0.01 ounces of gold and 0.28 ounces of silver per ton and 7.65 per cent copper. In general, the precious mineral content of the vein quartz is negligible and the copper content too low to be of interest.

PELLY PLATEAU AREA

Hoole River

(Asbestos)

Newmont Mining Corporation of Canada Limited (61°43'N, 131°45'W)

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

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

Late in the 1963 field season, the company staked the Pup group of 19 claims covering an occurrence of asbestos-bearing float. A magnetometer survey was completed in 1963 and bulldozer trenching and two diamond drill holes in 1964. A crew of 8 men was employed in the 1964 field season. The property is reached by a bulldozer access road about 3 1/2 miles in length that leaves the Watson Lake-Ross River development road at the Hoole River bridge, 33 miles from the junction with the Canol Road. The property was visited by the writer in late August 1964.

The showing lies at an elevation of about 2,700 feet in a poorly-defined plateau area. Bedrock is not exposed and the diamond drilling indicated that it lies beneath about 40 feet of overburden. In prospecting, coarse angular blocks of asbestos-bearing float were found in an area roughly coincident with an aeromagnetic anomaly (Geol. Surv. Can., 1963a). Bulldozer trenching, in places to a depth of 12 feet, did not reach bedrock, but exposed angular blocks of float to 6 feet in maximum dimension in a till containing rounded boulders to 6 inches in diameter. Two diamond drill holes with a total length of 635 feet were used to test the magnetic anomaly. No asbestos fibre of potential economic interest was encountered.

Two types of serpentine occur in the float and in the drill core; a dark green barren serpentine and a light apple-green serpentine cut by numerous white veinlets containing slip fibre asbestos. Very little fibre over 1/4 inch in length was noted. Other minerals present in both types of serpentine include magnetite and talc. In the lower part of one drill hole, the serpentine is altered to a carbonate-rich rock containing mostly dolomite. Magnetite is still present and the rock retains the outline of the altered asbestos fibre.

RANCHERIA RIVER AREA

Spencer Creek

(Silver-Lead)

Kodiak and Dee Groups (Canex Aerial Exploration Limited) (60°11'N, 130°25'W)

Reference: Poole, Roddick, and Green (1960).

During the summer of 1964, Canex Aerial Exploration Limited optioned the Kodiak and Dee groups, totalling 12 claims, from K. Armstrong and J. Kubiak of Watson Lake, Yukon. An additional 92 claims were staked in the vicinity of the showing and an access road, about 15

miles in length was built from near mile 693 on the Alaska Highway. The option was dropped later in the year.

The showings are located at an elevation of about 4,500 feet on the ridge north of Spencer Creek and are reported to consist of galena-bearing veins up to 1 foot wide occurring in limestone of probable Lower Cambrian age (Poole, Roddick, and Green, 1960). A number of other silver-lead showings occur within rocks of this map-unit in the general area. During the field season, a crew of up to 8 men carried out an exploration program of prospecting, stripping, and soil geochemistry. The property was not visited.

FRANCES LAKE AREA

Tyers River

(Lead-Zinc)

Norquest Joint Venture (61°22'N, 128°23'W)

During the 1964 field season, Norquest Joint Venture - formed by the Anaconda Company (Canada) Limited, Asbestos Corporation (Explorations) Limited, Bralorne Pioneer Mines Limited, the Granby Mining Company Limited, New Jersey Zinc Company (Canada) Limited, and Utah Construction and Mining Company - did exploration work on a number of lead-zinc showings that were discovered by R. McBean and H. Buczko who were with the Syndicate in 1963. A crew of 12 men was employed. As of late 1964, the syndicate held 155 claims in the general area. The author visited one showing, referred to as the Fir Tree, in early August. A larger showing, referred to as the Black Jack and located about 4 miles to the south, was not visited. It is understood to consist of a number of mineralized bands very similar to the Fir Tree showing described below. Early in the season, the showings, which lie 4 to 6 miles west of the Canada Tungsten road and 4 miles apart, were reached by pack-horse trails, but later a tote-road suitable for four-wheel drive vehicles was completed to the camp near the Black Jack showing. This road is about 5 1/2 miles in length and leaves the main road near mile 58.

The Fir Tree showing is located at an elevation of about 5,000 feet on the valley wall of a small tributary to the Tyers River. A program of trenching and sampling had just been started at the time of the visit. The showing consists of sulphide minerals replacing a band of epidote-rich gneiss within a thick sequence of gneiss. In one good exposure, the band appeared to be about 40 feet thick, and it is reported to have been traced for about 1,000 feet to the north and 300 feet to the south. The band strikes about north and dips about 30 degrees east parallel to the

banding of the enclosing gneiss. Sulphide minerals observed include: dark brown sphalerite, galena, pyrrhotite, pyrite, and chalcopyrite. Their grain size is commonly a few mm or less. A grab sample of mineralized rock assayed*: trace of gold, 0.42 ounce of silver per ton, 5.0 per cent lead, 3.1 per cent zinc, and 0.37 per cent copper. A composite sample of chips from 5 specimens assayed*: trace of gold, 1.12 ounces of silver per ton, 3.8 per cent zinc, 4.1 per cent lead, and 0.22 per cent copper. Near the main showing, a thin sulphide-bearing band, about 70 feet stratigraphically higher, assayed*: trace of gold, 1.68 ounces of silver per ton, 6.6 per cent zinc, 0.1 per cent lead, and 0.22 per cent copper.

The replaced gneiss is composed mainly of fine-grained epidote with varying amounts of quartz, calcite, and muscovite, plus the sulphide minerals. The weathered surface of the replaced gneiss is commonly brown to black as a result of iron-staining, and the fresh surface grey to green and, less commonly, white or pink. The enclosing gneiss varies from relatively massive quartz-feldspar-biotite gneiss to platy, chlorite-rich varieties. The gneiss has been intruded by granitic rocks in the form of stocks, dykes, and lit-par-lit injections, the latter a few inches and up in thickness. A stock, possibly a mile in diameter, lies about one mile east of the Fir Tree showing. The granitic rocks vary from grey biotite granodiorite to light coloured, essentially mafic-free varieties. Most of the rock is medium grained, but some is coarse grained or pegmatitic.

Regionally, the showing lies within a northwest-trending belt of gneiss and associated granitic rocks that is about 100 miles long and up to 40 miles wide. Within the belt, contacts between paragneiss and granitic rocks are, in part, gradational in marked contrast to the Canada Tungsten area, about 15 miles northeast, where contacts between low-rank metamorphic rocks and granitic rocks are invariably sharp and cross-cutting. Much of the gneissic terrane is believed to have formed through metamorphism of quart-pebble quartzite, shale, and phyllite of Precambrian age (unit 1 of Green and Roddick, 1961). Some prospecting has been done within the belt in the past, but most of the showings found were small, contact metamorphic deposits, principally containing copper and molybdenum. The belt would appear worthy of further careful prospecting for showings similar to those of Norquest Joint Venture.

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

MACMILLAN PASS AREA

(Zinc)

Tom Group (Hudson Bay Exploration and Development Company Limited)
(63°10'N, 130°09'W)

Reference: Financial Post Survey of Mines 1964, p. 110.

The company, a wholly-owned subsidiary of Hudson Bay Mining and Smelting Company Limited, holds 114 leased claims and 30 fractions covering zinc showings of the Tom Group.

The main showing lies about 2 miles south of the Canol Road and is reached by an access road that leaves the abandoned Canol Road about 7 miles southwest of MacMillan Pass. It is located at an elevation of about 5,400 feet on a west-facing slope above a small creek tributary to the South MacMillan River.

The showing was discovered by A. Lindsay and L. Saville in 1951, and exploration work was carried out until the fall of 1953, at which time work was suspended because of the isolated location and falling zinc prices. Work to this date, consisting principally of 39 drill holes with a total length of 17,834 feet, indicated about 10,470,000 tons averaging about 5 per cent zinc. No work has been done since this date and two camps, one located on the Canol Road and the other 1 1/2 miles up the access road, have fallen into disrepair. The author visited the property in September 1963.

Bedrock on the group consists mainly of black cherty slate, with lesser amounts of chert grain grit and fine chert pebble conglomerate. These rocks are believed to be Ordovician to Silurian in age similar to rocks to the southwest in Sheldon Lake map-area (Roddick and Green, 1961b). A body of granitic rock, crudely circular with a diameter of 2 miles, is located about 2 miles south of the main showing.

Near the showing the general trend of bedding appears to strike northwest and dip steeply southwest. However, few outcrops show reliable bedding attitudes and those that were measured indicated considerable variation.

The mineralization occurs in a light grey, thinly banded, altered carbonate (?) bed. Surface exposures of the bed are poor, but one exposure with a minimum thickness of 10 feet could be traced for about 250 feet. From the drilling, the bed appears to have a thickness of up to 200 feet, and it has been traced more than 3,600 feet along strike by drill holes that plunge steeply to the northeast and are approximately at right angles to the bedding.

The banding of the mineralized bed is composed of alternating light and dark bands a few millimetres apart. In addition to the main mineralized bed, thin beds of similar material occur within the slates. Some of the thinner beds are truncated by cross-bedding, suggesting that they are original sedimentary features. The bed may originally have been a carbonate rock, but a number of specimens examined consisted mainly of fine grains of barite with minor quartz, dolomite, and calcite. The sulphide minerals, all very fine grained, include pyrite, brown sphalerite, and minor galena. A small amount of pale brown, ferroan dolomite with crystal faces to several millimetres in size occurs as thin veinlets in the mineralized bed, replacing the matrix of chert pebble conglomerate. A typical specimen of mineralized rock from the surface outcrop assayed*: 0.10 ounce of silver per ton, trace gold, 0.7 per cent lead, and 3.5 per cent zinc.

A remarkable iron-cemented conglomerate outcrops in the creek for about a mile downstream from the showing and occurs as boulders below this. It has formed through the cementation by iron oxides of the creek bottom material including: boulders, angular blocks broken from bedrock, and finer stream sediments. The conglomerate is up to 10 feet thick. The iron appears to have been derived from oxidation of the pyrite from the mineralized bed and the cherty slate. An assay of the conglomerate showed traces of gold and silver, but no values in either lead or zinc. Similar conglomerates occur near the Vangorda lead-zinc deposit in the Ross River area and at a number of places in the Mayo district. They appear to be useful guides for prospecting in that they suggest the presence of iron-bearing sulphides nearby.

MACKENZIE (N.W.T.) AND MAYO MINING DISTRICTS

MACMILLAN PASS AREA

(Tungsten)

MacMillan Pass Tungsten Showing (Southwest Potash Corporation) (63°17'N, 130°09'W).

Reference: Green and Godwin (1963, p. 19).

The claims covering the showing straddle the Yukon-Northwest Territories boundary; 34 were recorded in the Mackenzie Mining District (NWT) and 14 in the Mayo Mining District. The claims

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

were recorded in October 1962 and are held by Southwest Potash Corporation, a wholly-owned subsidiary of American Metal Climax Incorporated. They are about 5 miles northwest of MacMillan Pass on the abandoned part of the Canol Road. A small cirque lake on the showing at an elevation of about 5,300 feet has been used by Beaver and Supercub aircraft carrying light loads. Limited mapping and sampling programs were carried out on the showing in 1963 and 1964, but no one was on the property when the author visited it in August 1964.

The main showing is located at an elevation of about 6,000 feet on a steep north-facing cirque face above the small lake. Here, disseminated scheelite occurs in skarn developed along the south contact of a small granitic stock. The skarn is formed through alteration of a limestone bed within a chert and shale sequence of Ordovician to Silurian age. The rocks strike roughly east and dip about 30 degrees to the south. The skarn is only partly exposed and is somewhat discontinuous. In addition, the sedimentary rocks are cut by a number of north-trending, near vertical faults. Scattered outcrops of skarn occur for about 2,000 feet along the cirque face and in one better exposed part the skarn has a length of 750 feet and a thickness of about 45 feet. The grade in this section is reported to be about 0.90 per cent contained WO_3.

The granodiorite stock adjacent to the showing is about 1 1/2 miles in diameter and a stock roughly the same size occurs about 2 miles to the south. These stocks are part of a chain of granitic rocks that is strung along the Yukon-Northwest Territories boundary for a distance of about 200 miles.

The stock consists of medium-grained biotite granodiorite, in part porphyritic. The rock also contains some muscovite. It is cut by a number of quartz veins, generally about 1 inch in thickness, which carry large crystals of black tourmaline and minor fine scheelite.

The sedimentary rocks consist of a lower limestone bed, partly altered to skarn, overlain by cherty shale about 200 feet thick and capped by an upper limestone about 100 feet thick. The coarser grained part of the skarn is composed of brown garnet, a green monoclinic pyroxene (probably intermediate between diopside and hedenbergite), quartz, calcite, scheelite, and minor amount of pyrrhotite. Most of the scheelite grains are a few mm or less in size. The finer grained skarn is composed mainly of quartz and monoclinic pyroxene with a small amount of a mineral with a refractive index of about 1.49 (X-Ray-scolerite*). The cherty shale has been partly altered to purplish brown biotite hornfels. Scattered

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*Identified by X-Ray Diffraction Laboratory, Geological Survey of Canada.

graptolite fragments were observed in the shale talus and the rocks are believed to be Ordovician to Silurian in age similar to those mapped by Roddick and Green (1961) in Sheldon Lake map-area to the south. The upper limestone has been altered to a white marble and some quartz-rich parts of it to a quartz-wollastonite rock.

The showing differs from the Canada Tungsten Mining Corporation Limited property (Green and Godwin, 1963, pp. 34-37) in the Flat River area, some 110 miles to the southeast, in that the skarn is formed from Ordovician to Silurian rather than Early Cambrian limestone. In the latter area skarns developed in other than Early Cambrian "Ore-limestone" appear to have limited economic potential. Very little more can be learned of the potential tonnage of the present deposit until the down-dip extension of the skarn zone is tested by deep drilling.

NAHANNI MINING DISTRICT (DISTRICT OF MACKENZIE)

SELWYN MOUNTAINS AREA

Upper Flat River

(Tungsten)

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); White (1963, pp. 390-393); Green and Godwin (1963, pp. 34-37; 1964, p. 48).

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.

The orebody, at an elevation of about 4,800 feet, is exposed on the floor of a small cirque on the west side of the valley of the Flat River and is mined by an open-cut operation. The mill and town-site, at an elevation of about 3,500 feet, have been built on a bench in the main valley near the mouth of the cirque. The two are connected by 3 miles of switchback road.

The concentrator was operated on an experimental basis from late 1962 until 1 September 1963, when inability to produce concentrates that would meet market specifications forced closure. During this period 83,664 tons were milled. In May 1964, the company announced that the

property would be reopened. Mining resumed in late June and continued until September 13th, by which time 59,764 tons had been mined and trucked to the stockpile. Milling resumed in October and during the remainder of the year 33,543 tons were milled. About 80 men were employed in the operation.

MACKENZIE MOUNTAINS AREA

Little Dal Lake

(Copper)

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

References: Baragar and Hornbrook (1963, pp. 35-37); Green and Godwin (1963, pp. 37-40; 1964, pp. 49-50).

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, as of late 1964, 594 claims, of which 568 are within the permit areas. During the 1964 field season, the company operated from a base camp about 2 miles south of Little Dal (Plateau) Lake. Work carried out during the summer consisted of diamond drilling on the Plateau Lake copper property and a prospecting program both in the vicinity of the property and in the Selwyn Mountains, approximately 120 miles northwest. Up to 34 men were employed, including two drill crews. Transportation was provided by helicopter and float-equipped aircraft, the latter based at Watson Lake, Yukon. Very effective use was made of the helicopter in moving and supplying two diamond drills operating on the steep sidehill near the base camp.

The Plateau Lake copper deposits were discovered during August 1962. Exploration work in 1963 consisted of 17 diamond drill holes with a total length of 5,312 feet and in 1964 of 27 holes with a total length of 17,732 feet. The main showings are located on the steep east face of the ridge east of Little Dal Lake (referred to as Plateau Lake in company reports) at an elevation of about 5,000 feet. Copper mineralization, which has been traced over 4 miles, occurs mainly in three persistent beds of green-weathering, carbonate-rich, rock found in the top 150 feet of an otherwise uniform section of brilliant purple-weathering mudstone and siltstone about 1,000 feet thick. A section (Green and Godwin, 1963, pp. 39-40) of the upper part of the unit measured east of Little Dal (Plateau) Lake consisted of upper green beds (15 feet), intermediate purple beds (40 feet), middle green bed (7 feet), intermediate purple bed (42 feet), and lower green bed (6 feet). The unit is overlain conformably by a sugary

quartzite bed, 20 feet thick, that forms an excellent marker horizon, followed by about 600 feet of platy limestone. This in turn is overlain, apparently conformably, by green- and purple-weathering conglomeratic mudstone and iron formation of the Rapitan group of probable Precambrian age. Rocks along the ridge strike north and dip steeply west. The mineralization in the green carbonate-rich beds consists mainly of fine chalcopyrite and bornite, in part altered to secondary minerals. Near the south end of the property some areas of similar mineralization have also been observed in the overlying limestone.

The property was visited in early August 1964. At this time, two drills were being used to check the down-dip continuity of the mineralized beds in the area between the saddle about 2 miles southeast of Little Dal (Plateau) Lake and the creek (Plateau Creek) draining the lake. From north to south, showings in this area are referred to as the Saddle, Ridge, H-C, and Findlay zones. In a report to shareholders (8 December 1964) the company stated that the results of the drilling program were inconclusive because it had been necessary to abandon a number of the important deep holes as a result of difficult drilling conditions encountered in broken ground produced through intense faulting. Returns given for some of the holes on the H-C and Ridge zones that did cut the mineralized zone are: Hole 28, 3.2 per cent copper over an apparent true thickness of 30 feet at a vertical depth below the surface of 550 feet; Hole 36, 2.2 per cent copper in a 15-foot zone at a vertical depth of 700 feet; Hole 39, a deep vertical test, 1.8 per cent copper in the best 3 feet of a 17-foot mineralized section cut at a vertical depth of about 1,350 feet. In addition, Hole 40 cut three zones of zinc and lead mineralization at a vertical depth of about 900 feet.

PLACER MINING

DAWSON MINING DISTRICT

KLONDIKE AREA

The Yukon Consolidated Gold Corporation Limited

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

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 a bulldozer-sluicing plant in the Klondike area in 1964. 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 connects 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 The Financial Post Survey of Mines, 1965, p. 101) are as follows:

Year	Cubic Yards Treated	Value of Gold (and Silver) Recovered
1932-60	182,948,849	49,231,383
1961	4,041,022	1,925,552
1962	4,477,386	1,647,985
1963	4,478,831	1,650,883
Total	195,946,088	54,455,803

Most of the following information concerning the 1964 operations of the company was supplied by Mr.A.G. Barrett, Manager, Dawson. The cooperation of the company is gratefully acknowledged.

General

In 1964 the Yukon Consolidated Gold Corporation Limited employed a maximum labour force of 282 men (230 of whom were seasonal), treated a total of 4,229,186 cubic yards of gravel, and produced 43,639 ounces of fine gold and 8,817 ounces of silver, with a total value of $1,540,567. Proven gravel reserves written off during 1964 were 3,069,534 cubic yards, and proven gravel reserves at the end of 1964 were 7,345,489 cubic yards valued at $3,174,539 (43.22 cents per cubic yard).

The start of various operations was delayed from one week to one month, owing to the latest spring break-up on record and cold weather during the month of May. In addition, the cool wet summer had an adverse effect on both thawing and stripping operations.

Mining Operations

Dominion Creek

Dredge No. 6 (7-cubic-foot buckets) is working down lower Dominion Creek about 2 1/2 miles south of Granville. In 1964 this dredge operated from 8 May until 18 November, mined 821,246 cubic yards at a cost of 32.4 cents per cubic yard, and recovered 8,325 ounces of fine gold and 1,583 ounces of silver valued at $293,749. Work started on the dredge and site on 3 April and finished on 22 November. The thawing plant ahead of the dredge operated from 13 June to 11 September and thawed 1,044,291 cubic yards of gravel at a cost of 10.1 cents per cubic yard. Work on the plant and site started 11 April and finished 26 October. The stripping plant ahead of the dredge removed from 19 May to 25 September 219,180 cubic yards of muck at a cost of 13.62 cents per cubic yard. Work on the plant started 11 April and finished 18 October.

Dredge No. 10 (7-cubic-foot buckets) is working down middle Dominion Creek about 2 miles south of the mouth of Jensen Creek. In 1964 this dredge operated from 1 May to 1 November, mined 810,957 cubic yards at a cost of 29.7 cents per cubic yard, and recovered 7,064 ounces of fine gold and 1,419 ounces of silver valued at $249,199. Work started on the dredge and site 7 April and finished 4 November. This dredge has completed mining its reserves and will not be operated in 1965.

Dominion Creek Benches

Bulldozer mining operation No. 16 is on the left limit bench of middle Dominion Creek about 1/2 mile above Jensen Creek. During 1964 the plant operated from 12 June to 12 October, mined 224,836 cubic yards of gravel at a cost of 78.0 cents per cubic yard, and recovered 4,779 ounces of fine gold and 950 ounces of silver valued at $168,626. Work started on the plant and site 11 April and finished 18 October. No thawing or stripping was done ahead of the operation in 1964.

Dredge No. 12 (2 1/2-cubic-foot buckets) was located on the left limit bench of middle Dominion Creek about 1 1/2 miles above Jensen Creek early in 1963. In 1964 this dredge, working downstream, operated from 12 June to 31 October, mined 259,576 cubic yards at a cost of 59.3 cents per cubic yard, and recovered 5,655 ounces of fine gold and 1,137 ounces of silver valued at $199,492. Work started on the dredge and site 6 May and finished 2 November. No thawing or stripping was done ahead of the operation in 1964.

Gold Run Creek

Operation No. 18, intended for bulldozer operation, and located between claims No. 12 and No. 16 commenced with the installation of a stripping plant in 1964. The plant operated from 29 May to 15 September and removed 182,590 cubic yards of overburden at a cost of 32.57 cents per cubic yard. Work started on the plant and site on 11 April and finished on 19 October.

Sulphur Creek

Dredge No. 8 (7-cubic-foot buckets) is working up Sulphur Creek about 4 1/2 miles northwest of Granville. In 1964 this dredge operated from 6 May until 23 November, mined 800,807 cubic yards of gravel at a cost of 30.4 cents per cubic yard, and recovered 5,790 ounces of fine gold and 1,175 ounces of silver valued at $204,320. Work started on the dredge and site 6 April and finished on 26 November. The stripping plant ahead of the dredge removed from 1 June to 9 September 232,039 cubic yards of muck at a cost of 9.91 cents per cubic yard. Work on the plant started 11 April and finished 30 September. No thawing was done ahead of the dredge in 1964.

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 1964 this dredge operated from 27 May to 24 November, mined 333,623 cubic yards of gravel at a cost of 58.3 cents per cubic yard, and recovered 5,547 ounces of fine gold and 1,192 ounces of silver valued at $195,835. Work started on the dredge and site 7 April and finished 26 November. The thawing plant ahead of the dredge operated from 4 June to 25 September and thawed 488,686 cubic yards of gravel at a cost of 11.96 cents per cubic yard. Work on the plant and site started 11 April and finished 19 October. No stripping was done ahead of the dredge in 1964.

Hunker Creek

Dredge No. 11 (7-cubic-foot buckets) is working down Hunker Creek, about 2 miles below Last Chance Creek. In 1964 this dredge operated from 4 May to 26 November, mined 978,141 cubic yards of gravel at a cost of 19.8 cents per cubic yard, and recovered 6,479 ounces of fine gold and 1,361 ounces of silver valued at $229,346. Work started on the dredge and site 3 April and finished on 28 November. No stripping or thawing was done ahead of the dredge in 1964.

Ballarat Mines Limited

References: Skinner (1961, p. 10; 1962, p. 10); Green and Godwin (1963, pp. 47-48; 1964, pp. 53-56).

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 1964 production in excess of 5,000 ounces of crude gold. During 1964, the company worked a full season on the Eldorado Creek operation and a partial season on Quartz and Dominion Creeks. A total of 14 men was employed in addition to the owners.

Eldorado Creek (63°52'N, 139°15'W)

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

In 1964, the company, using a bulldozer-sluicing plant, mined about 82,000 cubic yards on claims 36 to 43 Above over the period 15 April to 12 October. Stripping preparatory to mining has been completed to the mouth of Chief Gulch (47 Above). Equipment used includes two D-8 bulldozers and a sled-mounted monitor and pump.

Quartz Creek (63°47'N, 139°06'W)

On Quartz Creek, the company holds lease claims 19-28 Below A. Mack's Discovery from the Yukon Consolidated Gold Corporation Limited. In 1964, Ballarat Mines Limited operated a bulldozer-sluicing plant in one cut near the mouth of Quartz Creek and seven small cuts on the right limit bench between claims 20 to 30 Below. The cut near the mouth of the creek was put in on an area of high bedrock missed by the dredging operation. Values were low and the cut was abandoned after 8,000 cubic yards had been mined. The seven cuts on the right limit bench had a total area of 265,500 bedrock square feet and about 73,000 cubic yards were sluiced in the period 1 July to 7 September 1964. Equipment used in the Quartz and Dominion Creek operation includes 6 bulldozers and a sled-mounted pump.

Dominion Creek (63°49'N, 138°39'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. The company has operated a bulldozer-sluicing plant on the left limit bench of Dominion Creek since 1959, although during 1962 and 1964 most of the men and the equipment were employed on Quartz Creek for part of the season. During the 1964 season, the company put in one cut early in the season before moving to Quartz Creek and five cuts after returning. The first cut, totalling 40,000 bedrock square feet and 12,000 yards sluiced, was put in on claim 69 Below, just upstream from the Yukon Consolidated Gold Corporation bulldozer mining operation No. 15. Later in the season, two cuts, totalling 30,000 bedrock square feet and 9,000 cubic yards sluiced, were put in on claims 34 Below opposite the mouth of Portland Creek and three cuts, totalling 65,000 bedrock square feet and 19,000 yards sluiced, on claims 37 and 38 Below opposite and downstream from the mouth of 72 Pup. Sprinklers were not used for thawing during the 1964 season, but an extensive stripping program using them is planned for 1965 on parts of a deeply muck-covered right limit bench that occurs intermittently for about 3 miles downstream from the mouth of Caribou Creek.

F. and G. Caley

Reference: Green and Godwin (1964, pp. 60 and 69).

G. Caley in partnership with his father, F. Caley, carried out small mining operations on one claim on Paradise Hill above Hunker Creek and a 2-mile prospecting lease on Clear Creek. A bulldozer-sluicing plant was operated on Paradise Hill from 15 April to 15 June 1964, with a production of 100 ounces of crude gold and on Clear Creek later in the season with a production of 12 ounces of crude gold.

L.M. Fuhr

References: Skinner (1962, p. 14); Green and Godwin (1963, p. 53; 1964, pp. 63-64).

During 1964, L.M. Fuhr produced about 195 ounces of crude gold. 56 ounces of this was produced by mining about 15,000 bedrock square feet in a bulldozer-sluicing operation on claim 20 Eldorado Creek between late August and mid-September. The claim is owned by F. Chudy.

Bonanza Creek

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

References: Skinner (1962, p. 8); Green and Godwin (1963, pp. 44-45; 1964, p. 56).

The company was inactive in 1964.

A.T. Fry (63°57'N, 139°22'W)

References: Skinner (1961, p. 9; 1962, p. 9); Green and Godwin (1963, pp. 45-46; 1964, p. 57).

A.T. Fry owns three hill claims on King Solomon Hill, which is on the left limit of Bonanza Creek about 6 miles from the mouth, and two creek claims on both Boulder Creek and Monte Cristo Gulch, to the north and south of King Solomon Hill respectively. The Fry family's main operation is a hydraulic pit in White Channel gravels on King Solomon Hill using water brought by ditch from upper Boulder Creek.

During the 1964 season, his production was 191 ounces of crude gold. About 5,000 cubic yards were mined in the cut on King Solomon Hill.

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

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

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. Their operations include a hydraulic plant on Adams Hill and a bulldozer-sluicing plant on Adams Creek, the latter being operated when there is insufficient water on the hill. In 1964, they operated on the hill for the entire season and produced 205 ounces of crude gold through mining 5,000 bedrock square feet.

The work done in the hydraulic cut on Adams Hill was at the north end. Further extension in this direction appears to be blocked by chloritic phyllite, which rises possibly 8 feet above the normal base of the White Channel gravels. This rock was poorly exposed when the cut was visited early in October and it was uncertain whether the rise was caused by faulting, slide rock, or the presence of an island in the original channel where the White Channel gravels were deposited.

Victoria Gulch
(Tributary of Upper Bonanza Creek)

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

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

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. In 1964, they worked on the claims from mid-April to early October. An area of about 15,000 square feet was mined and about 300 ounces of crude gold were produced. The operation uses water from Victoria Gulch, and operations are restricted in periods of dry weather.

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; 1964, p. 59).

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 1964, the Bremners with one hired man continued working a hydraulic pit in White Channel gravels on Discovery Hill. They recovered about 303 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; 1964, pp. 59-60).

I. Norbeck owns a placer prospecting lease (covering claims 35, 35a, and 35b Below Discovery) on Hunker Creek about 1/2 mile below Gold Bottom Creek. Working alone, 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. Water for the operation is brought from Gold Bottom Creek by ditch during the spring run-off and is pumped from Hunker Creek during the remainder of the season. In 1964, Norbeck recovered about 148 ounces of crude gold. The depth of black muck is increasing rapidly as the pit is extended into the hill and the operation may not be continued in 1965.

Gold Bottom Creek
(Tributary of Hunker Creek)

O. Lunde (63°55'N, 138°59'W)

References: Skinner (1961, p. 12; 1962, p. 14); Green and Godwin (1963, pp. 49-50; 1964, p. 60).

O. Lunde owns claims 8 to 17 on Gold Bottom Creek. Working alone he has operated a bulldozer sluicing plant on the ground since 1962 with a production of 485 ounces of crude gold in 1962 and 1963. In the 1964 season, he mined about 36,000 bedrock square feet on claims 9 and 10, and sluiced about 72,000 cubic yards to recover 322 ounces of crude gold. An automatic gate is used to strip the overlying muck.

B. Bratsberg (63°54'N, 138°59'W)

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

B. Bratsberg owns the upper 500 feet of Discovery claim and claims Nos. 3 to 12 Above Discovery 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 the creek. In 1964, Bratsberg operated a bulldozer sluicing plant and produced about 212 ounces of crude gold.

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.

J.R. Colbourne (63°48 1/2'N, 138°36 1/2'W)

During 1964, J.R. Colbourne operated a bulldozer-sluicing plant on hill claim leased from the estate of P. Nazzareno. The claim, located on the left limit bench, covers the upper half of 81 Below Lower Discovery. Colbourne, working with one helper, recovered about 138 ounces of crude gold.

Caribou Creek
(Tributary of Dominion Creek)

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

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

Mr. and Mrs. Burgelman own claims Nos. 2, 3, 5 to 10, and 20 on Caribou Creek, a large right limit tributary of Upper Dominion Creek. They have operated a bulldozer-sluicing plant since 1958 with production, from 1958 to 1963 inclusive, of 642.89 ounces of fine gold. In 1964, they mined about 30,000 cubic yards on claim 7, with a production of 104 ounces of crude gold.

Gold Run Creek
(Tributary of Dominion Creek)

The Yukon Consolidated Gold Corporation

Gold Run Creek operations are described in the general report on the company.

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

References: Green and Godwin (1963, pp. 51-52; 1964, pp. 62-63).

Lamontagne and Schink lease claims 36 to 51, excluding 45, on Gold Run Creek from the Yukon Consolidated Gold Corporation Limited. The property is accessible from the Dominion Creek road by a 3-mile road along the left limit of Gold Run Creek. Production from 1962, the first year of mining, and 1963 was 2,080 ounces of crude gold (1,693 ounces fine gold). In 1964, the partners mined approximately 110,000 cubic yards on claims 39 and 40 with a production of 1,252 ounces of crude gold.

In 1964, work on the property started in mid-April and sluicing was carried out from 1st July to 5 September. Stripping, in preparation for the 1965 season was done from claims 41 to 45 and a dam was built on claim 50.

Sulphur Creek

The Yukon Consolidated Gold Corporation Limited

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

Quartz Creek

A. Sundt (63°50'N, 139°02'W)

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

A. Sundt owns 4 claims on Little Blanche Creek (a tributary of Quartz Creek), and 8 claims on Quartz Creek. In 1964, Sundt, assisted by one helper, operated a bulldozer-sluicing plant on claims 5, 6, and 7 Above A. Mack's Discovery and mined about 50,000 cubic yards with a production of 394 ounces of crude gold.

A. Sailer (63°47'N, 139°06'W)

During the 1964 season, Sailer operated a bulldozer-sluicing plant on right limit hill claim 27 Below A. Mack's Discovery, owned by O. Lunde. Using a D6 bulldozer and working alone he mined about 4,000 bedrock square feet between 22 July and 15 September and recovered 53

ounces of crude gold. Sailer also holds a 1-mile prospecting lease on the left limit of Dominion Creek opposite claims 83 to 91 Below Discovery, which he intends to prospect next year in addition to working the Quartz Creek claim.

Ballarat Mines Limited

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

Eureka Creek

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

References: Skinner (1962, p. 13); Green and Godwin (1963, pp. 54-55; 1964, p. 64).

The company was inactive in 1964.

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

References: Skinner (1961, p. 12; 1962, p. 14); Green and Godwin (1963, p. 55; 1964, pp. 64-65).

Northern Yukon Services Limited, owned by M.D. Cole of Dawson, 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 an access road 12 miles in length.

The company has operated a bulldozer-sluicing plant on Eureka Creek since 1960, and production, from 1960 to 1963 inclusive, is 3,046 ounces of fine gold. In 1964, the plant operated on claims 13 to 17 Below and 150,000 bedrock square feet were mined with a production of about 1,353 ounces of crude gold. Four men were employed.

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; 1964, p. 66).

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 Consolidated Brewis Minerals Limited. Production by K. and S. Placers Limited from 1961 to 1963 inclusive is 1,236 ounces of fine gold. In 1964, about 998 ounces of crude gold were produced. Three men were employed.

Klondike River Valley

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

References: Green and Godwin (1964, p. 67).

D.M. Strachan of Dawson holds 4 placer claims along the south side of the Klondike River Valley just west of the settlement of Flat Creek. During 1964 he continued his part-time hydraulic operation on a poorly defined bench about 30 feet above the level of the Klondike River. The water supply is pumped from the Klondike River. During 1964, 94 ounces of crude gold were shipped.

Germaine Creek

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

References: Green and Roddick (1962); Green and Godwin (1963, p. 56; 1964, pp. 67-68).

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. Since 1962, the partners have operated a bulldozer-sluicing plant on the left limit of Germaine Creek at the point where the latter enters the Klondike River valley. Production for 1962 and 1963 totalled 281 fine ounces of gold. During the first part of the 1964 season, they mined one cut with an area of about 10,000 bedrock square feet and recovered about 61 ounces of crude gold. The operation was subsequently abandoned owing to increasing depth and a drop in values back from the rim of the bench. The bench, about 50 feet in elevation above Germaine Creek and 90 above the present Klondike River, is covered by 8 to 10 feet of frozen boulder gravel. Boulders are up to 3 feet in diameter, but generally 1 foot or less; most are well rounded. Rock types included are quartz-pebble conglomerate (grit), blue-grey quartzite, diorite, syenite and "bull" quartz, all of which are prominent northeast of Tintina Trench (Green and Roddick, 1962), and were

probably derived from that area. The matrix of the gravel is sandy and contains little clay. The gravels show some horizontal layering produced by sand lenses. The gravel is overlain by silt and black muck that is 4 feet thick near the rim, but rises rapidly to 15 feet behind. Bedrock includes dark brown shale and white quartz porphyry, both of probable Tertiary age. Much of the bedrock has undergone a clay alteration and considerable difficulty was encountered in sluicing because of its tendency to ball up and carry considerable gold with it. Typical gold is worn, flat, and flaky. Cassiterite of the wood-tin variety is abundant, generally in pebbles 1/4 inch or less in diameter. It is not highly worn and is probably derived from nearby quartz porphyry bedrock.

CLEAR CREEK AREA

References: Bostock (1941, pp. 12-14); Department of Mines and Technical Surveys (1964).

Placer gold was reported on Clear Creek in 1900 but the main production was between 1940 and 1955. Canadian Placers, Limited installed a bulldozer sluicing plant on Left Clear Creek (originally referred to as the north fork) in 1940 (Bostock, 1941). This appears to have been among the first plants of this type to be used in Yukon. Subsequently, from 1943 to 1955, Clear Creek Placers Limited operated a diesel-driven dredge on the lower 4 1/2 miles of Left Clear Creek and about 1 1/2 miles down the main creek. Total production figures are not available, but from 1948 to 1955, 20,028 ounces of fine gold were recovered (Department of Mines and Technical Surveys, 1964). The area is accessible by a road about 21 miles in length that leaves the Stewart Crossing-Dawson road near mile 47 1/2 and follows the ridge between Barlow and Clear Creeks to Left Clear Creek some 3 1/2 miles upstream from the forks.

Clear Creek

G. Heitman and C. Janus (63°47'N, 137°18'W)

References: Skinner (1962, p. 16); Green and Godwin (1963, p. 57; 1964, p. 68).

Heitman, in partnership with H. Netzel until 1962 and C. Janus subsequently, has operated a bulldozer-sluicing plant on Clear Creek since 1961. During this period, mining has been carried down the left limit from the forks, a distance of about 1 1/2 miles, in a narrow slot beside the dredge workings. The ground presently being mined had been stripped preparatory to dredging when that operation was abandoned. The partners

hold two Discovery claims, which are presently being worked, and three additional claims downstream. The operation is reached by a rough road that follows the valley bottom for an additional 5 miles from where the road first reaches Left Clear Creek.

Production from 1961 to 1963 inclusive has been about 1,458 ounces of crude gold. In 1964, about 70,000 cubic yards were mined between June and October with a production of about 950 ounces of crude gold. In addition to the partners, 3 men were employed. Equipment included four bulldozers — two D-8's, a D-6 and a HD-14.

On the claims, the present creek is against the right limit and the rimrock rises rapidly on that side while a wide bench is present on the left limit. Mining is on the bench where the level of bedrock is 12 to 15 feet above that in the creek bottom. The total depth to bedrock is generally about 6 to 7 feet and most of the ground is thawed as a result of the earlier stripping. The only section exposed when the operation was visited by the writer in mid-July consisted of 4 to 5 feet of platy gravels containing cobbles and boulders, most of which were 6 inches or less in maximum diameter, in a sandy matrix and overlain by 2 to 3 feet of sandy muck. Bedrock is hard gritty quartzite and most of the boulders and cobbles are of similar rock. The best pay occurs along the edge of the bench. The gold is mainly fine, and other heavy minerals include hematite and magnetite. The hematite is a fine-grained specularite and its presence is believed to indicate that part of the gravel is of glacial origin. The source area for much hematite of this type is believed to be sedimentary iron-formation near the Yukon Northwest Territories boundary (cf. Crest Exploration).

SIXTYMILE RIVER AREA

The Sixtymile Goldfield (Miller, Glacier, Big Gold, Little Gold, Bedrock Creeks, and Sixtymile River) is accessible via a rough road, 10 miles in length, that leaves the main Sixtymile Road near mile 49. The goldfield has been in production continuously since it was discovered in 1892, although on a much-reduced scale since 1961.

Sixtymile River

O. and D. Medby (64°00'N, 140°47'W)

Reference: Green and Godwin (1964, pp. 69-71).

O. Medby holds Discovery claim and 4 placer claims on a right limit bench of Sixtymile River, immediately upstream from Miller

Creek. During the 1964 season, Mr. and Mrs. Medby, and E. Ballendine, operated a hydraulic plant on bench claims 1 and 2. Total production from this operation was about 100 crude ounces of gold.

Miller Creek

D. Murphy and J. Simcox (64°00'N, 140°49'W)

Reference: Green and Godwin (1964, p. 71).

During the winter of 1963-64, Murphy and Simcox drift mined on the left limit of Miller Creek, about 1 1/2 miles from the mouth, and recovered about 100 ounces of crude gold. This is the same area as worked by J. Holstrom in 1962-63 (Green and Godwin, 1964, p. 71).

Glacier Creek

J. Lynch (64°02'N, 140°53'W)

Reference: Skinner (1962, p. 15).

During the 1964 season, J. Lynch recovered about 20 ounces of crude gold while testing the benches on Glacier Creek. The creek bottom has been mined previously (Skinner, 1962, p. 15).

KIRKMAN CREEK - STEWART RIVER AREA

Kirkman Creek

L.M. Ross (63°00'N, 139°15'W)

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

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 and leases 7 Above to 6 Below Upper Discovery from Ballarat Mines Limited. Ross has operated on Kirkman

Creek since 1957 and has produced 2,351 ounces of fine gold from 1957 to 1963, inclusive. During 1964, Ross and one helper mined about 125,000 cubic yards on Claims 17 to 19 Below, working upstream from the Canyon. About 900 ounces of crude gold were produced. In addition, ground was stripped from about 3 Below to Upper Discovery in preparation for mining in 1965.

Thistle Creek

W.E. Edwards (63°04 1/2'N, 139°18'W)

References: Skinner (1962, p. 16); Green and Godwin (1964, pp. 72-73).

W.E. Edwards did not continue his operation in 1964.

Brewer Creek

K. Djukastein (63°11'N, 139°00'W)

K. Djukastein holds a one-mile placer prospecting lease on Brewer Creek, a left limit tributary of Stewart River, about 3 miles downstream from Barker Creek. During the 1964 season he and one hired man worked on the creek from 20 June to 13 September, mined about 12,000 bedrock square feet and recovered 135 ounces of fine gold. Djukastein reports that in the part of the creek bottom mined the gravels are between 3 and 6 feet deep and the overlying muck 4 to 12 feet and that both are frozen. An area has been stripped in preparation for the 1965 season. Equipment includes a D-4 bulldozer and a 20 HP 6-inch pump, pipe, and monitor.

Henderson Creek

References: McConnell (1905, p. 32A)*; Department of Mines and Technical Surveys (1964).

The placer deposits of Henderson Creek were discovered in 1898 (McConnell, 1905), but work on the creek appears to have been restricted to a few hand-mining operations until Yukon Gold Placers Limited brought a small dredge into production in 1949. The dredge operated from 1949 to 1956, with the exception of 1953, and produced about 26,636 ounces

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, p. 42).

of fine gold (Dep't of Mines and Technical Surveys, 1964). The dredge operated for about 2 miles on main Henderson Creek and the lower end of the workings are some 10 miles from the mouth of the creek.

Golden Gate Placers (63°26'N, 139°08'W)

Reference: Green and Godwin (1964, p. 73).

The Burian family of Stewart River, Yukon, operates a bull-dozer-sluicing plant on a 1-mile placer prospecting lease on main Henderson Creek, upstream from the former dredging operation. Their operation, reached by a rough road from near the mouth of Henderson Creek, is immediately above Golden Gate Creek, a right limit tributary that joins main Henderson Creek about 12 miles from the mouth. In 1964, they operated the plant from 15 June to 25 September, mined about 12,000 cubic yards and recovered about 111 ounces of crude gold.

ARCTIC COAST AREA

Blow River

Arctic Gold Syndicate (68°43'N, 137°27'W)

References: Bamber et al. (1963); Gleeson (1963, pp. 7-8).

Early in 1964, R. Duck and I. Thompson each applied for a 10-mile dredging lease on the Blow River on behalf of Arctic Gold Syndicate, a subsidiary of Westfield Minerals Limited. The leases extend approximately 20 miles upstream from the mouth of the river. Early in June 1964, drilling equipment and supplies were moved to near the mouth of Anker Creek by a heavy helicopter operating from the airport at Shingle Point, Yukon. Between then and early August, a total of 21 holes were drilled over a distance of about 15 miles downstream. Depth of gravel is reported to be about 14 feet and the ground is frozen. Some values were obtained, but they were considered too low to be of potential economic interest. The late Anker Hoidahl, of Dawson, Yukon, did considerable prospecting in the vicinity of Mount Fitton, on the drainage of the Blow River about 25 miles southwest of the drilling, and samples of placer concentrates from his operation contained abundant wolframite and scheelite, a little gold, and a trace of molybdenite (Gleeson, 1963).

MAYO MINING DISTRICT

HAGGART CREEK AND DUBLIN GULCH AREA

References: Keele (1906, pp. 18A-42A)*; Cairnes (1916, pp. 19-22*; 1917, pp. 14-15)*; Cockfield (1919, pp. 10B-12B)*; Bostock (1939, p. 8; 1941, pp. 14-15); Little (1959, pp. 21-29); Skinner (1961, p. 15; 1962, pp. 16-18); Green and Godwin (1963, pp. 57-60; 1964, pp. 74-77).

The productive part of Haggart Creek and its tributary, Dublin Gulch, are about 30 miles north of Mayo, Yukon. Haggart Creek flows into South McQuesten River and lies within the Stewart River drainage. The placer workings of Haggart Creek and Dublin Gulch are accessible by a secondary road that leaves the Mayo-Elsa road near mile 268. Road distance to the farthest workings on Dublin Gulch is about 26 miles.

Coarse gold was found on Haggart Creek in 1895 (Keele, 1906, p. 19A) and the creek is known to have been prospected by Thomas Nelson in 1896 (Cairnes, 1916, p. 20), after whom the creek was originally named. In 1898 Thomas Haggart, Thomas Nelson, Peter Haggart, and Warren Hiatt started from Dawson for the creek but en route separated into two parties. Peter Haggart and Warren Hiatt reached their destination first, staked Discovery and re-named the creek after Peter Haggart. Mining has been carried on intermittently since on both Haggart Creek and Dublin Gulch. When visited by Cairnes (1916, pp. 19-22) in 1915, about 14 men were mining on Haggart Creek between Discovery and 20 Below, the upper end of Discovery claim being about the mouth of Dublin Gulch. Mining being done at that time included three summer open-cut operations using self-dumping scrapers or cars, one hydraulic operation on the right rim of the creek, and two winter underground operations on the right limit bench. At the same time 3 men were working Dublin Gulch, one miner, John Suttles, having worked ground near the mouth of Dublin Gulch since 1898. His operation consisted mainly of hydraulicking the stream gravels. Cairnes (1916, p. 22) estimated the gold production of Haggart Creek to 1915 at about $47,000 (about 2,550 crude ounces at the price given). Later Cairnes, (1917, pp. 14-15) quoted an estimate for Suttles' Dublin Gulch operation to 1916, including the production of the Cantin brothers who acquired it that year, of about $51,000 to $56,000, roughly 3,000 crude ounces at the price given (Cairnes, 1916, p. 22). From 1916 to 1918, there was considerable interest in the placers of Dublin Gulch as a source of scheelite (Cockfield, 1919, pp. 10B-12B) and some shipments were made during this period.

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 127-143; 426-433; 461-480; respectively).

Following this period, activity on both Haggart Creek and Dublin Gulch is believed to have been limited to a few small operations until revived about 1937 by E. Barker on Haggart Creek and F. Taylor on Dublin Gulch. More recent descriptions of workings include: Bostock (1939, p. 8; 1941, pp. 14-15); Little (1959, pp. 21-29); Skinner (1961, p. 15; 1962, pp. 16-18); Green and Godwin (1963, pp. 57-60; 1964, pp. 74-77).

Haggart Creek Mining Company, managed by Barker, held 22 claims on Haggart Creek and mined them from 1937 to 1945, using a modified bulldozer-sluicing plant and dragline operation. During this period, they produced about 10,000 ounces of crude gold (Skinner, 1962, p. 18). Later the creek was mined from 1953 to 1957 by Waddco Placers Limited, who recovered about 12,620 ounces of crude gold (Skinner, 1962, p. 18) and from 1961 to 1964 by Spruce Creek Placers Limited, who recovered 3,136 ounces of crude gold. Both operators employed bulldozer-sluicing plants. Fred Taylor has mined on Dublin Gulch since 1937 with the exception of 1943 to 1952 inclusive. Hand methods using ground sluicing and a gasoline hoist to remove the large boulders were employed until 1946 and a bulldozer-sluicing plant subsequently. Taylor's total production has been about 8,032 ounces of crude gold and 7 tons of tungsten concentrates. In addition, there have been smaller placer operations on both Haggart Creek and Dublin Gulch during this period.

A minimum estimate of production up to and including 1964 is 28,900 crude ounces (about 890 fine) for Haggart Creek and 12,920 crude ounces (about 860 fine) for Dublin Gulch. For Haggart Creek, this includes 2,550 ounces to 1915; 12,620 ounces by Waddco Placers Limited, 1953 to 1957; 3,136 ounces by Spruce Creek Placers Limited from 1961 to date; and 596 ounces from small operations by both Barker and Malicky. For Dublin Gulch, this includes 3,000 to 1916, 8,032 ounces by Taylor (1937 to 1964), 1,065 ounces by Greig (1955 to 1960), and 823 ounces by Smashnuk (1960 to 1962).

Some scheelite concentrates have been shipped from Dublin Gulch, principally by Taylor, and the bulk of the Yukon production of 32,169 pounds of tungsten (WO_3) (see Table I) undoubtedly came from Dublin Gulch. This was shipped in 1918, 1941 to 1944, and intermittently since 1951.

Haggart Creek

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

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

Spruce Creek Placers Limited, owned by F.M. Wilson, J.M. Acheson, and W.L. Drury, lease 22 claims from the E.H. Barker estate on Haggart Creek, between Dublin Gulch and Fifteen Pup. In addition, the company holds a 1-mile prospecting lease along the left limit bench downstream from Dublin Gulch and a 3-mile prospecting lease downstream from the mouth of Fifteen Pup. The property is accessible by a 25 mile road from Proctor's sawmill, which is near mile 268 on the Mayo-Elsa road.

Managed by Acheson, Spruce Creek Placers have mined the ground since the end of September 1961, using a bulldozer-sluicing plant. Production from 1961 to 1963 inclusive was about 2,080 ounces of crude gold. Total production for 1964 from 20 April to 12 October was 1,039 ounces of crude gold from about 70,000 cubic yards mined. The area mined was a slot along the right limit about 2,000 feet long, 70 to 80 feet wide, and up to 40 feet deep against the bank. The lower end of the cut is about 1,500 feet upstream from the mouth of Fifteen Pup. The ground is partly frozen, but thaws rapidly enough to permit mining in one season. The cuts did not reach rimrock, but the increasing depth of gravels makes it difficult to extend the cuts farther into the bank. An area, about 2,500 feet long and 100 feet wide, on the left limit and commencing about the upper end of the 1964 cuts has been stripped preparatory to mining in 1965. Five persons were employed in the operation and equipment includes two D-8's and a TD-18 bulldozer, 1 1/2 yard dragline, and a sled-mounted monitor and pump.

The previous operators frequently lost bedrock towards the left limit of the creek, and work in 1962 and 1963 (Green and Godwin, 1964, pp. 74-75) indicated a possible deep channel on this limit between Fifteen Pup and Dublin Gulch, with bedrock up to 25 feet below that in the present creek. One pit was mined in this ground in 1963 with satisfactory recovery, although some mining difficulties were encountered as the bottom of the cut was about 8 feet below drainage and despite pumping the bulldozers had to operate in about 1 foot of water. No further exploration was done on this channel in 1964.

An item of mineralogical interest was a silver nugget of about 1 1/8 ounces recovered in the 1964 operation. Parting of scrapings from the nugget indicated that it contained only traces of gold and platinum.

Dublin Gulch

F. Taylor (64°02'N, 135°50'W)

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

F. Taylor owns 7 claims extending upstream from the mouth of Dublin Gulch. His operation is accessible by a rough road extending about 1 1/2 miles beyond Spruce Creek Placers Limited's camp.

Taylor has mined on Dublin Gulch intermittently since 1936 and to 1963 inclusive has produced about 7,351 ounces of crude gold and about 7 tons of tungsten concentrates. During 1964, Taylor working with his two sons mined approximately 45,000 cubic yards and produced about 681 ounces of crude gold. Owing to limited water supply, Taylor is frequently able to sluice only for short periods several hours apart. His method of operation is to mine using a 977 Traxcavator while the automatic gate-equipped dam is filling and then sluice the mined gravels in the limited time available.

The cut mined in 1964 is a slot on the left limit about 300 feet long, 100 feet wide, and 50 feet deep, and is located about 1 mile from the mouth of Dublin Gulch and opposite the main camp. Frost was encountered in the lower part of the cut, but the upper had either thawed or had never frozen. Gravels are poorly sorted and contain numerous large granitic boulders to 3 feet or more in diameter. The creek in the immediate vicinity of the 1964 cut has now been mined for a width of about 400 feet, in this and former operations, without reaching rimrock on either limit. An area downstream on the left limit has been prepared for mining in 1965.

HIGHET AND JOHNSON CREEKS AREA

Highet Creek

References: Keele (1906, pp. 18A-42A)*; Cairnes (1916, pp. 23-25)*; Bostock (1933, pp. 4A-5A*; 1939, pp. 8-9; 1941, p. 14; 1964); Skinner (1961, pp. 15-16; 1962, p. 19); Green and Godwin (1963, pp. 60-61; 1964, pp. 78-79).

Highet Creek, one of the more important placer creeks of the Mayo district is located about 12 miles northwest of Mayo. The creek, about 7 1/2 miles in length, rises in the pass south of Scheelite Dome and flows southeast into Minto Creek, a tributary of Mayo River. The placer area is reached by a secondary road, 12 miles in length, that leaves the Mayo-Elsa road near mile 256.7.

Placer gold was first mined on Highet Creek in 1903 (Cairnes, 1916, p. 25), although gold had been found several years earlier by W. Hiatt, after whom the creek was named. When visited by Cairnes in 1915

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 127-143; 396-398; 636; respectively).

(op. cit.) a bench deposit was being worked on the right limit opposite the mouth of Rudolph Pup (Rudolph Gulch) on claim 108, about the next 2 miles downstream was owned by E. Middlecoff, who had operated an hydraulic plant on the ground for seven years, and farther downstream a partnership of 5 men, locally known as the "Little Gugs", owned 12 claims and had mined for 5 years. Cairnes (op. cit.) estimated the total production of the creek to that time at nearly $500,000 (about 28,900 crude ounces at the price given) of which between $100,000 and $140,000 came from the bench deposits, nearly $250,000 from Middlecoff's operations, and $80,000 from the Little Gugs. More recent descriptions of workings on the creek include: Bostock (1933, pp. 4A-5A; 1939, pp. 8-9; 1941, p. 14); Skinner (1961, pp. 15-16; 1962, p. 19) and Green and Godwin (1963, pp. 60-61; 1964, pp. 78-79). During the 40-year period, until 1946, that Middlecoff continued to work the creek, two dredges were started but only one was completed and worked only one full season; the Ray brothers operated a bench cut below the canyon for a number of years following 1935, Ballarat Placers Limited operated on the Middlecoff ground in 1952, and E.C. Bleiler has worked the Middlecoff ground from 1958 to 1964. In addition there have been a number of small individual operations. Total production for the creek to 1964 inclusive is estimated by Bleiler (personal communication) at about 50,000 ounces of crude gold (about 835 fine) including 28,900 ounces to 1915 (Cairnes, 1916, p. 25), 16,220 ounces from 1916 to 1946, mainly from the Middlecoff operations and 3,280 ounces from 1946 to 1964.

A unique method of mining was developed by Middlecoff to combat the large boulders and low gradient of the creek (Bostock, 1936, p. 7). Hydraulic monitors were used to force the gravels up an inclined ramp, the bottom of which was a grating, through which the finer materials and the gold fell into sluice boxes set below. The coarser material was blown out at the far end onto a tailings pile, which was on ground that had been worked previously. This method of mining, modified somewhat to make use of earth-moving equipment, is still being used by Bleiler.

Highet Creek valley appears to have been filled with ice in the Pleistocene period and the surrounding ridges still show the scars of melt-water channels. The creek lies between two main channels of ice movement, South McQuesten and McQuesten River valley to the northwest and Minto Creek, Minto Lake, Bear and Moose Creeks to the southeast. Slightly more than 2 miles from the mouth, the creek makes a sharp hairpin bend through a bedrock gorge and the productive portion of the creek, about 3 1/2 miles in length, lies upstream from the mouth of the gorge. The bench workings of the Ray brothers are at the lower end of the gorge and it is possible that these are at the mouth of a buried channel lying up to 1/2 mile north of the present gorge. Above the gorge, steeper lower slopes on the valley walls suggest recent downcutting related to the deepening of the gorge, and this break of slope can be traced about 3 1/2 miles upstream

where it is represented by the rich bench deposits opposite Rudolph Gulch and meets the present creek valley not far upstream from the benches. The present valley bottom is about 500 feet wide, frequently with low benches a few feet above the level of the present creek. The depth of gravel is variable, but may be as much as 35 feet towards the banks. The original bench workings were in frozen ground, but much of the creek bottom was not frozen (Keele, 1906, p. 36A).

The gravels are coarse, commonly with boulders to several feet in diameter in a clayey matrix. Both boulders and clay have handicapped hand and dredge operations in the past. Heavy minerals present include considerable hematite and lesser amounts of magnetite, scheelite, pyrite, and arsenopyrite. Native bismuth has been reported from the creek (Keele, 1906, p. 38A). Typical gold is about 800 fine, well worn, and coarse, with nuggets commonly weighing up to 3/4 ounce.

Bedrock in the area is chlorite-rich phyllite and phyllitic quartzite, although small stocks of granitic rocks occur on Scheelite Dome at the head of Rudolph Gulch (Bostock, 1964).

E.C. Bleiler (63°45 1/2'N, 136°09'W)

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

E.C. Bleiler owns 24 placer claims on Highet Creek, covering most of the ground held previously by his father-in-law, E. Middlecoff. With his son he operates a combined bulldozer- and hydraulic-sluicing plant about 1/2 mile above his camp; the latter is at the mouth of Dredge Creek and is accessible from the Mayo-Elsa road by about 13 miles of secondary road.

Bleiler has mined on Highet Creek since 1958 and from 1958 to 1963 produced about 1,130 ounces of crude gold. During 1964, he sluiced about 23,000 cubic yards from 5 cuts on the right limit, located about former claim 80, and produced about 460 ounces of crude gold. Equipment includes a sluice-box and grizzly, 955H Traxcavator, a Td-14 bulldozer, and a monitor. The monitor utilizes water brought by ditch from McRae Creek at a head of about 150 feet.

Bedrock on the right limit bench was 6 to 8 feet above that in the present creek in the earlier cuts, but when visited in October was 3 to 4 feet. In the final cut the section mined against the bank was about 32 feet dropping to about 20 feet towards the creek. Bedrock in the cut was quartz-muscovite-chlorite schist, much of which was decomposed to buff to

greenish clay. The method of mining is to force the gravel over an inclined grizzly using a monitor. Bedrock is excavated by Traxcavator, piled in front of the grizzly, and hydraulicked in the same manner. The finer material drops through the grizzly and into the sluice-box, which is set at right angles, and the coarser material is blown up the inclined grizzly onto a tailings pile. The material that passes through the sluices can be handled in the bedrock drain without difficulty.

F. Erl (63°46'N, 136°12'W)

Reference: Green and Godwin (1963, p. 61).

F. Erl owns 4 claims located on Highet Creek a short distance upstream from the mouth of Rudolph Gulch. He has worked the ground on holidays and weekends since 1961, with a total production from 1961 to 1964, inclusive, of 92 ounces. During the 1964 season, about 2,500 cubic yards were sluiced with a production of 57 ounces of crude gold and about 14,000 square feet of creek bottom was stripped preparatory to mining in 1965.

Johnson Creek

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

References: Cairnes (1916, pp. 25-26)*; Skinner (1961, p. 16; 1962, pp. 19-20); Green and Godwin (1963, pp. 61-62; 1964, p. 79).

Barduson Placers Limited, owned by H. Barchan and J. Sandanger, operates a sluicing plant on Johnson Creek (about 1/4 mile below the mouth of Sabbath Creek). The property is reached by about 6 miles of rough road leading from upper Highet Creek.

Placer gold was known on the creek prior to 1898, but the first recorded production was $800 worth of gold (about 47 1/2 ounces) in 1915 (Cairnes, 1916). The present operators are of the opinion that there was little or no other production until the start of their operation. From 1958 to 1963, the latter has resulted in the production of about 5,878 ounces of crude gold. During 1964, Barchan and one part-time helper, mined about 60,000 yards and produced 391 ounces of crude gold. Equipment includes a D-6 and a D-8 bulldozer and a 3/4 yard diesel shovel.

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

During the 1964 season, a number of cuts totalling about 700 feet long and 90 feet wide were mined on the right limit on claims 5 and 6 Above and another smaller cut with an area of about 4,000 square feet on the left limit on claim 4 Below. In addition, about 500 feet of drain was put in at the lower end of the workings and on Upper Johnson Creek, about 1/4 mile upstream from the mouth of Sabbath Creek, an area about 500 feet by 150 feet was stripped in preparation for a test cut in 1965.

Mining on the creek has been confined from a point near the mouth of Sabbath Creek to about 4,000 feet downstream with widths up to 250 feet. The richest ground was found in the vicinity of the Discovery Claim, about 3,500 feet downstream from the mouth of Sabbath Creek. The ground is only partly frozen and as a result most of the earlier attempts to mine it by underground methods were flooded out. The depth of gravel is about 12 feet in much of the mined area, but deepens towards the upper end. The following section was observed in the drainage ditch at the lower end of the workings:

	Thickness in feet	
	Unit	Total from Base
Silt and organic material	1	9
Gravel, with boulders to 2 feet in diameter, mainly well rounded and composed chiefly of granitic rocks, but including greenstone, quartzite, and lamprophyre, in a matrix of fine pebbles to 1/4 inch in diameter, many of which are tabular and derived from phyllitic rocks. Some horizontal layering	6	8
Poorly sorted gravel in a silt to clay matrix; most pebbles 2 inches or less in diameter. Heavy minerals include specular hematite	2	2
Brown quicksand - altered bedrock? .		

The gold, which is from 760 to 820 in fineness, becomes increasingly flat and well worn below Discovery. Heavy minerals include scheelite, particularly upstream, hematite, and minor magnetite. Specular hematite, some of it with jasper nodules, is abundant throughout the area mined, and its presence is believed to indicate that some of the

gravel is of glacial origin. The source area for much hematite of this type is believed to be sedimentary iron formation near the Yukon-Northwest boundary (cf. Crest Exploration). Bedrock throughout much of the mined area consists of green chloritic phyllite and chloritic pebbly quartzite. However, in the lower part of the workings a considerable amount of quicksand has been encountered. In the author's opinion, this has formed through the alteration of bedrock, possibly along fractures. This material is impossible to mine and, in any case, the gravels overlying it appear to contain little or no gold.

DUNCAN CREEK AREA

Thunder Gulch

S. Mosich and B. Kelly (63°54'N, 135°16'W)

References: Keele (1906, pp. 25A-30A); Cairnes (1916, pp. 16-19)*; Bostock (1941, p. 15); Green and Godwin (1963, p. 62).

Thunder Gulch is a tributary of Lightning Creek, in turn a tributary of Duncan Creek. The property is accessible by a rough road, which leaves the road to the Mount Keno property and fords Lightning Creek near the mouth of Thunder Gulch.

Placer gold wad discovered in the canyon of Upper Duncan Creek in 1898 (Keele, 1906, p. 19A) by a party of three Swedes. They worked their ground without staking it for several years until it was discovered and staked by another group on 12 September 1901 in the absence of the Swedes. The canyon was soon worked out and since then numerous attempts have been made to mine the deep gravels of lower Duncan Creek with indifferent success. Cairnes (1916, p. 19) reported that one miner, Martin Malesich, was working Thunder Gulch by ground-sluicing in 1915 and had worked for 6 or 7 previous seasons. Bostock (1941, p. 15) reported that four miners worked on Malesich's claims in 1939, but that the returns were disappointing and the ground was dropped in 1940. In that winter, 3 claims on the same ground were purchased by John Backe. Backe is believed to have worked the ground from 1941 to 1944, but the amount of gold he recovered is unknown. Since then the ground has been idle with the exception of small operations in 1962, 1963, and 1964. Production of the creek to 1964 includes about 120 ounces of crude gold estimated by Cairnes (1916, p. 19) prior to 1915, an unknown amount by Backe, and about 400 ounces in the recent operations. The gold is about 825 fine.

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 132-135; and 387-391; respectively).

Thunder Gulch, a precipitous mountain stream about 4 miles long, rises in the Gustavus Range and empties into Lightning Creek about 2 miles upstream from the canyon on the latter. The main placer workings are within 1,500 feet of the mouth of the Gulch, starting immediately downstream from where the creek leaves a steep V-shaped valley with bedrock on each wall and enters the valley of Lightning Creek. Much of the valley of Thunder Gulch and the entire valley of Lightning Creek appear to have been ice-filled during Pleistocene time. However, there appears to have been little scouring along these valleys; the main flow of ice moving south along Christal Creek and lower Duncan Creek valleys. Lightning Creek appears to have flowed north prior to glaciation, but it now flows into Duncan Creek through a deep bedrock gorge about 1 mile in length that it has been diverted into by thick glacial deposits near Keno Hill village.

Eight claims on Thunder Gulch are held by Kelly and five claims and a 1-mile lease by Mosich. In the 1964 season, Mosich, working with E. Friesen early in the season and B. Kelly later, mined about 10,000 cubic yards and recovered a total of 294 ounces of crude gold. The cut mined, about 200 feet long, 50 to 75 feet wide, and up to 24 feet deep, is immediately upstream from the open-cuts of the former operators. The valley is narrow at this point and blocky scree of massive quartzite overlies the gravels towards the rims. The ground is all frozen. The following section was exposed on the right limit when the writer visited the property in October:

	Thickness in feet	
	Unit	Total from Base
Scree, angular blocks of massive grey quartzite to several feet in maximum dimension	5	18
Rusty weathering gravels containing poorly rounded boulders to 2 feet in diameter	5	13
Black silt with considerable organic material	2	8
Boulder gravel, poorly sorted with poorly rounded boulders to 6 feet in a matrix of rock fragments and finely comminuted material; resembles a till	6	6

	Thickness in feet	
	Unit	Total from Base
Bedrock; an irregular surface of thick-bedded blue grey massive quartzite interbedded with a minor amount of thinner bedded material. (Angular blocks of quartzite, which appear to have moved only a few feet or less, are common in the lower part of the gravels.)		

Mining is made difficult by the extremely large boulders and the hard, but highly fractured quartzite bedrock. The latter strikes perpendicular to the creek and dips upstream forming natural riffles. Bedrock is difficult to mine and virtually impossible to clean thoroughly, although about 10 per cent of the production was obtained in this manner.

Much of the gold is rough, and about one third of it is in nuggets, some with adhering quartz. The largest nugget obtained in the 1964 operation weighed 7 1/2 ounces. Heavy minerals include abundant specular hematite, some of it with jasper, magnetite, pyrite, garnet, galena, cerussite (lead carbonate) and a trace of scheelite.

Equipment used in the operation includes a D-6 bulldozer and a 955 Traxcavator. An automatic gate-equipped dam, about 500 feet upstream from the cut, is used for stripping.

WHITEHORSE MINING DISTRICT

KLUANE LAKE AREA

Burwash Creek

Burwash Mining Company Limited (61°22 1/2'N, 139°15'W)

References: Skinner (1961, pp. 17-18; 1962, pp. 20-21); Green and Godwin (1963, p. 63; 1964, pp. 82-83).

Burwash Mining Company Limited owns 22 claims and operates a sluicing plant on Burwash Creek about 6 miles upstream from the Alaska Highway. The operation is accessible by tote road along the creek. From 1945 to 1963, the company has recovered about 21,197 ounces of crude gold. During 1964, the company recovered about 946 ounces of crude gold.

DAWSON RANGE AREA

Canadian Creek

L.I. Proctor (62°45'N, 138°51'W)

References: Cairnes (1917, pp. 29-31)*; Bostock (1941, pp. 28-30); Little (1959, pp. 16-19).

Late in 1964, L.I. Proctor purchased placer claims on Canadian Creek and mineral claims covering a silver-lead showing about 2 1/2 miles to the south from J. Meloy, formerly of Kirkman Creek, Yukon. The placer claims include Discovery claim on Patton Gulch, a tributary of Canadian Creek and 8 adjoining claims of Canadian Creek. The original Discovery on Canadian Creek was staked 21 April 1911, and the creek has been worked intermittently since (for descriptions see Cairnes, 1917, pp. 29-31; Bostock, 1941, pp. 28-30; and in Little, 1959, pp. 16-19). The deposit is notable in that it contains a considerable amount of tungsten, chiefly in the form of the mineral ferberite, and it has been considered as a potential source of tungsten in both World Wars.

Late in the season, Proctor moved 2 bulldozers and supplies to the property by way of a ferry on the Yukon River and an existing 15 mile road from the mouth of Britannia Creek, of which Canadian Creek is a tributary. A limited amount of testing was done on the placer ground and an airstrip was constructed near the Casino Creek silver-lead property.

Duke River

L.I. Proctor

Early in 1964, L.I. Proctor, of Whitehorse, Yukon, applied for a 10-mile dredging lease on the Duke River extending upstream from about 1/4 mile above the bridge on the Alaska Highway, near mile 1099. Between July 3rd and August 10th, 1964 a drilling program of 12 holes was completed on the gravels between the lower end of the proposed lease and the canyon that discharges about 3/4 of a mile upstream from the highway. Depth of gravel is reported to be about 22 feet and the ground is not frozen. Some values were obtained, but the ground is not considered economic for dredging and the application was withdrawn.

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*Reprinted in Geological Survey of Canada, Memoir 284 (Bostock, 1957, pp. 442-445).

Proctor owns two small dredges - 4 1/2 cubic foot buckets - formerly operated by Yukon Gold Placers Limited on Henderson and Thistle Creek, both located south of Dawson, Yukon. During the early spring of 1964, the hull and superstructure of the dredge on Henderson Creek was moved to Granville, Yukon.

Nansen Creek

T. Wheeler (62°06'N, 137°12'W)

References: Green and Godwin (1963, p. 64; 1964, p. 83).

T. Wheeler holds a 1-mile lease near the head of Nansen Creek and during the 1964 season employed A. Van Bibber to operate it from July 1st to August 30th. Production for the season was 121 ounces of crude gold.

Big Creek

Seymour Placers (62°20'N, 137°16'W)

Seymour Placers, operated by A.W. Warville and son, M. Warville, lease 10 placer claims on a tributary creek (locally known as Revenue Creek) to Big Creek from P.F. Guder. Revenue Creek enters Big Creek on the right limit about 4 miles upstream from the mouth of Seymour Creek. In addition, the Warvilles hold 2 one-mile placer prospecting leases on Mechanic Creek, another right limit tributary about 1 mile upstream from Revenue Creek. During 1964, Warville and his son working on Revenue Creek, sank a prospect shaft to bedrock and did some preliminary stripping. The shaft, 24 feet deep, is located about one-half mile up the creek. About 7 ounces of crude gold were recovered during the season, most of which came from the shaft. P.F. Guder has produced a small amount of gold in the past from small open cuts, which did not reach bedrock.

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); Wheeler (1961, p. 74); Skinner (1961, p. 30; 1962, p. 30); Green and Godwin (1963, p. 65; 1964, pp. 83-84).

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 109,941 tons. Annual production during this period has varied from less than 4,000 tons to a maximum of 14,113 tons in 1954. In 1964, production was 7,220 tons, which, with the exception of about 120 tons, was used by United Keno Hill Mines Limited at Elsa and Calumet. A maximum crew of 11 men is employed.

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.

The main entry, elevation 2,056 feet and about 350 feet above the Yukon River, follows the main coal seam northward and is about 2,550 feet in length. The seam strikes north and dips about 55°W. During 1964, most of the production came 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 counters 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.

When the writer visited the property early in 1965, a seam about 18 feet in width had been picked up beyond the northern fault in the main entry and followed for about 200 feet. This seam lies in about the projected position of the seam south of the fault, but it is not known whether it is the same seam. Where exposed in the main entry, about the location of the planned No. 20 raise, the seam had a true width of about 15 feet with the footwall not exposed. There were no visible partings in the seam as exposed, although a few discontinuous dark siliceous bands appear to be present. As broken, the coal from this face is about 30 per cent lump. Three raises, Nos. 17, 18, and 19 are being driven in the new block and

three counters have been established above the main entry. At the time of the visit all the mine production was being obtained from the development work in the new block.

A channel sample of the coal, taken in No. 1 Room, 50 feet north from No. 18 Raise on No. 2 Counter, where the seam has an apparent thickness of 16 feet, was analysed by the Mines Branch of the Department of Mines and Technical Surveys with the following results:

Laboratory No.	2251-65	2252-65
Proximate Analyses (Dry Basis)		
Ash ..... %	24.1	15.1
Volatile Matter ..... %	31.8	32.2
Fixed Carbon ..... %	44.1	52.7
Ultimate Analysis (Dry Basis)		
Carbon ..... %	61.0	69.5
Hydrogen ..... %	3.9	4.1
Sulphur ..... %	0.3	0.2
Nitrogen ..... %	0.8	0.9
Ash ..... %	24.1	15.1
Oxygen (by difference) ..... %	9.9	10.2
Equilibrium Moisture ..... %	2.4	3.1
Calorific Value ..... Btu/lb	10,580	11,720

The coal is classified as high volatile B bituminous according to the ASTM System of Classification of Coal by Rank. All samples are agglomerating and have a swelling index of 1 (ASTM). Coals of this type would not be expected to yield metallurgical grade coke.

2251-65: 8 foot channel sample from footwall of seam.
2252-65: 8 foot channel sample from hanging-wall of seam.

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INDEX OF OPERATIONS AND LOCATIONS

	Page
All Gold Creek	63
American Metal Climax Incorporated	49
Anaconda Company (Canada) Limited	45
Arctic Coast Area	69
Arctic Gold Syndicate	69
Asbestos Corporation (Explorations) Limited	27, 45
Ballarat Mines Limited	56, 59, 61, 63
Barduson Placers Limited	76
Becker-Cochran Property	42
Big Creek	82
Bleiler, E.C.	75
Blow River	69
Bonanza Creek	58
Boutillier, H.C. and D.F.	58
Bralorne Pioneer Mines Limited	45
Bratsberg, B.	60
Bremner, J. and I.C.	59
Brewer Creek	68
Brown McDade Mines Limited	32
Bunker Hill	14
Burgelman, A. and N.	61
Burwash Creek	80
Burwash Mining Company Limited	80
Caley, F. and G.	57
Caley Property	27
Canada Tungsten Mining Corporation Limited	7, 50
Canadian Creek	81
Canadian Johns-Manville Company Limited	27
Canex Aerial Exploration Limited	44
Caribou Creek	61
Carmacks Area	82
Casino Creek	34
Cassiar Asbestos Corporation Limited	6, 25, 27, 83
Cassiar Creek	27
Clear Creek Area	65
Clinton Creek Property	25
Colbourne, J.R.	61
Consolidated Discovery Yellowknife Mines Limited	29
Conwest Exploration Company Limited	27
Crest Exploration Limited	22
Cripple Hill Mining Company Limited	58
Dawson Range Area	28, 81
Dezadeash Area	35

	Page
Dickson Yukon Syndicate	37
Discovery Mines Limited	6, 28
Djukastein, K.	68
Dominion Creek and tributaries	54, 56, 61
Dublin Gulch Area	70, 72
Duke River	81
Duncan Creek Area	78
Dynasty Explorations	36
Eagle Group	12
Edwards, W.E.	68
Eldorado Creek	56, 59
Erl, F.	76
Eureka Creek	63
Eureka Placers Yukon Limited	63
Fifteenmile River Area	23
Fortymile Area	25
Foxy Group	27
Frances Lake Area	45
Freegold Mountain	28
Fry, A.T.	58
Fuhr, L.M.	57
Galena Hill Area	7, 12
General Enterprises Limited	35
Germaine Creek	64
Glacier Creek	67
Glenlyon Range Area	38
Gold Bottom Creek	60
Golden Gate Placers	69
Gold Run Creek	55, 61
Gold Queen Property	13
Granby Mining Company Limited	45
Haggart Creek Area	20, 70, 71
Heitman, G.	65
Henderson Creek	68
Highet Creek Area	73
Homestake Group	14
Hoole River	43
Hudson Bay Exploration and Development Company Limited	47
Hunker Creek and tributaries	55, 59
Janus, C.	65
Jersey Consolidated Mines Limited	12
Johnson Creek Area	73, 76
Johobo Mines Limited	35
K. and S. Placers Limited	63

	Page
Kelly, B.	78
Keno Hill Area	7, 13
Keno Hill Mining Company Limited	7
Kerr Addison Mines Limited	36, 38
Ketza River	42
Kirkman Creek Area	67
Klondike Area	52
Klondike River Valley	64
Kluane Lake Area	80
Kodiak and Dee Group	44
Kulan, A.	38
Laforma Property	28
Lamontagne, J.	62
Lesaux, E.	59
Lindsay, A.R.	64
Little Dal Lake	51
Little Salmon Lake Property	38
Lookout property	16
Lunde, O.	60
Lustre Yukon Mines Limited	14
Lynch, J.	67
Mackenzie Mountains Area	51
MacMillan Pass Area	47, 48
MacMillan Pass Tungsten Showing	48
Medby, O. and D.	66
Meloy, J.	35
Miller Creek	67
Mosich, S.	78
Mount Haldane	16
Mount Nansen Exploration Syndicate	32
Mount Nansen Mines Limited	6, 32
Murphy, D.	67
Nansen Creek	32, 82
New Imperial Mines Limited	6, 40
New Jersey Zinc Company (Canada) Limited	45
Newmont Mining Corporation of Canada Limited	32, 43
Norbeck, I.	60
Norquest Joint Venture	6, 45
Northern Yukon Services Limited	63
Ormsby Mines Limited	6, 29
Oxo Group	42
Oxso Silver Mining and Smelting Company Limited	42
Pelly Mountains Area	42
Pelly Plateau Area	43

	Page
Perret, F.	59
Peso Silver Mines Limited	6, 20, 21, 32
Plateau Lake Property	51
Proctor, L.I.	35, 81
Prospectors Airways Company Limited	38
Quartz Creek	56, 62
Rancheria River Area	44
Redstone Mines Limited	7, 51
Rex Property	20
Rio Plata Silver Mines Limited	13
Ross, L.M.	67
Ross River Area	36
Sailer, A.	62
Schink, E.	62
Secret Creek	20
Selwyn Mountains Area	50
Seymour Placers	82
Shanghai Property	19
Silver City Property	23
Silver Titan Mines Limited	16, 18
Simcox, J.	67
Sixtymile River Area	66
Snake River Area	22
Sockeye Lake	35
South McQuesten River Valley	19
Southwest Potash Corporation	48
Spencer Creek	44
Spruce Creek Placers Limited	71
Stewart River Area	67
Strachan, D.M.	64
Sulphur Creek	55, 62
Sundt, A.	62
Swim Lakes	36
Tantalus Butte Mine	82
Taylor, F.	72
Territorial Supply Company Limited	83
Thistle Creek	68
Thunder Gulch	78
Tom Group	47
Treadwell Yukon Corporation Limited	8
Tyers River	45
United Keno Hill Mines Limited	2, 6, 7, 83
Upper Flat River	50
Utah Construction and Mining Company	45

	Page
Vangorda Creek	36
Vangorda Mines Limited	36, 37, 38
Victoria Gulch	59
Werbiski, J.	64
Wheaton River Area	42
Wheeler, T.	82
Whitehorse Area	40
Whitehorse Copper Belt	40
Yukon Antimony Corporation Limited	42
Yukon Coal Company Limited	2, 83
Yukon Consolidated Gold Corporation Limited	5, 7, 52, 59, 61, 62