



GEOLOGICAL
SURVEY
OF
CANADA

DEPARTMENT OF MINES
AND TECHNICAL SURVEYS

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MINERAL INDUSTRY OF YUKON TERRITORY
AND SOUTHWESTERN DISTRICT OF MACKENZIE,
1961

R. Skinner



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By
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Information for this series of preliminary accounts is gathered from visits to most of the properties described, from personal communications with individuals and companies, from recent technical papers, from the annual reports of the Mining Recorders at Dawson and Mayo and from the staff of the Mining Recorder's office at Whitehorse. The initial report in this series, GSC Paper 61-23, contains a brief historical outline of some of the large companies. Some of the historical and geological information is from earlier reports of the Geological Survey. The writer is grateful to the persons and companies concerned for their assistance and cooperation.

Reports on the mining industry of Yukon for the years 1929 and 1930 were written by W.E. Cockfield, and for the years 1931 to 1940 by H.S. Bostock; these are listed in the Selected Bibliography. Useful and interesting accounts of geological surveys and mining activity during the years 1898 to 1933 are reprinted in Memoir 284 of the Geological Survey of Canada.

MINERAL INDUSTRY OF YUKON TERRITORY
AND SOUTHWESTERN DISTRICT OF MACKENZIE, 1961

INTRODUCTION

During the 1961 field season the writer visited the silver-lead-zinc properties on Galena and Keno Hills, the Johobo Mines copper property at Sockeye Lake, the Canada Tungsten Mining Corporation Limited tungsten property on Flat River, District of Mackenzie, the newly discovered Conwest Exploration Company Limited high-grade silver-lead-zinc showings, 105 miles northwest of Watson Lake, the recently discovered copper showings near North Lake and Fire Lake, and the Peso Silver Mines Limited property on Secret Creek, 15 miles northeast of Elsa. Several placer operations in the Klondike and Mayo districts were also visited.

The chief producer in the Yukon during 1961—United Keno Hill Mines Limited—operated the Hector, Calumet, and Elsa mines on Galena Hill, and produced \$8,540,143 silver, lead, zinc, and cadmium. Two small lode-mining operations were conducted: Johobo Mines Limited produced about 1,730 tons of high-grade copper ore from the Bornite Creek deposit near Sockeye Lake in Dezadeash map-area; and B. O'Neil and A. Triggs mined about 200 tons of high-grade silver-lead ore from the Comstock property on Keno Hill. Yukon Coal Company at Carmacks produced 7,804 tons of coal.

Yukon Consolidated Gold Corporation, Limited—the second-largest producer in the Yukon—operated five dredges and a bulldozer-sluicing plant near Dawson in the Klondike area, and produced \$1,905,372 gold and silver. Several small-scale placer operations, mainly in the Klondike area, produced a total of about \$485,850 gold and silver. Table I, made up from Mining Recorders' annual reports, gives approximate 1961 production of placer gold and silver by areas in the Yukon.

Table I
Yukon Placer Gold and Silver Production, 1961

District	Number of Operators	Production (approx.)	
		Gold (ounces)	Value of Gold and Silver (\$)
Klondike Y.C.G.C.*..	1	52,633	\$1,905,372
Others	18	7,821	283,000
Sixtymile	2	1,596	57,750
Henderson Creek - Thistle Creek	1	110	3,980
Clear Creek.....	1	246	8,920
Mayo.....	7	1,949	70,600
Kluane Lake.....	3	1,699	61,000
Totals	33	66,054	2,390,622

* Yukon Consolidated Gold Corporation, Limited.

Exploration during 1961 in Yukon has been greater than in any other year since 1955 when Hudson Bay Mining and Smelting Company Limited, Prospectors Airways Limited, and American Smelting and Refining Company Limited were actively exploring their Yukon properties. The mining highlight of the 1961 season was the discovery by Conwest Exploration Company Limited of several high-grade silver-lead-zinc veins 105 miles northwest of Watson Lake. The company plans to spend about \$400,000 in 1962 exploring these deposits by adit, stripping, drilling, and geophysical surveying. Dominion Explorers Limited optioned the Johobo Mines Limited Bornite Creek property and is exploring it by adit and diamond-drill. Peso Silver Mines Limited is exploring its silver-lead-antimony property on Secret Creek 15 miles northwest of Elsa by adit and trenching. Ormsby Mines Limited has freighted mining equipment from Yellowknife to its Laforma gold property on Freegold Mountain, 30 miles northwest of Carmacks, in preparation for the driving of 3,000 feet of adit and drifts to test the main ore zone 650 feet below the surface.

Canada Tungsten Mining Corporation Limited explored the east limb of its tungsten deposit at Flat River, District of Mackenzie, by adit and drilling, extended to air strip to 4,100 feet, and explored its four prospecting concessions. The main company activity, however, was the construction of an access road westward to, and down, Hyland River Valley. The company has built a winter road along Hyland River to connect with the government road to Watson Lake so that the mill, mining and townsite equipment and supplies can be transported by tractor-train to the property by the spring of 1962. Two syndicates were also active in the District of Mackenzie. Canex Aerial Explorations Limited headed a syndicate that explored a tungsten deposit in the Nahanni and Frances Lake map-areas. Nahanni Sixty Syndicate prospected in the Glacier Lake and Foran Lake map-areas, and discovered several silver-lead-zinc-copper showings near Dal Lake and 50 miles to the south.

Table II

Mineral Production of Yukon Territory
(Figures supplied by Dominion Bureau of Statistics)

Mineral	1960		1961*	
	Quantity	Value	Quantity	Value
Gold.....	78,115 ozs.	\$ 2,652,004	67,775 ozs.	\$ 2,401,946
Silver.....	7,217,361 ozs.	6,416,956	7,096,386 ozs.	6,672,022
Lead.....	20,286,871 lb.	2,166,638	17,484,845 lb.	1,792,197
Copper.....	—	—	880,000 lb.	256,872
Zinc.....	13,402,899 lb.	1,789,287	12,198,639 lb.	1,534,589
Cadmium.....	145,496 lb.	206,604	133,776 lb.	214,042
Coal.....	6,470 tons	97,156	7,804 tons	115,243
Platinum.....	19 ozs.	1,553	—	—
Total.....		\$13,330,198		\$12,986,911

*Preliminary figures.

Table III

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

Mining District	1958	1959	1960	1961
Whitehorse.....	725	521	928	1,642
Mayo.....	94	71	165	618
Dawson.....	124	85	244	202
Total.....	943	677	1,337	2,462

Table IV

Value of Mineral Production, Yukon Territory
(Figures supplied by Dominion Bureau of Statistics)

Mineral	1957	1958	1959	1960	1961*	Cumulative Total to Year Ending Dec. 31, 1961
Gold.....	\$ 2,481,425	\$ 2,301,975	\$ 2,247,847	\$ 2,652,004	\$ 2,401,946	\$ 254,788,316
Silver.....	5,665,232	5,569,348	6,192,556	6,416,956	6,672,022	85,452,374
Lead.....	3,488,023	2,449,920	2,290,960	2,166,638	1,792,197	41,882,731
Copper.....	—	—	—	—	256,872	2,711,695
Coal.....	91,595	56,379	58,200	97,156	115,243	2,083,324
Tungsten.....	—	—	—	—	—	25,888
Zinc.....	2,069,741	1,688,811	1,621,375	1,789,287	1,534,589	23,832,747
Antimony.....	—	—	—	—	—	173
Cadmium.....	315,782	244,323	181,440	206,604	214,042	3,493,265
Platinum.....	—	—	—	1,553	—	1,553
Total.....	\$14,111,798	\$12,310,756	\$12,592,378	\$13,330,198	\$12,986,911	\$414,272,066

*Preliminary figures.

PLACER MINING

KLONDIKE AREA

References: McConnell (1905*, 1907*)¹; Cairnes, Wright, and Martin (1913, pp. 95-121); Oliver (1909, pp. 39-111); Gibson (1950, pp. 9-10, 38-39); Bostock (1950, p. 15).

Yukon Consolidated Gold Corporation, Limited

References: Cockfield (1930*, pp. 1A-2A; 1931*, p. 1); Bostock (1933*, pp. 2AII-4AII; 1934*, pp. 1A-3A; 1935, pp. 1-2; 1936b, pp. 2-3; 1937, pp. 1-4; 1938, pp. 3-8; 1939, pp. 4-7; 1941, pp. 4-12); Skinner (1961, pp. 6-9).

The Yukon Consolidated Gold Corporation Limited operated five electrically driven dredges and a bulldozer-slucing plant in the Klondike area in 1961. The company holds most of the placer ground in the district (1,109 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. hydro-electric 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 Yukon Consolidated Gold Corporation (from Financial Post Survey of Mines, 1962, p. 302) are as follows:

Year	Cubic Yards Treated	Value of Gold (and Silver) Recovered
1932-57.....	166,385,951	\$43,350,028
1958.....	6,130,347	1,894,772
1959.....	5,914,587	1,804,449
1960.....	4,517,964	2,182,134

Much of the following information concerning the 1961 operations of Yukon Consolidated Gold Corporation was supplied by Mr. A.G. Barrett, Manager, Dawson, with the kind permission of Mr. W.A. Arbuckle, President, Montreal.

Dredge No. 6 (7-cubic-foot buckets) is working down lower Dominion Creek immediately below Sulphur Creek. In 1961 this

*Reprinted in GSC Mem. 284 (Bostock, 1957).

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

dredge operated from April 29 until November 8, mined 983,885 cubic yards of gravel at a cost of 27.4 cents per cubic yard, and recovered 9,431 fine ounces of gold and 1,881 ounces of silver valued at \$341,160. Work started on the dredge and site on April 6 and finished on November 15.

Dredge No. 8 (7-cubic-foot buckets) is working down lower Sulphur Creek about 2 1/2 miles from its mouth. In 1961 this dredge operated from May 3 until November 10, mined 922,380 cubic yards of gravel at a cost of 31.4 cents per cubic yard, and recovered 9,579 fine ounces of gold and 1,929 ounces of silver valued at \$346,842. Work started on the dredge and site on April 6 and finished on November 13.

Dredge No. 9 (5 3/4-cubic-foot buckets) is working up upper Sulphur Creek at the mouth of Friday Gulch, about 9 1/2 miles from Hunker Summit. In 1961 this dredge operated from May 1 until November 7, mined 336,153 cubic yards of gravel at a cost of 57.8 cents per cubic yard, and recovered 6,057 fine ounces of gold and 1,313 ounces of silver valued at \$219,516. Work started on the dredge and site on April 10 and finished on November 9.

Dredge No. 10 (7-cubic-foot buckets) is working down middle Dominion Creek at the mouth of Hunker Creek, 1 3/4 miles above Jensen Creek. In 1961 this dredge operated from April 28 until November 5, mined 911,591 cubic yards of gravel at a cost of 31.4 cents per cubic yard, and recovered 7,131 fine ounces of gold and 1,448 ounces of silver valued at \$257,680. Work started on the dredge and site on April 7 and finished on November 10.

Dredge No. 11 (7-cubic-foot buckets) is working down lower Hunker Creek, 1/2 mile below Last Chance Creek. When it reaches the old dredge tailings at the mouth of Hunker Creek it will work its way back up the left limit of Hunker Creek to Last Chance Creek and thence up the latter creek. In 1961 this dredge operated from April 27 until November 4, mined 887,013 cubic yards of gravel at a cost of 25.6 cents per cubic yard, and recovered 10,757 fine ounces of gold and 2,217 ounces of silver valued at \$288,856. Work started on the dredge and site on April 7 and finished on November 7.

In 1961 the six dredges mined a total of 4,041,022 cubic yards of gravel at a cost of 31.3 cents per cubic yard and recovered 42,955 fine ounces of gold and 8,788 ounces of silver valued at \$1,554,118.

In 1960 and 1961 the company operated a bulldozer-sludging plant on No. 15 Reserves on the left limit bench of middle Dominion Creek about 2 miles above Jensen Creek. During 1961 the plant operated from June 1 until September 29, mined 257,192 cubic yards of gravel at a cost of 62.9 cents per cubic yard, and produced 9,678 fine ounces of gold and 1,913 ounces of silver valued at \$351,254. Work started on the plant and site on April 15 and finished on October 18.

The floor of Dominion Bench at Reserve No. 15 is 375 to 450 feet wide, 3 to 5 feet above the bed of the creek at the rim, and slopes gently downward to the left limit. Dominion Bench here contains about 11 feet of gravel overlain by about 23 feet of muck. The company

mines the gravel by the slot method using a D-8 bulldozer with a pusher blade. The slots are commonly 125 feet square. The gravel is pushed in one side of a 20-foot-long steel hopper attached to the up-slope end of a 42-inch-wide by 52-foot-long sluice-box and is sluiced down the box by jets of water from five 4-inch and two 3-inch nozzles arranged along the side of the hopper. Water is supplied at the rate of 5,500 gallons per minute by two 10-inch pumps. The sluice-box is equipped with 2 1/2-inch-deep steel riffles covered with perforated steel plates having half- to one-inch-diameter holes. Gold recovered from the bench is coarse near the rim and grades to flaky at the left limit. Fine cassiterite is also recovered. Clean-ups are made every third day of operation.

The hydraulic-sluicing plant on Paradise Hill was not operated in 1961.

Stripping in 1961 was done ahead of dredge No. 9 and on Dominion Bench Reserve No. 15 and No. 17. Stripping plant No. 9, on upper Sulphur Creek about 2 miles above dredge No. 9, operated from May 19 until September 25 and removed 332,628 cubic yards of overburden. Work started on the plant and site on April 11 and finished October 20. Stripping plant No. 15, on the left limit bench of middle Dominion Creek about 1/4 mile below bulldozer-sluicing plant No. 15, operated from May 14 until July 27 and removed 255,119 cubic yards of overburden. Work started on the plant and site on April 18 and finished August 5. Stripping plant No. 17, on the left limit bench of middle Dominion Creek about 1 1/2 miles above Jensen Creek, is preparing placer ground for dredge No. 12. The plant operated from May 15 until September 24 and removed 626,692 cubic yards of overburden. Work started on the plant and site on April 12 and finished October 19. The three stripping plants removed a total of 1,214,439 cubic yards of overburden at an average cost of 8.89 cents per cubic yard.

Thawing in 1961 was done ahead of dredges No. 6, No. 9, and No. 10. Thawing plant No. 6, on lower Dominion Creek, operated from May 20 until August 30 and thawed 1,069,270 cubic yards of gravel. Work started on the plant and site April 11 and finished October 17. Thawing plant No. 9, on upper Sulphur Creek, operated from May 19 until September 20 and thawed 741,226 cubic yards of gravel. Work started on plant and site on April 11 and finished October 20. Thawing plant No. 10, on middle Dominion Creek, operated from May 16 until September and thawed 735,390 cubic yards of gravel. Work started on the plant and site on April 11 and finished October 19. The three thawing plants thawed a total of 2,545,886 cubic yards of gravel at an average cost of 8.69 cents per cubic yard.

The company exploration program consisted of mapping the bedrock geology of the general area of the placer deposits, the staking (in partnership with Asbestos Corporation Limited) of a group of 48 lode claims in the Stand-to Mountain area of the Davidson Range, and the examination of a number of properties in Yukon Territory and British Columbia. None of the examined properties was considered worth further exploration.

In 1961 the Yukon Consolidated Gold Corporation employed a maximum labour force of 309 men, mined a total of 4,298,214 cubic yards of gravel and produced \$1,905,372 gold and silver. Proven gravel reserves written off during 1961 were 3,976,426

cubic yards and proven gravel reserves at the end of 1961 were 15, 114, 094 cubic yards valued at \$6, 081, 885 (40.24 cents per cubic yard).

In 1962 the company plans to operate dredges No. 6, 8, 9, 10, and 11 and a bulldozer-sluicing plant on Dominion Bench Reserves Nos. 15 and 16. Stripping operations will be carried out ahead of dredge No. 9 and on Dominion Bench Reserves Nos. 16 and 17. Thawing operations will be carried out ahead of dredges No. 6 and No. 10 and on Dominion Bench Reserves No. 17 (in preparation for the 2 1/2-cubic-foot bucket dredge No. 12). Exploration parties will be in the field.

Bonanza Creek

Cripple Hill Mining Company Limited

The Cripple Hill Mining Company Limited—owned by Ralph E. Troberg and Peter Foth—has six creek claims on Bonanza Creek, one on Trail Gulch, three hill claims on Cripple Hill and one on Trail Hill (all part of the old Bronson and Rae Concession) about 2 1/4 miles up the Bonanza Creek Road. In the company's first year of mining, 1961, it installed equipment and prepared ground from April 1 to July 4 and mined with a maximum crew of six from July 4 to September 30 on hill claims Nos. 77 and 78 Below Discovery. Production was about 540 crude ounces of gold.

Equipment used included a 12-inch pump driven by a 400-hp. electric motor, about 2, 000 feet of 16-inch steel pipe, two No. 2 monitors with 4-inch nozzles, a 30-inch-wide by 48-foot-long sluice-box and a D-4 bulldozer. The pump supplied 4, 500 gallons of water per minute from Bonanza Creek at a pressure of 90 pounds per square inch at the nozzle. The sluice-box grade is about 1 inch to the foot. The company planned to add 400 feet of 14-inch pipe, two monitors, and another sluice-box at the north end of the pit.

The hydraulic pit is in frozen White Channel gravels about 223 feet above Bonanza Creek. When visited on July 23, 1961, the face was 90 feet high and about 200 feet long. The gravel is stratified and compact and is composed of a groundmass of small angular grains of quartz and rock flour commonly enclosing rounded quartz pebbles 2 to 4 inches long. The lower 5 feet of the deposit, however, is coarser and contains boulders up to 12 inches long. The gold recovered is fine grained and is distributed evenly from top to bottom of the gravel. Some of the gold has quartz attached to it. The bedrock at the pit is green-grey quartz-chlorite schist that is cut by numerous quartz veinlets.

S.M. Berg and E.M. Lintick

S.M. Berg and E.M. Lintick own two hill claims on Sourdough Hill and two bench claims below that hill on the left limit of Bonanza Creek about 3 miles up the Bonanza Creek Road. Berg and Lintick stripped ground from June 1 to October 15, 1961, in preparation for mining in 1962.

A.T. Fry

Reference: Skinner (1961, p. 9).

A.T. Fry owns two creek claims on Boulder Creek, and two on Monte Cristo Creek, and three hill claims on King Solomon Hill on the left limit of Bonanza Creek, 6 miles up the Bonanza Creek Road, where he operates a hydraulic pit. The White Channel gravels there were mined by drifting as early as 1900 and later by hydraulicking. The Yukon Gold Company acquired the property in 1907 and hydraulicked it until 1924; in 1927 the property was taken over by the Yukon Consolidated Gold Corporation. Fry acquired his first claims there in 1945 and began hydraulicking on Monte Cristo Gulch in 1952. He mined there until 1959, with the exception of the years 1947 and 1958, and produced about 505 crude ounces of gold. In the latter parts of most of these seasons he also mined on claim No. 44 Below Discovery on Hunker Creek. Fry started his present hydraulic pit on the right limit of Boulder Creek in September 1959 and has worked it since that time, producing about 475 crude ounces of gold. In 1961 he mined from April 17 to October 10 and produced about 248 crude ounces of gold.

The hydraulic pit is in frozen White Channel gravels about 190 feet in altitude above Bonanza Creek, and—when visited in July 1961—the face was about 180 feet long, semicircular in outline, and 45 to 50 feet high. The pit drains northward to Boulder Creek through a ditch worn in bedrock. The sluice-box is placed at the outlet of the ditch about 130 feet in altitude below the pit. Water is ditched 1 1/2 miles from upper Boulder Creek along its left limit, and this supplied enough water (in July) to operate a 7-inch monitor for about 1 1/2 hours, four times a day. Four- or five-inch nozzles are used on the monitor. An RD-6 bulldozer is used to move the gravel to the ditch leading to the sluice-box.

The lower 14 feet of the White Channel face is composed of gravel containing quartz boulders up to 18 inches long and is overlain by about 2 to 3 feet of sand, which in turn is overlain by about 30 feet of stratified gravel containing quartz cobbles up to 6 inches long. Gold is distributed throughout the gravel from top to bottom. It has a fineness of about 800, is flattened, and commonly is in grains up to 3 or 4 cm long and 1 to 2 cm thick. Other heavy minerals found in these gravels are magnetite and cassiterite. The bedrock is grey-green quartz-sericite schist having a schistosity that strikes 125° and dips 25° southward. The schist is cut by numerous irregular quartz veins that average about an inch in thickness.

H.C. and D.F. Boutillier

Reference: Skinner (1961, p. 9).

H.C. and D.F. Boutillier own eleven creek claims on Adams Creek and four bench claims on Adams Hill, all about 8 miles up on the left limit of Bonanza Creek. The Boutilliers operate a hydraulic plant in White Channel gravels on Adams Hill in the spring when the water is plentiful and a bulldozer-sluicing plant on Adams Creek during the summer. They mined from April 1 to October 4, 1961, and recovered about 300 crude ounces of gold.

A TD-40 bulldozer and sluice-box is used on Adams Creek. The creek flows in a narrow V-shaped valley whose bed at the workings, on No. 8 claim about 4,000 feet from the mouth, is about 50 feet wide and contains about 5 feet of coarse gravel overlain by 5 to 10 feet of frozen muck. The gravels contain slabs of Klondike schist, 18 inches to 4 feet long, and some coarse gold.

E. Lesaux and F. Perret

E. Lesaux and F. Perret have a 1/2-mile placer lease on Victoria Gulch and lease claims No. 42 and No. 43 Above Discovery on Bonanza Creek (at the mouth of Victoria Gulch) from the Yukon Consolidated Gold Corporation. They stripped and mined from May 1 until September 25, 1961, using a TD-18 bulldozer and sluicing equipment, and recovered 70 crude ounces of gold.

J. Lamontagne

Reference: Skinner (1961, pp. 10, 13).

J. Lamontagne mined on upper Bonanza Creek at the mouth of Ready Bullion Gulch from April 1 until October 1, 1961. He used sluicing equipment and a TD-6 bulldozer and recovered 90 crude ounces of gold. Lamontagne plans to mine on Gold Run Creek in 1962 in partnership with E. Schink.

Eldorado Creek

Ballarat Mines Limited

Reference: Skinner (1961, p. 10).

Ballarat Mines Limited owns claims 29, 30, and 43-OA and leases claims 28, and 31 to 46A from Yukon Consolidated Gold Corporation and claims 47 to 56 (numbered from the mouth) from J. Castonguay and D.M. Campbell, all on Eldorado Creek. In 1961 the company stripped placer ground between claims 30 and 38, below Gay Gulch, and mined from August 5 to September 13. Three men used two D-8 bulldozers, pumps and sluicing equipment.

Eldorado Creek was the richest creek in the Klondike, and the richest part of it was between the mouth and Gay Gulch, a stretch of about 3 1/2 miles. Claims 5, 16, 17, and 30 are reported to have each produced about \$1 1/2 million of gold prior to 1904.

The bed of Eldorado Creek at the mouth of Gay Gulch is about 125 feet wide and contains about 6 feet of gravel overlain by about 9 feet of frozen muck. The gravel consists mainly of flat quartz-sericite schist pebbles, 1 inch to 6 inches long and 1 inch to 2 inches thick, and rounded quartz pebbles with some large angular quartz boulders.

Hunker Creek

J. and I.C. Bremner

Reference: Skinner (1961, p. 10).

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. They operate a hydraulic pit in White Channel gravels on Graves and Allan benches, left limit of Last Chance Creek, and in 1961 mined from April 20 until October 4 and produced 280 crude ounces of gold.

E. Schink

Reference: Skinner (1961, p. 11).

E. Schink owns a bench claim on Paradise Hill, a hill claim on the left limit of Hunker Creek above No. 72 Below Discovery, and three hill claims on the right limit of Eighty Pup, left limit tributary of Hunker Creek. In 1961 he leased (from Yukon Consolidated Gold Corporation) and worked two bench claims on Paradise Hill, on the left limit of Hunker Creek about 5 miles up the Hunker Creek Road. Schink mined from April 25 until September 30, 1961, using a D-8 bulldozer, monitor, and sluice-box and produced 150 fine ounces of gold.

G. Fant and I. Norbeck

Reference: Skinner (1961, p. 10).

G. Fant and I. Norbeck have a five-claim (34 to 35 C Below Discovery) prospecting lease on Hunker Creek about 3/4 mile below Gold Bottom Creek and operate a hydraulic-sluicing plant on a low-level bench on the left limit of Hunker Creek on claims 34 and 35 Below Discovery. In 1961 they stripped placer ground from April 27 until mid-August, then mined until the end of September and recovered about 272 fine ounces of gold.

Normally in May, during the spring run-off, water is ditched for 3 miles from middle Gold Bottom Creek, but during the remainder of the mining season it is pumped from Hunker Creek. Equipment used includes a 10- by 12-inch diesel-driven pump, 2,000 feet of 10-inch steel pipe, five 4-inch and one 5-inch monitors a TD-18 bulldozer, and a sluice-box.

The bench, which is only a few feet in altitude above Hunker Creek, contains 3 to 6 feet of gravel overlain by 20 to 40 feet of black frozen muck. The gravel is composed mainly of flat schistose pebbles, subangular quartz pebbles and some quartz boulders. The gold is fine grained and is present in the lower part of the gravel and in the shattered bedrock to a depth of 5 feet. The latter is mined as well as the gravel. Bones of mastodons, mammoths, bison, and other Pleistocene animals, and beaver cuttings, are present in the muck.

Gold Bottom Creek

B. Bratsberg

Reference: Skinner (1961, p. 10).

B. Bratsberg owns these creek claims: upper 500 feet of Discovery (4.8 miles from the mouth), and Nos. 3 to 12 Above Discovery in Gold Bottom Creek. From 1947 to 1955, Bratsberg held and mined claims 16 to 29 above the mouth of Gold Bottom Creek and produced about 5,000 crude ounces of gold. In 1956 and 1957 he mined on his present holdings and produced about 1,000 crude ounces of gold.

In 1958 and 1959 he mined on his hill claims Nos. 24 and 26, Right Limit, Hydraulic Reserve on Hunker Creek, about a mile up the Hunker Creek Road and produced about 1,150 crude ounces of gold. In 1960 and 1961 he stripped placer ground and mined on Gold Bottom Creek and assisted his son-in-law, A. Sundt, on Little Blanche Creek. In 1961 he produced about 60 ounces of gold from his Gold Bottom property.

Bratsberg's camp is at Discovery Claim. He has mined the creek for about 1/3 mile above the camp and has stripped beyond for about 2/3 mile to Soap Creek. The creek bed at the mining site is about 80 feet wide and contains about 8 feet of gravel overlain by 15 to 30 feet of frozen muck. The gold occurs in the lower part of the gravel and a few feet in the shattered schistose bedrock. It is coarse and has a higher than average fineness.

Dominion Creek

A. Burgelman

Reference: Skinner (1961, p. 11).

Mr. and Mrs. Burgelman have creek claims Nos. 2, 3, 5-10, and 20 on Caribou Creek, one of the largest right-limit tributaries of Upper Dominion Creek. They mined with a D-6 bulldozer and sluice-box from April 15 to October 15 and produced 170 crude ounces of gold.

Ballarat Mines Limited

Reference: Skinner (1961, p. 11).

Ballarat Mines Limited—owned by G.D. Franklin of Seattle, Washington, and H. Schmidt of Healdsburg, California—has operated a bulldozer-slucing plant since 1959 on the left limit bench of Dominion Creek between Nevada Creek and Coarse Gold Pup. On Dominion Creek the company owns creek claim No. 13 Below Lower Discovery (Lower Discovery is about 1/3 mile below Troublesome Pup), has a 1 1/4-mile lease above claim No. 9 Above Lower Discovery, and leases 48 claims below the 1 1/4-mile lease from Yukon Consolidated Gold Corporation. In 1960, Ballarat mined below Troublesome Pup (Little Quebec) and about 1/2 mile below Portland Creek; in 1961, above and below Troublesome Pup and below Portland Creek. In 1961 the company also mined on Eldorado Creek and stripped on Quartz Creek. Equipment used on Dominion Creek included two D-8 bulldozers, a 10- by 12-inch diesel-driven pump and a 40-inch-wide by 40-foot-long sluice-box equipped with a 12- by 20-foot hopper and a monitor. A maximum crew of seven was employed between April 20 and September, 1961.

The left limit of Dominion Creek, near Troublesome Pup, has two low benches. The lower one is about 150 feet wide, about 10 feet above the creek bed, and contains 9 to 14 feet of fine gravel and sand; the upper one, about 10 feet above the lower one, is about 200 feet wide and contains 3 1/2 to 4 feet of gravel and sand. The creek bed here is 500 to 600 feet wide and contains about 4 feet of gravel overlain by about 15 feet of muck. The gold recovered is smooth and coarse grained and occurs near the bottom of the gravel and in the upper part of the schistose bedrock. The coarse gold, rarely 1/2-ounce nuggets,

commonly has quartz attached to it. Some cassiterite is also recovered from the gravels below Portland Creek.

Spruce Creek Placers Limited

Reference: Skinner (1961, pp. 11-12).

Spruce Creek Placers Limited—owned by F.M. Wilson of Kirkland, Washington, J.M. Acheson of San Francisco, California, and W.L. Drury of Whitehorse—in 1959, 1960, and 1961 mined under agreement with Ballarat Mines Limited on upper Dominion Creek, about 3/4 mile below Troublesome Pup. The company, managed by Acheson, mined a width of approximately 250 feet of undredged creek gravels on the left limit of the creek as well as gravels on the lower left limit bench. The latter is about 10 feet above the creek bed and about 200 feet wide. Both the creek bed and bench have about 3 feet of gravel overlain by about 20 feet of muck. The muck was stripped off the gravel, and the gravel, together with about 2 feet of the schistose bedrock, was mined. Equipment used included: a 1 1/2-cubic-yard Keohring dragline to stack tailings and dig drainage ditches; a TD-18 and a D-8 bulldozer for stripping, feeding gravel into the sluice-box, and removing tailings; a sluice-box; and a pump and monitor to supply water for sluicing.

Spruce Creek Placers Limited started mining on Spruce Creek in the Atlin area, British Columbia, in 1940. The holdings of this company were leased by the present owners, who operated on Spruce Creek under the name "Enterprise Placers Limited". In 1956 the present owners bought the holdings of Spruce Creek Placers and have operated under that name since. The Atlin operation, managed by F.M. Wilson, mined on Spruce Creek until September 1960 when it moved to Pine Creek, also in the Atlin area. On September 15, 1961 the Dominion Creek operation was moved to Haggart Creek.

Eureka Creek

Eureka Placers Limited

Reference: Skinner (1961, p. 12).

Eureka Placers Limited—owned by G. Shaw, H. Hanulik, J. Buss, and Dr. J. Rooks of Dawson—own two Discovery claims and 26 claims on the right fork Above and Below Discovery on Eureka Creek, tributary of Indian River. The company also has a 4-mile prospecting lease on the left fork of Eureka Creek and a 1-mile lease on Eighteen Pup, left limit tributary of the left fork. Since 1959, Eureka Placers has operated a bulldozer-sluicing plant on the left fork of Eureka Creek about 1/2 mile above the forks. In 1960 it mined 80,000 bedrock square feet of gravel and recovered 951 crude ounces of gold, whereas in 1961, from May 1 to September 27, it mined about 120,000 bedrock square feet of gravel and recovered 352 crude ounces of gold. Equipment used included a D-7 and a D-8 bulldozer and a 26-inch by 30-foot sluice-box equipped with an 8- by 16-foot hopper. Three men were employed.

The creek bed at the workings is about 80 feet wide and contains about 6 feet of fine gravel overlain by about 6 feet of muck. The gold is coarse, in rough and flattened grains, has a fineness of about 735, and is present at the base of the gravel and in the underlying

fractured schistose bedrock. Nuggets up to 1/2 ounce have been recovered, and 2- to 5-dollar ones are common. Magnetite and hematite occur with the gold in the concentrate.

Northern Yukon Services Limited

Reference: Skinner (1961, p. 12).

Northern Yukon Services Limited—owned by M.D. and L.G. Cole (brothers)—sublease placer ground from Eureka Placers Limited on Eureka Creek below the forks and operate a bulldozer-slucing plant there. In 1961, from April 28 to September 30, the company, with a crew of six, mined about 150,000 bedrock square feet of gravel and produced 1,800 crude ounces of gold. Equipment included three D-8 bulldozers, a 1 1/2-cubic-yard dragline, a 10- by 12-inch diesel-driven pump, a No. 2 monitor, and a sluice-box.

The bed of Eureka Creek below the forks is about 200 feet wide and contains about 12 feet of gravel and 12 feet of muck. The gold is coarse—nuggets weigh up to 1 ounce—and is present at the base of the gravel and in the underlying fractured schistose bedrock. The muck and the upper 6 feet of gravel are stripped, then the underlying gravel and about 2 feet of the bedrock are mined.

Quartz Creek

O. Lunde

Reference: Skinner (1961, p. 12).

O. Lunde owns Radford's Discovery claim and hill claim Upper Half R.L. No. 27 Below A. Mack's Discovery on Quartz Creek. He operated a bulldozer-slucing plant on Quartz Creek about a mile above Calder Creek and produced 120 crude ounces of gold in 1960 and 286 ounces in 1961. During the seasons of 1957 to 1959 inclusive he mined on Dominion Creek at the mouth of Caribou Creek. Equipment used included a D-6 bulldozer, a 10- by 12-inch diesel pump and a sluice-box.

L.M. Fuhr

L.M. Fuhr operated a bulldozer-slucing plant on Quartz Creek in 1961. He mined about 1 1/2 miles above Calder Creek and produced 102.5 fine ounces of gold.

A. Sundt

A. Sundt in 1961 operated a bulldozer-slucing plant on Little Blanche Creek, a tributary of Quartz Creek. He mined about a mile from the mouth of the creek and produced 111 fine ounces of gold.

All Gold Creek

K. and S. Placers Limited

K. and S. Placers Limited—owned by M. Kinakin and W. Scott of Dawson—in 1961 operated a bulldozer-slucing plant on All Gold Creek and produced 174 fine ounces of gold. In 1960, Kinakin and G. Jarvis mined on All Gold Creek under the name "All Gold Creek Mining Company" and produced 83 fine ounces of gold.

SIXTYMILE RIVER AREA

References: Oliver (1909, pp. 56-57); Cockfield (1921a; 1930*, p. 2A; 1931*, p. 1A); Bostock (1933*, p. 4All; 1934*, pp. 3A-4A; 1935, p. 3; 1936b, p. 1; 1937, p. 1; 1938, pp. 2-3; 1939, pp. 3-4; 1941, pp. 3-4); Gibson (1950, pp. 38-39).

Glacier Creek

Yukon Placer Mining Company

References: Gibson (1950, p. 38); Skinner (1961, p. 13).

Yukon Placer Mining Company, managed by G.D. Franklin, has operated Yukon Exploration Company's property on Sixtymile River at the mouth of Glacier Creek since 1949. From 1949 to 1959 a 3 1/2-cubic-foot bucket-line diesel-electric dredge and an open-cut bulldozer-sluicing plant was added. In 1960 and 1961, only the sluicing plant was used. Yukon Exploration's production during 1947 and 1948 totalled about \$66,000 gold and silver. Yukon Placer Mining Company's production from 1949 to 1961 inclusive totalled \$2,536,430 gold and silver. In 1961 a crew of four men using three D-8 bulldozers, pumps, and sluice-boxes, mined from May 4 until August 5 and produced 1,521 fine ounces of gold and 261 ounces of silver. The 1961 operation brings to a close the Yukon Placer Mining Company's activity in the Sixtymile River area.

Miller Creek

O. Medby

Reference: Skinner (1961, p. 13).

O. Medby and one hired man, using a D-6 bulldozer and sluice-box, mined on Miller Creek, a tributary of Sixtymile River, from June 25 until September 15, 1961. Production was 108 crude ounces of gold. Medby has worked on Miller Creek since 1951. From 1951 until 1958 he was in partnership with J. Lamontagne who worked mainly on Bedrock Creek.

HENDERSON CREEK - THISTLE CREEK AREA

References: Cairnes (1917a*); Cockfield (1930*, p. 2A; 1931*, p. 1A); Bostock (1934*, p. 4A; 1935, p. 3; 1936b, p. 4; 1937, p. 4; 1938, p. 8; 1939, p. 10; 1941, p. 16).

Kirkman Creek

L.N. Ross

Reference: Skinner (1961, pp. 13-14).

L.N. Ross owns creek claims 14 to 19 inclusive Below Upper Discovery and a 1-mile lease 2 1/2 miles above the mouth; he leases three Upper Discovery claims and claims 1 to 5 Above and Nos. 1 to 6 Below Upper Discovery from Ballarat Mines Limited.

*Reprinted in GSC Mem. 284 (Bostock, 1957).

All are on Kirkman Creek. The Upper Discovery claims are about 7 miles above the mouth of the creek and about a mile above Ross' camp and workings. Ross operated a bulldozer-slucing plant on Kirkman Creek from 1957 to 1961 and produced a total of about 2,600 crude ounces of gold. The creek was worked extensively between 1914 and 1920 and again between 1934 and 1941. Ballarat Mines Limited operated on the creek in 1953. In 1960, Ross mined on Kirkman Creek from May 10 until September 25 and produced 800 crude ounces of gold. In 1961 about three weeks of stripping was done in the spring and about a month of mining in July and August. Recovery was about 130 crude ounces of gold. Equipment used included two D-8 bulldozers, a pump and sluice-box.

The bed of the creek at the working site is about 200 feet wide and contains about 5 feet of coarse gravel overlain by about 15 to 20 feet of muck—both frozen. The gold is coarse, has a fineness of about 860, and occurs in the lower part of the gravel and in the fractured schistose bedrock. The muck and 3 or 4 feet of gravel are stripped and the remaining gravel and about a foot of bedrock are mined.

Thistle Creek

W. Edwards

W. Edwards of Alaska has leased the lower 6 1/2 miles of Thistle Creek and tested placer ground near the mouth of the creek. He intends to mine the benches at the mouth of Green Gulch in 1962. Edwards has acquired a HD-15 and two HD-20 bulldozers, pumps and pipe from Nighthawk Mines Limited which operated a 4 1/2-cubic-foot bucket dredge on Thistle Creek from 1949 to 1952.

R. Burian

R. Burian of Stewart River has a 4-mile placer lease above the Edwards lease on Thistle Creek and a 1-mile placer lease on Henderson Creek about 15 miles from its mouth.

CLEAR CREEK AREA

References: Bostock (1936b, p. 3; 1937, p. 4; 1938, p. 8; 1939, p. 9; 1941, pp. 12-14; 1950, p. 18); Gibson (1950, p. 39).

Clear Creek

G. Heitman and H. Netzel

G. Heitman and H. Netzel operated a bulldozer-slucing plant on Netzel's 2-mile placer lease below the main fork on Clear Creek from June 15 until October 10, 1961. Four men using two D-6 bulldozers and sluice-boxes recovered 300 crude ounces of gold.

MAYO AREA

References: Keele (1906*); Cairnes (1916*); Cockfield (1919*); Bostock (1933*, pp. 4AII-5AII; 1934*, p. 4A; 1935, p. 3; 1936b, pp. 3-4; 1937, p. 4; 1938, p. 8; 1939, pp. 7-9; 1941, pp. 14-16).

*Reprinted in GSC Mem. 284 (Bostock, 1957).

Dublin Gulch

F. Taylor

References: Bostock (1939, p. 8; 1941, p. 15; 1959, pp. 21-29);
Skinner (1961, p. 14).

F. Taylor owns five claims on the lower part of Dublin Gulch and ground-slucies on the left limit of the gulch immediately below the lower left-limit pup, 0.6 mile above the mouth. Taylor staked the lower mile of the gulch in 1936 and has mined there since, except for the years 1943 and 1944 (when the ground was leased), 1946 to 1948 inclusive, and 1950 and 1952. He produced about \$300,000 of gold, silver and tungsten. In 1961 his production was about 810 crude ounces of gold.

Taylor has mined the left limit of the gulch from near its mouth to his present workings and some of the right limit above his present workings. Because of the small flow of water in the gulch he uses a dam equipped with an automatic gate. Other equipment used includes a model 977 Traxcavator equipped with a 2 1/2-cubic-yard bucket and a 36-inch by 30-foot sluice-box with a V-shaped hopper 10 feet wide at the mouth. Taylor's cuts vary in size from 50 feet to 150 feet square and the volume of gravel mined during a season varies from 5,000 to 40,000 cubic yards. In 1961 he mined about 20,000 cubic yards.

The creek bed at Taylor's cut is about 400 feet wide, is composed of quartzite and graphitic schist, and contains about 25 feet of coarse gravel overlain by about 5 feet of muck—both frozen. The boulders in the gravel are mostly granitic and are up to 3 feet long. The gold is distributed throughout the gravel from top to bottom, but tends to be concentrated under large boulders. It is rough and wiry and about 10 per cent is coarse, ranging up to nuggets of an ounce or more. The largest nugget recovered by Taylor weighed 4 ounces. The heavy minerals include hematite, scheelite, ferberite, arsenopyrite, garnet, and cassiterite.

Double S Placers Limited

Reference: Skinner (1961, p. 14).

Double S Placers Limited—owned and operated by G. Smashnuk of Mayo—has five claims above F. Taylor's on Dublin Gulch that were purchased from C.W. Greig in 1960, who in turn purchased them from Taylor in 1955. Greig ground-slucied the lower claim until 1960 and produced about 1,065 crude ounces of gold. Smashnuk worked in the same area, about a mile up the gulch at Eagle Pup, during 1960 and 1961. He used a dam with an automatic gate, a sluice-box, a model 955 Traxcavator with bucket and blade, and a dump truck, and produced about 700 crude ounces of gold. In 1961 he stripped 4,000 cubic yards of muck and mined about 14,000 cubic yards of gravel yielding about 324 crude ounces of gold.

During 1960 and until September 1961 Smashnuk ground-slucied the right limit of the gulch where there is about 20 feet of gravel;

in September he mined the left limit, above Eagle Pup, to a depth of 35 feet below the stripping without reaching bedrock. He is certain that there is an older and deeper channel along the left limit and expects a higher concentration of gold there.

Haggart Creek

E.H. Barker

References: Bostock (1938, p. 8; 1939, p. 8; 1941, p. 15; 1959, p. 24); Skinner (1961, p. 15).

Barker held placer claims on Haggart Creek since 1936 and managed the Haggart Mining Company until 1945. This company held 24 claims below Dublin Gulch and mined them with bulldozers, a mechanical shovel, a dragline, and sluice-boxes from 1937 until 1945, and produced approximately 10,000 ounces of gold. From 1953 to 1957 inclusive, Waddco Placers Limited—owned by F.M. Wilson, J.M. Acheson, and W.L. Drury—mined on Barker's ground and produced about 12,620 crude ounces of gold. In 1959 and 1960, Barker mined for short periods and produced a total of about 270 crude ounces of gold. In recent years he spent considerable time and effort prospecting for lode deposits and was engaged in this work when he died on July 4, 1961.

W. Malacky

Reference: Skinner (1961, p. 15).

W. Malacky leased five of Barker's claims on Haggart Creek in 1960 and 1961 and mined with one hired man, a D-7 bulldozer, and a sluice-box on the left limit of the creek about a mile above Fifteen Pup. In 1960 he mined for only a few weeks and produced 141 crude ounces of gold; in 1961 he mined from May 15 until August 31 and recovered 185 crude ounces of gold.

Spruce Creek Placers

Reference: Skinner (1961, pp. 11-12).

Spruce Creek Placers Limited—owned by F.M. Wilson, J.M. Acheson, and W.L. Drury—moved its placer-mining equipment from Dominion Creek, Klondike area, to Haggart Creek in the latter part of September 1961. The company leased from the E.H. Barker estate, 22 claims on Haggart Creek between Dublin Gulch and Fifteen Pup, and staked a 1-mile placer lease along the left limit bench below Dublin Gulch. The creek claims were leased and worked from 1953 to 1957 inclusive by Waddco Placers Limited, which was also owned by Wilson, Acheson, and Drury. Starting about September 30, 1961, Spruce Creek Placers, managed by Acheson, mined a cut of about 5,000 cubic yards and recovered about 30 crude ounces of gold. The company plans to operate there in 1962.

Highet Creek

E.C. Bleiler

Reference: Skinner (1961, pp. 15-16).

E.C. Bleiler owns 36 placer claims (formerly owned by his father-in-law, E. Middlecoff) and a 1-mile lease on Highet Creek. He operates a hydraulic-sluicing plant about 3/4 mile above his camp, which is at the mouth of Dredge Creek. The first placer mining was done on the creek in 1903, but Middlecoff, who worked his claims from 1906 to 1946, has been the major producer. Ballarat Mines Limited leased and mined part of Bleiler's claims in 1952, but found mining conditions unsuitable for its equipment. Bleiler has worked there since 1958, mining about 1,000 feet of the left limit of the creek, from which he recovered about 506 crude ounces of gold (113 in 1961). The boulder-filled drifts of old workings have been a great hindrance to him so he plans to move his mining operation downstream in 1962 to unworked ground near Dredge Creek.

Bleiler uses water, under pressure of 100 feet of head, in one or two No. 2 monitors. It is ditched for a mile along the right limit of the creek and piped 500 feet or more to the monitors. A TD-14 bulldozer is used for stripping and stacking tailings and moving large boulders. The gravel being mined is monitored onto a perforated plate, the fine material dropping through into a sluice-box and the coarse being forced over it.

The creek bed at Bleiler's workings is about 200 feet wide and contains from 25 to 40 feet of a mixture of gravel and boulder till. The gravel contains granitic boulders up to 3 feet long and small schist and quartzite pebbles. The gold is smooth and commonly medium grained, ranging up to 3/4-ounce nuggets; the largest nugget recovered weighed 2 1/2 ounces. The gold is found on, or in, the fractured bedrock. Heavy minerals include magnetite, hematite, scheelite, and ferberite.

Johnson Creek

Barduson Placers Limited

Reference: Skinner (1961, p. 16).

Barduson Placers Limited, owned by K. Djukastein and J. Sandanger, operates a sluicing plant on Johnson Creek about 1/4 mile below Sabbath Creek. Sandanger originally held and worked the ground, then in 1956 and 1957 he and Djukastein prospected the creek. In 1958, Djukastein mined the creek about 3/4 mile below Sabbath Creek and produced 324 crude ounces of gold; and in 1959, he and Sandanger formed Barduson Placers Limited and mined 777 crude ounces of gold from the creek. The production in 1960 and 1961 was 990 and 772 crude ounces respectively.

The company purchased a 3/4-cubic-yard Bay City diesel shovel early in 1961 and has mined in much the same manner as H. Besner on Burwash Creek (see "Burwash Mining Company Limited", Kluane Lake Area). Previously, bulldozers were the only form of

mechanical equipment used. When visited in July 1961, about 1,000 yards of the creek had been mined to an average width of 80 feet, and the left limit bench was being stripped in preparation for mining there.

The stream bed is about 150 feet wide at the workings and contains about 15 feet of gravel underlain by a few feet of boulder clay and overlain by about 5 feet of muck. The gravel is coarse, containing granitic boulders up to 3 feet long and pebbles of quartz-sericite schist. The gold is coarse and occurs on or in the underlying boulder clay, about 2 feet of which is mined.

Duncan Creek

United Keno Hill Mines Limited

United Keno Hill Mines Limited tested the gravels on its placer lease on Duncan Creek and found them to be about 160 feet thick a mile or so below Lightning Creek, and about 95 feet thick a mile below this point. Some gold is present, but not enough to warrant mining.

Davidson Creek

A. Pelland

A. Pelland operates a bulldozer-sluicing plant on Davidson Creek, a tributary of Mayo River 3 miles below Mayo Lake. He started mining the creek in 1960 when he produced 28 crude ounces of gold; in 1961 he produced 60 crude ounces.

KLUANE LAKE AREA

References: McConnell (1906*, pp. 13A-18A); Cairnes (1915*, pp. 13-25); Bostock (1934*, p. 4A; 1935, pp. 4-5; 1936b, p. 6; 1937, p. 5; 1938, p. 9; 1939, p. 10; 1941, pp. 17-18; 1952, pp. 40-41).

Burwash Creek

Burwash Mining Company Limited

Reference: Skinner (1961, pp. 16-17).

Burwash Mining Company Limited, whose president and operations manager is Henry Besner, operates a sluicing plant on Burwash Creek, 6 miles above the Alaska Highway. In 1961, Besner with a crew of four men working one shift a day from June 4 until October 5, mined about 78,000 cubic yards of gravel, advanced about 700 feet up the creek valley and recovered about 1,500 crude ounces of gold.

*Reprinted in GSC Mem. 284 (Bostock, 1957).

Burwash Creek from above the highway bridge to the foot of the canyon (a distance of about 2 miles) was mined by Klwane Dredging Company from 1946 to 1950 when about 3,500 crude ounces of gold was recovered. The lower part of the canyon was mined by P. & G. Placers Limited from mid-1956 to mid-1958.

Bullion Creek

Action Mining Company

Reference: Skinner (1961, pp. 17-18).

Action Mining Company—owned by J.P. LaCross and J. Kelly of Fairbanks, Alaska—operates a bulldozer-sluicing plant about 3 miles up Bullion Creek. The 7-mile road to the camp leaves the Alaska Highway at mile 1060.5, Slims River. Placer gold was discovered on Bullion Creek in 1903 and since then the creek has been mined intermittently. Production from the creek for the years 1947 and 1948 totalled about 1,825 crude ounces, but from then until 1958 it totalled only about 150 crude ounces. The 1958 production was 393 crude ounces.

Action Mining Company started mining on Bullion Creek in 1958 but produced only 20 ounces that year. From 1959 until the end of 1961 this company had the only placer operation on the creek and produced a total of about 6,150 crude ounces of gold (900 in 1961). Equipment used includes a 2 1/2-cubic-yard dragline, a D-9 bulldozer equipped with a rake, a D-8 bulldozer, and a 6- by 60-foot sluice-box.

The creek bed at the workings is about 500 feet wide and contains about 10 feet of coarse gravel with boulders up to 10 feet long. The gold is commonly coarse and smooth and is erratically distributed. Nuggets up to 7 1/2 ounces have been recovered. Heavy minerals found in the gravels include native copper, pyrite, galena, and platinum, as well as gold.

Arch Creek

P. and G. Placers Limited

Reference: Skinner (1961, pp. 18-19).

P. and G. Placers Limited—owned by A.H. Clark, W.L. Drury and R.O. Davis, all of Whitehorse—operated a bulldozer-sluicing plant on the lower part of Arch Creek, tributary of Donjek River, 10 miles south of the Alaska Highway. The company started mining on Sugden Creek in the Dezadeash area in 1955, moved to the lower part of the lower canyon on Burwash Creek in mid-1956 and then moved to Arch Creek in August 1958. Operations on Arch Creek have been mainly prospecting, but some mining was done. Total production has been about 440 crude ounces of gold (230 in 1961). Equipment used includes a D-7 and a D-8 bulldozer, and sluice-box.

The mining operation on Arch Creek has been hindered by large boulders in the creek gravels. The company may return to the lower part of the lower canyon on Burwash Creek in 1962.

DEZADEASH AREA

References: Cockfield (1928*, pp. 1A-7A; 1930*, p. 2A);
Bostock (1933*, p. 6AII, 1934*, p. 4A; 1939, p. 10; 1941,
pp. 17-18); Kindle (1953, pp. 48-55).

Bates River

R.S. Richards and F. Young

Reference: Skinner (1961, p. 19).

R.S. Richards of Anchorage, Alaska, and F. Young and son of Haines, Alaska, have three placer claims on Bates River below Iron Creek in Dezadeash map-area. In 1961 they extended the Dalton Post - Onion Lake road along Wolverine valley to their property.

LODE MINING

MAYO AREA

Galena and Keno Hills

References: Cairnes (1916*, pp. 26-29); Cockfield (1919*, pp. 3B-5B; 1921b*, pp. 1A-6A; 1924*, pp. 1A-21A; 1930*, pp. 4A-12A; 1931, pp. 3A-8A); Stockwell (1926*, pp. 1A-24A); Bostock (1933*, pp. 6AII-8AII; 1934*, p. 5A; 1935, pp. 7-8; 1936b, pp. 8-9; 1937, pp. 5-7; 1938, pp. 9-11; 1939, pp. 10-14; 1941, pp. 18-22; 1947); McTaggart (1950; 1960); Boyle (1956; 1957); Kindle (1962).

United Keno Hill Mines Limited

References: Boyle (1956; 1957); Pike (1957); Gritzuk (1959);
United Keno Hill Mines Limited (1961); Skinner (1961, pp. 21-28).

United Keno Hill Mines Limited is Canada's leading producer of silver, and operates the only large-scale lode mines in Yukon. Its three producing mines—the Hector, Calumet, and Elsa—are situated on Galena Hill near Elsa, about 32 miles north of Mayo, in central Yukon. The company also owns several other properties in the district that are or have recently been under development or exploration. These include the Silver King, Galkeno, Jock, U.N., No Cash, Birmingham, and Dixie on Galena Hill; and the Keno (No. 9), Onek, Lucky Queen, and Sadie-Friendship-Ladue mines on Keno Hill. The company owns 621 mineral claims and fractions covering most of the 16-mile-long mineralized belt in the Galena and Keno Hills area.

*Reprinted in GSC Mem. 284 (Bostock, 1957).

Placer gold was discovered in 1895 and most of the creeks were staked between 1897 and 1903. The Silver King vein, exposed in the canyon of Galena Creek on the north side of Galena Hill, was discovered about 1906, but lode mining did not begin until 1913. At that time Keno Hill was known as Sheep Hill; it was given its present name in 1919. The first ore was shipped to Mayo in 1920 and was smelted in the summer of 1921. The high silver values drew the attention of the mining world and started a wave of development in the Yukon, based on the high-grade silver-lead ore.

The Treadwell Yukon Company, Limited started mining in the Ladue claim in 1921, and in due course acquired the better showings in the area. During its twenty-one years of operation this company produced 625,000 tons of ore, from which 44 million ounces of silver and 96 million pounds of lead were recovered.

In 1945, Frobisher Limited and Conwest Exploration Company Limited formed Keno Hill Mining Company Limited and purchased the holdings of the Treadwell Yukon Company. Development work was carried out in the Hector, Calumet, Elsa, and Silver King mines; in 1947 the Hector was brought into production and the 125-150 ton per day mill at the Elsa mine was rehabilitated. More capital was required to maintain development and production during the September-June period when the Stewart and Yukon Rivers were closed to navigation, so in January 1948 the company was reorganized and renamed United Keno Hill Mines Limited.

Operations increased in 1948 and included development work at the Calumet, Elsa, No Cash, Birmingham, and Silver King mines on Galena Hill and surface exploration on the No. 6 vein on Keno Hill. Steam heating plants were built at Elsa and Calumet using coal from the company's newly acquired mine at Carmacks. In June 1949, operations were abruptly halted when the mill, crushing plant and assay office at Elsa were destroyed by fire. All effort was concentrated on reconstruction, and by October 24 of the same year a new mill with a capacity of 250 tons per day had been built and was in operation. In 1950 the Onek mine was acquired, the Whitehorse - Mayo Highway was completed, and the company organized and set up a transport division at Whitehorse to haul concentrates to Whitehorse for transshipment to Trail, B.C. In 1951 a larger ball mill was installed and a 350-ton-per-day cyanide plant was built to treat oxidized ore and old tailings. In 1952 the Northwest Territories Power Commission completed the installation of a 3,000 hp. hydro-electric plant on the Mayo River near Mayo, and United Keno Hill Mines began using power from this source. In 1956 the Calumet mine was brought into production and the road from Elsa to Keno was completed. In 1958 a second 3,000 hp. unit was added to the hydroplant, the Elsa mine went into production, the Keno mine's 700 adit was started, and the Galkeno mine was acquired. In 1959 the Galkeno 900-level adit was reopened and driving started, and the highway bridge over the Yukon River at Carmacks was completed. In 1960, dewatering of the Silver King mine commenced, Ventures Limited purchased Conwest interests in the company, the Canadian National Telegraph landline from Whitehorse to Elsa was completed, and the highway bridges over the Pelly and Stewart Rivers were completed, allowing year-round trucking operations.

From 1949 to 1953, considerable development work was carried out on the Elsa, No Cash, Bermingham, Onek, and Flame and Moth mines. At the No Cash, 600 feet of ore was developed that averaged about 100 ounces of silver a ton over an average width of 3 feet. At the Onek, 123,491 tons of ore grading 10.27 ounces of silver to a ton, 4.4% lead and 13.0% zinc was blocked out. At the Flame and Moth, 105 feet of ore was developed that averaged 15.57 ounces silver a ton, 1.7% lead, and 6.9% zinc over an average width of 37.1 feet. Development work in 1956 and 1957 on the Shamrock mine outlined a length of 119 feet of ore grading 71.4 ounces of silver a ton and 22% lead over an average width of 3 feet.

Ore reserves at the Galkeno mine at March 31, 1957 amounted to 73,442 tons (developed, probable, and stockpiled) grading 41.0 ounces of silver a ton, 8.3% lead, 8.1% zinc, 0.121% cadmium, and 0.013 ounce of gold a ton. The Galkeno mine closed down in September 1957 and has not been in production since.

Extensive exploration from 1956 to the present in the Keno mine has outlined at least three ore shoots. Crosscutting and drifting on the 450 and 575 levels developed ore lengths of 291 feet averaging 38.36 ounces of silver a ton over an average width of 6.2 feet, and 92 feet averaging 58.55 ounces of silver a ton over an average width of 5.6 feet. At the end of September, 1961, drifting on the 700 level outlined 23 feet of ore grading 37.6 ounces of silver a ton across an average width of 5.8 feet. This mine is expected to go into production in 1962, mining at the rate of about 100 tons a day.

Production by United Keno Hill Mines Limited since 1949 has been more than \$5 million a year, and ranged up to \$9,750,220 in 1956. Total production from 1947 to September 30, 1961 was 1,883,305 tons of ore, from which 71,451,846 ounces of silver, 270,965,772 pounds of lead, 206,692,748 pounds of zinc and 2,626,600 pounds of cadmium, valued at about \$101,163,300, were recovered.

The following information on 1961 production and operation of United Keno Hill Mines Limited is from the company's annual report covering the fiscal year ended September 30, 1961.

Expenditures on plant additions and on preproduction development increased during the year. Major additions included the installation of a new 75-ton per hour crushing plant now in operation; new housing at Elsa; purchase of main line transformers, and the installation of a new boiler at the Calumet camp. Preproduction expenses were largely incurred at the Silver King and Keno mines.

A summary of operations for the fiscal year is provided by A.E. Pike, resident manager.

Of the 186,116 tons milled, 22,822 tons (12.26%) came from the Hector mine; 122,575 tons (65.86%) from the Calumet mine; 35,523 tons (19.09%) from the Elsa mine; the balance being drawn from development in the Keno, Silver King, and Galkeno mines.

Production at the Hector mine was down from the previous year's total of 37,008 tons. The available ore in the No. 2, No. 3, No. 3A, and No. 4 veins above the 1,040-ft. level has now been almost completely mined. Only one small oreshoot was developed and mined during the year.

For the second consecutive year, there was a substantial increase in production at the Calumet mine as a result of accelerated mining and development. Total lateral development footage in ore amounted to 1,719 ft. averaging 40.47 oz. of silver per ton over an average width of 6.1 ft. Of this amount, the major part was in the Nos. 18-19 vein zone where 104 ft. grading 41.73 oz. silver over 7.8 ft. was developed on the 650 level; 549 ft. grading 41.05 oz. over 6.1 ft. on the 775 level; and 383 ft. grading 41.83 oz. over 5.8 ft. on the 900 level. In addition, short oreshoots were developed in the Nos. 18-19 vein zone on the 300 and 525 levels.

In branching veins from the No. 1 vein on the 900 level, a total length of 359 ft. of ore averaging 43.96 oz. silver was developed over a width of 6.4 ft. Also developed in similar branching veins on the 525 and 650 levels were oreshoots of 102 ft. grading 34.49 oz. silver over 5.7 ft., and 44 ft. averaging 22.2 oz. silver over 5.1 ft.

Development is continuing in the No. 1 vein structure on the 900 and 1,040 levels and in the No. 18-19 vein zone on the 300, 525, 775, and 900 levels.

Most of the Elsa mine's production of 35,523 tons came from stopes in the No. 15 vein and No. 5 - No. 15 vein junction area. Development during the year has proven some of the ore blocks to be larger than expected.

Late in the year, an oreshoot 42 ft. in length, averaging 45.2 oz. silver per ton across a width of 6 ft. was developed in the No. 2 vein on the 650 level. This is the first shoot developed in this vein north of and below the Porcupine Creek Fault. Development is continuing in this area.

Lateral development was continued on the Jock property, but no ore was developed.

Early in the year, the 700 adit at Keno was extended a further 424 ft. and a 288 ft. raise was driven connecting to the bottom of the winze. Crosscutting and drifting from the raise on the 450 and 575 levels developed ore lengths of 291 ft. averaging 38.36 oz. silver over 6.2 ft. and 92 ft. averaging 58.55 oz. silver over 5.6 ft.

At the end of the fiscal year, drifting on the 700 level was proceeding in the vein and a short oreshoot 23 ft. in length had been developed grading 37.6 oz. silver per ton across a width of 5.8 ft. Development is being accelerated to prepare the property for early production.

At the Silver King property, lateral development continued on the 100, 200, and 300 levels after the No. 3 shaft

had been unwatered to the 300 level. An old raise on the 200 level was reopened and driven through to the surface. From the 200 level it showed an ore length of 116 ft. grading 34.2 oz. silver per ton across a width of 5.6 ft.

New ore was developed on the 100 and 300 levels over lengths of 175 ft. averaging 39.95 oz. silver per ton across a width of 5.9 ft. and 122 ft. grading 27.15 oz. silver per ton across a width of 5.3 ft. Development and rehabilitation are proceeding on the 200 and 300 levels.

Rehabilitation of the adit at the No Cash property was started in preparation for the sinking of a winze to test the downward extension of the ore on the 200 level.

No work was carried out during the year on the Onek, Shamrock, Lucky Queen, Ladue, U.N., and Birmingham properties. Ore reserves at the Onek remained unchanged at 123,491 tons averaging 10.27 oz. silver per ton, 4.4% lead and 13% zinc.

Operating Results Compared

	12-Month Period Ended Sept. 30	
	1961	1960
Dry tons milled.....	186,116	176,745
Average tons daily.....	509	483
Mill heads:		
Silver (oz./ton).....	41.16	43.35
Lead (%).....	5.83	7.25
Zinc (%).....	4.84	4.80
Concentrates, tons.....	25,305	27,071
Metal content:		
Silver (oz.) ^a	7,231,908	7,249,101
Lead (lb.).....	17,911,672	21,986,887
Zinc (lb.).....	15,512,624	14,440,774
Cadmium (lb.).....	202,432	181,132
Ore reserves:		
Tons ^b	514,369	512,577
Silver (oz./ton).....	38.47	38.39
Lead (%).....	6.78	6.36
Zinc.....	4.95	4.84
Metal sales.....	\$8,540,143	\$8,793,284

^aIncludes 565,814 oz. (1961) and 535,873 oz. (1960) from treatment of flotation tailings in cyanide plant.

^bExclusive of Onek mine reserves of 123,491 tons averaging 10.27 oz. silver per ton, 4.4% lead and 13% zinc.

Details of the geology of the silver-lead-zinc deposits of Keno and Galena Hills are given in the Mineral Industry of Yukon report for 1960 (Skinner, 1961, pp. 26-28).

Gold Star Claim

References: Boyle (1956, pp. 32-33); Skinner (1961, pp. 27-28).

Comstock Keno Mines Limited hold the Gold Star and ten other silver-lead claims near the top of Keno Hill. The company leased the Gold Star claim to J.B. O'Neil of Keno, Yukon Territory, from 1959 until August 1961, but recently has made an agreement with United Keno Hill Mines Limited, who will explore the property in 1962. In 1961 O'Neil (in partnership with A. Triggs and H. Barchen in Mayo) mined and shipped about 200 tons of high-grade silver ore.

The main vein fault strikes northwest, dips 70 to 80°SE, and is a breccia zone 8 to 10 feet wide that contains siderite and pods of galena (with some freibergite) in places 2 to 3 feet thick. The wall-rocks are mainly greenstone, but some chlorite schist is present.

Formo Property

References: Cockfield (1930, p. 12A, reprinted in Bostock, 1957, p. 606); Boyle (1957, pp. 21-22); Financial Post (1961, p. 307).

The Formo property, owned by Yukeno Mines Limited, is on the north slope of Galena Hill beside the Elsa-Keno Road. The property was leased to A.A. Smith of Mayo in 1961. From 1951 to 1953 inclusive this property was partly developed by about 4,000 feet of underground tunnelling, including two adit drifts at elevations of 2,600 and 2,700 feet and a level at 2,800 feet established from an old shaft. Ore reserves were estimated to be 12,000 tons averaging 27.7 ounces of silver a ton, 9.4% lead, and 10.3% zinc. Since 1953, only assessment work was done until Smith leased the property and mined about 18 tons of ore averaging about 200 ounces of silver a ton in 1961 and early 1962. The main showing is a 4- to 5-foot vein striking north-northeast-erly and dipping 50 to 60° easterly, which cuts thin-bedded quartzite, graphitic schist, and greenstone, and contains siderite and quartz and pods of sphalerite, pyrite, galena, and freibergite. Another vein, 6 or 7 feet wide, striking north-northwest, is reported to have been exposed in the recent mining operation.

DEZADEASH AREA

References: Cockfield (1928, pp. 1A-7A, reprinted in Bostock, 1957, pp. 570-576); Kindle (1953).

Sockeye Lake

Bornite Creek Deposit

References: Kindle (1953, pp. 57-58); Skinner (1961, pp. 28-30, 37).

Johobo Mines Limited—owned by H. Johannes, H. Honing and H.E. Boyd, all of Whitehorse—has a 58-claim copper property 2 miles southeast of Sockeye Lake, about 18 miles south of Haines Junction. The workings are on the steep western slope of Kluanne Range, north and immediately south of Bornite Creek at altitudes between 3,340 and 3,550 feet.

During the winter of 1960-61 and spring of 1961 Johobo Mines Limited open-cut mined about 1,500 tons of chalcopyrite-bornite ore and hauled it to the Haines Road where it was sorted. About 1,730 tons of ore grading 26 1/2% copper and 2 ounces of silver a ton were hauled to Haines, Alaska and shipped to Japan in July 1961.

Dominion Explorers Limited optioned the Johobo property in September 1961 and have explored the area in the vicinity of the two northern deposits with two adits and diamond-drilling. The first adit was collared in October 1961 in the north wall of the upper cut in a 4 1/2-foot-thick exposure of bornite about 55 feet from the entrance of the cut (adit portal) at an altitude of about 3,435 feet. It was driven on a bearing of about S85°E for 100 feet. About 20 feet from the face a crosscut was driven S32°E for 138 feet, and from a point 65 feet south of the adit a drift was driven about N62°E for 160 feet. About 18 feet from the face of the drift a crosscut was driven N22°W for 70 feet and another crosscut was driven from the face of the adit about N14°E for 120 feet.

The second adit was collared in December 1961, about 190 feet south and 125 feet west of the portal of the upper adit at an altitude of about 3,340 feet. It was driven N84°E for 75 feet, N62°E for 47 feet, N49°E for about 164 feet, then N10°W for 135 feet. A 50-degree knuckle-raise was driven from a point 40 feet from the face of the adit and entered the upper adit 70 feet from the portal in March 1962. Diamond-drilling was done from underground stations.

The following geological description of the property was taken largely from maps drawn by geologist G. Warnock for Cerro de Pasco Corporation in 1960, from conversations with Warnock and from brief visits to the property in 1960 and 1961.

The deposits are on the east limb of a tightly folded northwesterly trending anticline in volcanic rocks of the Lower Mesozoic Mush Lake Group. They are localized along easterly trending, steeply dipping faults and shear zones that cut andesite flows. Bornite and/or chalcopyrite occur as irregular lenses a few inches to several feet long; as veinlets; as breccia fragments; or as disseminated particles. Malachite and minor chalcocite are present along fractures cutting the ore.

The two most important deposits along Bornite Creek lie about 100 and 120 feet south of the creek at an altitude of about 3,550 feet and are exposed in two open-cuts. They consist mainly of bornite lenses up to a few feet long, disseminated within two shear zones trending on the average about N80°E and dipping about 70°S. The bornite lenses commonly contain one or more chalcopyrite lenses. The mineralized zones are 6 to 8 feet wide and 50 or more feet long and deep. A smaller deposit lies about 275 feet east of these, trends about N80°E, dips 10°S, and is about 15 feet long and a foot or two thick.

The deposit discovered in 1959 is 2,300 feet northwest of the Bornite Creek deposits at an altitude of about 3,340 feet. It consists mainly of chalcopyrite lenses, up to a few feet long, disseminated in a N65°E trending shear zone that dips vertically. A few easterly and southeasterly trending, southerly dipping shears within the main shear zone contain chalcopyrite lenses up to 2 feet thick. The lenses commonly contain one or more lenses of bornite. An open-cut in the deposit showed that the mineralized zone varies from 6 to 12 feet in width, is more than 75 feet long and deep, and that the andesite wall-rocks are altered to an orange or purple rock.

The deposit 100 feet northeast of the one described above occurs in an easterly trending, vertically dipping shear zone and consists mainly of chalcopyrite and/or bornite lenses up to several feet long and a few feet thick (ratio of chalcopyrite to bornite is about 3:2). About 1,500 tons of ore from this deposit were mined at an altitude of about 3,435 feet from a cut that is 125 feet long, 8 to 12 feet wide, and trends about S80°E into a 40-degree westerly-sloping hillside. The face contains a cross-section of a chalcopyrite vein about 10 feet wide and 70 feet high that is surrounded by a 2- to 3-foot zone of malachite stain. The walls of the cut are highly fractured and altered, and commonly mineralized with disseminated chalcopyrite and bornite and stained with malachite. A strong set of N60°E striking, 55°NW dipping faults deflects the mineralized zones, flattening them.

A massive bornite-chalcopyrite vein, 4 1/2 feet wide, striking N80°E and dipping 70°N, was exposed in the north wall of the cut 55 feet from the entrance. Dominion Explorers drifted on it for about 45 feet where it is cut off by a northeasterly trending fault dipping 35°SE. A raise from the lower adit shows that the dip of this vein changes to steeply south and becomes low-grade a short distance below the upper adit level. The orebody is estimated to contain 2,100 tons of ore grading 21% copper across an average width of 6 feet.

A mineralized zone averaging about 5% copper across 8 feet was cut in the lower adit about 150 feet from the portal (about 140 feet due south of the upper portal).

The andesite at the Bornite Creek deposits is unaltered up to 200 feet northeast of the deposits where a strong, steeply dipping, northwesterly trending fault is present. East of the fault the andesite is altered to an orange or purple rock. The contact between the Mush Lake andesite and the Dezadeash sedimentary rocks lies about 1,200 feet northeast of this fault. The andesite there is highly shattered and altered up to 200 feet west the contact, and much gouge is present; east of the contact the sedimentary rocks are drag-folded and fractured. An easterly trending fault along Bornite Creek is indicated by a left-hand displacement of about 100 feet at the contact between the altered and unaltered andesite, 200 feet east of the deposits, and a left-hand displacement of about 1,000 feet at the Mush Lake - Dezadeash Group contact, about 3,000 feet up the creek from the deposits. About 400 feet west of the deposits is a 450-foot-wide limestone band crossing the creek, yet there is no apparent displacement there, indicating a scissors-type fault with the south side moved upward. Some of the subsidiary northwesterly trending faults are mineralized.

COAL MINING

Carmacks

Tantalus Butte Mine

References: Cairnes (1910, pp. 52-53); Bostock (1936a, pp. 59-62; 1937, pp. 13-16; 1939, p. 17; 1941, pp. 26-27); Skinner (1961, p. 30).

The Yukon Coal Company Limited—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 1961 inclusive was about 91,000 tons, an average of 6,500 tons a year. In 1961, production was 7,804 tons, most of which was used by United Keno Hill Mines at Elsa and Calumet.

EXPLORATION AND PROSPECTING

KLONDIKE AREA

Eldorado and Bonanza Creeks

Klondike Lode Gold Mines Limited

References: McConnell (1905*, pp. 10B-28B); MacLean (1914*, pp. 20-40); Cockfield (1930*, pp. 2A-4A; 1931, pp. 9A-10A); Bostock (1936b, pp. 7-8; 1942); Skinner (1961, pp. 31-32).

Klondike Lode Gold Mines Limited was formed in Vancouver in 1960 to explore a triangular-shaped area of gold-bearing rocks lying mainly between Eldorado Creek, upper Bonanza Creek, and Victoria Gulch, about 10 miles south-southeast of Dawson. The company holds most of this area with claims that surround twenty-two staked in 1960 by J. Lamontagne and J. Castonguay, and thirteen Crown-granted claims, nine of which were formerly owned by the Consolidated Lone Star Mining Company.

In 1961, exploration commenced late in April and continued until early October. Geologist G. Hilchey with a crew of eight to thirteen men, using a D-7 and a D-8 bulldozer, power wagons, a diamond-drill and a churn-drill, did about 1 1/2 miles of sidehill trenching, 600 feet of diamond-drilling and 275 feet of churn drilling. Most of the work was confined to the left limit of Oro Grand Gulch and upper Seven Pup, tributary of Victoria Gulch, but some was done on the left limit of French Gulch. The cuts and churn-drill cuttings were sampled and the heavy minerals were concentrated in a small sluice-box,

*Reprinted in GSC Mem. 284 (Bostock, 1957).

as in 1960. The most encouraging results were obtained on Oro Grand Gulch and Seven Pup and these areas will likely be diamond-drilled in 1962. Some potential placer ground was staked on Oro Grand Gulch and above French Gulch.

MAYO AREA

Sourdough Hill

Bellekeno Property

References: Cockfield (1930, p. 11A, reprinted in Bostock, 1957, p. 605); Bostock (1935, p. 8); Boyle (1956, pp. 25-27).

The Bellekeno property, fifteen claims, is on the north slope of Sourdough Hill about 1 1/4 miles east of the settlement of Keno, at an altitude of about 3,500 feet. Bellekeno Mines Limited acquired the property from Murmac Lake Athabaska Mines Limited in 1950. Exploration work started immediately and concentrated on the Whipsaw, Extension, Apex, and Eureka claims. In the autumn of 1952 the company discovered a rich orebody on the 2nd level, and in 1953 and 1954 developed it to the 4th level and produced 10,082 tons of ore from which 475,860 ounces of silver and about 2 million pounds of lead were extracted. The mine was closed September 30th, 1954, and the company changed its name to Consolidated Bellekeno Mines in 1955.

In 1961 the property was leased to G.C. Campbell and W.C. Kennedy, who operated under the name "C.K. Mine Operators Limited", financed by Newmont Mining Corporation Limited. They drove a 345-foot northwesterly trending crosscut from the 48 vein on the 3rd level in search of a vein indicated at the surface by a lineament and mineralized float. No mineralized zone was cut, so a 193-foot diamond-drill hole was drilled from the face of the crosscut in a northwesterly direction. As no mineralized zone was cut in it either, the program was discontinued and the mine closed.

Haggart Creek

Peso and Rex Groups

Reference: MacLean (1914, pp. 153-157); Bostock (1943); Skinner (1961, pp. 32-33); Aho (1962, p. 32).

Peso Silver Mines Limited owns the Peso and Rex Groups of 100 claims situated between Secret and Haggart Creeks, 28 miles north of Mayo. The silver-lead-antimony showings are at altitudes of 3,600 to 4,300 feet and can be reached from the Haggart Creek road over a 4 1/2-mile road up Secret Creek.

The Peso property was originally staked in 1910 by J. Alverson and G. Huffman who held it until 1916. In 1949, Alverson and C.D. Poli restaked it as the Peso Group, and in 1950 Poli reopened the shaft and traced the extension of the vein eastward 2 or 3 miles onto the adjoining Barber Group. In 1951 the property was optioned to consulting geologist A.W. Johnson and J.M. Fowelson who

held it until 1952. Poli continued to explore the property by bulldozer trenching until 1960 when Tanar Gold Mines Limited optioned his Peso and Rex Groups. Early in 1961 the company staked 80 claims adjoining the two groups to make up a block of 100 claims. These tie in on the west of the E.H. Barker Estate Barber and Brobar Groups, which also have exposed silver-lead-antimony veins.

Much of the following information was obtained from maps and reports prepared for Peso Silver Mines Limited by consulting geologist Dr. A.E. Aho, from conversations with Aho and his staff, and from a visit to the property in October 1961.

Peso Silver Mines Limited, formed in 1961, acquired the Peso and Rex Groups from Tanar Gold Mines and in June commenced an exploration program. A shaft was sunk on the No. 1 vein to an inclined depth of 40 feet and stripping was carried out on the three previously known and two newly discovered veins (Nos. 3 and 4). One bulldozer was used in August and two in September and October. A winter camp was erected in October and about the middle of November work was started on an adit to intersect the No. 1 vein about 300 feet southwest of the shaft at an altitude about 200 feet below the top of the shaft. The vein was intersected early in February, 1962, and crosscut between 302 and 326 feet from the portal; the adit was continued another 35 feet beyond the vein. The first 90 feet of the adit is on a bearing of S65°E and the remaining 270 feet is on a bearing of S73°E. By early April, 1962, the foot-wall of the vein had been drifted along to the southwest for 60 feet and to the northeast for 202 feet, and eight crosscuts had driven at 30-foot intervals to test the vein across its full width.

No. 1 vein is about 1/2 mile west of Secret Creek at an altitude of about 3,700 feet at lat. 64° 0 1/2'N, long. 135° 54'E. Its average strike is about N45°E and it dips about 65°NW. It has been exposed by eight cross-trenches along a length of about 900 feet, and two longitudinal trenches (one 150 feet long and directly northeast of the shaft and the other 250 feet long and 40 feet southwest of the shaft), and has been explored by a 40-foot shaft, and by about 275 feet of drifting and eight crosscuts about 120 feet below the surface.

At the surface, No. 1 vein is completely weathered to brown, yellow, and green oxides. A weighted average of 12 sample sections of this material, taken 10 feet apart along a 120-foot length of the vein 150 feet southwest of the shaft, averaged 10 ounces of silver a ton over an average width of 4 feet. Assays of about 40 channel samples taken along the northeast and southwest walls of the shaft at about 2-foot intervals averaged .06 ounce of gold and 62 ounces of silver to the ton, 2.5% lead and 2.3% antimony, over an average width of 8.5 feet. An 18-foot down-dip length of the foot-wall of the vein on the east wall averaged .09 ounce of gold and 102 ounces of silver to the ton, 5% lead, and 4.7% antimony, over an average width of 2.6 feet.

In the adit 110 feet below the surface the vein material is only partly oxidized. On the hanging-wall side it consists of 2 to 4 feet of fine-grained quartz impregnated with arsenopyrite and minor jamesonite, 0 to 3 feet of siderite and quartz with scattered tetrahedrite, pyrite, and jamesonite, and on the south wall, 0 to 1 foot of massive chalcopyrite. On the foot-wall it consists of 2 to 5 feet of massive pyrite with abundant jamesonite and associated chalcopyrite (mostly on

the south wall) and 3 to 5 feet of crumbly black-coated pyrite with minor jamesonite.

Assays of channel samples taken across the vein along the north and south walls of the crosscut at waist height and 6 feet above the rail, gave the following results. The average of two channel samples across 3.7 feet of a zone of siderite with scattered tetrahedrite along the north wall is 34.5 ounces of silver a ton, 5.1% lead, 3.1% antimony, 0.4% copper, 1.0% zinc, and 1.6% arsenic. A 7.7-foot zone along the south wall averages 11.8 ounces of silver a ton, 4.0% lead, 2.43% antimony, 1.5% copper, 0.8% zinc, and 12.0% arsenic. Across the entire 21-foot width of the vein zone (including schist and barren sections) the average is 6.39 ounces of silver a ton, 1.99% lead, 1.19% antimony, 0.9% copper, 0.68% zinc, and 5.2% arsenic. An ore shoot 98 feet long, averaging 37.4 ounces of silver a ton across an average width of 6.8 feet (or 23.3 ounces across 13 feet), was cut by the first three crosscuts east of the adit. The overall average for the 275 feet of the vein cut in the drift is about 10 ounces of silver a ton across 15 feet.

No. 2 vein lies about 500 feet east of the east end of No. 1 vein and has been traced for about 1,800 feet in thirteen bulldozer cuts and an old shaft. Its average strike is about N70°E and it dips 45 to 80°N. As it has not been well exposed it cannot be properly appraised. At its west end it is 11 feet wide and averages 10 ounces of silver a ton and 4% lead, and 1,100 feet to the east it is 5 1/2 feet wide and averages 18 ounces of silver a ton and 3% lead. The west end of its most easterly exposure (No. 2 vein North) has a 15-foot width of arsenopyrite.

No. 3 vein lies about 5,500 feet N70°E from the shaft on No. 1 vein at an altitude of about 4,300 feet. It has been exposed in ten lateral bulldozer-cuts over a length of 450 feet and for a length of 130 feet in a longitudinal cut. In the latter the vein strikes easterly, dips about 35°N and is about 20 feet wide. The wall-rocks up to a distance of 50 feet south of the vein are mineralized. The western part of the vein bifurcates into four or five branches that average about 10 feet in width. The assay values are low, ranging up to 4.6 ounces of silver a ton across 6.3 feet, and 4.4 ounces of silver a ton across 14 feet in the 130-foot exposed section of the vein.

No. 4 vein lies about 2,100 feet north of the shaft on No. 1 vein. It has been exposed in only two bulldozer-cuts where it is 10 and 15 feet wide and is composed of arsenopyrite and quartz. It strikes about N80°E.

The No. 5 or Rex vein lies 11,000 feet S72°E of the shaft on No. 1 vein and about 6,000 feet S80°W of the mouth of Fifteen Pup, tributary of Haggart Creek, at an altitude of about 3,700 feet. It has been traced in twelve bulldozer-cuts for 1,500 feet and has an average strike of N73°E and dips at about 60°N. A rough estimate of its value from a few scattered assays suggests that it may average about 30 ounces of silver a ton and 3.2% lead across about 3 1/2 feet. A 42-foot-deep prospect shaft was sunk on this vein early in 1962. A sample of oxidized galena and jamesonite at a depth of 2 feet assayed 50.3 ounces of silver a ton, 12.95% lead, 2.17% zinc, and 5.34% antimony, across 2.4 feet. The vein is cut off at a depth of 12 feet by a fault. Vein material was cut again at a depth of 25 feet where it

consists of unaltered galena, sphalerite, jamesonite, and siderite. Below this the vein is reported to have widened to 2 1/2 feet, where it is well mineralized with galena.

The property is underlain by Yukon Group quartz-mica schist, graphite schist, and chlorite schist. The attitude of the schistosity, which appears to be parallel to bedding, is variable within even a few feet, but commonly strikes northwest and dips 25°NE. A small stock of granodiorite intrudes these rocks a mile north of No. 1 vein; another small one intrudes them about 1 1/2 miles north-northeast of the Rex vein; and one that is more than 3 miles long intrudes them 2 miles northeast of the Rex vein. Several northeasterly trending faults, dipping 35 to 65°NW, were cut in the adit, and southeasterly trending faults are indicated on surface at the west end of No. 1 and No. 2 veins. Easterly and northeasterly faults are also indicated by wide gouge zones near the No. 5 or Rex vein.

Ice has covered the area to an elevation of at least 3,800 feet, but has not removed the thin mantle of residual overburden. There are few natural exposures and the veins are deeply weathered.

CARMACKS AREA

Freegold Mountain

Laforma Property

References: Bostock (1932*, pp. 7A-13A; 1933*, pp. 8AII-14AII; 1934*, pp. 5A-8A; 1935, pp. 8-9; 1936a, pp. 52-56; 1936b, pp. 9-12; 1937, pp. 7-11; 1938, pp. 11-12; 1939, pp. 15-16; 1941, pp. 22-26); Johnston (1937); Skinner (1961, pp. 33-35).

Ormsby Mines Limited in 1960 purchased the Laforma Gold Mine on Freegold Mountain, 28 miles west of Carmacks, from W.J. Langham and the late E. Forrest, and the adjoining property from G. Fairclough. The properties, consisting of nineteen and nine claims respectively, are on the south side of Freegold Mountain at an altitude of between 3,500 and 4,000 feet.

In 1961 Ormsby Mines Limited improved the 42-mile access road and hauled 50 tons of equipment to the property from Yellowknife. In 1962 it plans to haul 75 tons consisting mainly of plant equipment and portable steel buildings to the property, to erect the buildings, install the equipment, drive a low-level adit, and do surface stripping, sampling, and detailed geological mapping. The 1,100-foot adit is intended to cut the veins 650 feet below the surface (180 feet below the old adit). About 2,000 feet of drifts and crosscuts will also be driven.

Details of the history of mining operations and the geology of the Freegold Mountain deposits are given in the Mineral Industry of Yukon report for 1960 (Skinner, 1961, pp. 33-35).

*Reprinted in GSC Mem. 284 (Bostock, 1957).

DEZADEASH AREA

Sockeye Lake

Bornite Creek Deposit — See under "Lode Mining", Sockeye Lake.

Kathleen River

Kathleen River Asbestos Deposit (lat. 60°44 1/2'N, long. 137°18 1/2'W)

References: Kindle (1953, p. 39); Skinner (1961, p. 38).

Kathleen River asbestos deposit lies 6 1/2 miles east-southeast of Haines Junction, Yukon Territory, and about a mile west of Kathleen River at an altitude of about 2,750 feet. It can be reached by a 7-mile truck road from mile 152 on Haines Road. The 36-claim property is owned by H.S. Fromme, P. Johnson, W.J. Abraham, and the estate of the late J. Noble—all of, or formerly of, Whitehorse.

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

Most of the work has been carried out on the Rex No. 2 claim where there are about twelve easterly trending bulldozer-cuts 100 to 200 feet long across a northerly trending zone about 600 feet long. Only the central cuts expose the peridotite bedrock. Spooner Mines cut six bedrock trenches in three of the central cuts and exposed good-grade cross-fibre chrysotile asbestos in two of the trenches. In one trench the asbestos veins make up about 7 per cent of the rock and are up to 2 inches wide, but commonly they are less than 1/2 inch wide.

WHITEHORSE AREA

Montana Mountain

Jean Group

References: Bostock (1941, p. 26); Wheeler (1961, p. 127);
Skinner (1961, p. 38).

The Jean Group of fifteen mineral claims—owned by Mathew Watson of Carcross—is situated about 7 miles south of Carcross on Montana Mountain, about a mile northwest of the peak. Access is by an 8-mile truck road. New Imperial Mines Limited optioned the property in 1960 and in 1961 drove an adit under the main showing.

The main showing is reported to be a 12- to 24-inch gold-bearing quartz vein containing about 20 per cent sulphides (galena, sphalerite, and pyrite). The vein outcrops on a talus slope at an elevation of 6,500 feet, and is in the southwestern part of a granodiorite stock. It is reported to strike S40°E and dip vertically, to be

exposed over a 90-foot length, and to average \$168 a ton. The adit is reported to strike S70°E, to be 160 feet long, and to require an advance of 45 feet to intersect the vein.

WOLF LAKE AREA

Logjam Creek

Logjam Creek Property (lat. 60°01'N, long. 131°34'W)

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

The Logjam Creek property, owned by Wilfred McKinnon, is situated near the head of Logjam Creek. The silver-lead-zinc showings were diamond-drilled by Hudson Bay Explorations and Development Company Limited in 1945 and 1946. In 1961 the property was optioned to Kootenay Base Metals Limited who trenched three known veins and exposed two new ones. The company also built a 5 1/2-mile truck road to provide better access to the property from the Alaska Highway.

It is reported that a 500-foot section of the No. 6 vein averages 0.01 ounce of gold and 30.3 ounces of silver a ton and 3.5% lead, across an average width of 13 feet. A sample across a 2-foot width of the recently exposed No. 9 vein is reported to have assayed 83.3 ounces of silver a ton.

PELLY MOUNTAINS AREA

Ketza River

Key Group Showing (lat. 61°34 1/2'N, long. 132°13'W)

References: Wheeler, Green, and Roddick (1960a); Skinner (1961, pp. 39-40).

The Key Group of 44 claims is situated on upper Ketza River, 28 miles south-southeast of Ross River. The main silver-lead showing is about a mile west-southwest of the Conwest Exploration Company camp on Ketza River at an altitude of about 5,500 feet. A 35-mile tractor road to the property leaves the Canol Road at Jackfish Lake (5 miles from Ross River). Ketzakey Silver Mines Limited—owned by G. Smith and E.T. Case of Edmonton—acquired the property from R.R. Kerwan of Cassiar, British Columbia, in 1960.

In 1961 the company exposed the Key 3A vein over a length of 100 feet or more and mined and shipped about 15 tons of silver-lead ore from it. The smelter return on the ore is reported to have been \$2,800. In 1962 Ketzakey plans to do further exploratory work on the property.

Ings River

Eagle Showings (Tintina Silver Mines Limited) (lat. 61°09'N,
long. 131°09'W)

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

The Eagle silver-lead-zinc showings are 7 miles northwest of the confluence of the Ings and upper Liard Rivers in the St. Cyr Range of the Pelly Mountains, 105 miles northwest of Watson Lake, at an altitude of 4,500 to 5,600 feet. The property—consisting of 130 "Eagle" claims, 104 "Ram" claims (southwest of the Eagle Group) and 36 "It" claims and 30 "El" claims (northwest of the Eagle Group)—was acquired in December 1961 by Tintina Silver Mines Limited, a subsidiary of Conwest Exploration Company Limited.

The first discoveries (Nos. 1-4 veins) were made by prospector Nels Hal of Conwest Exploration Company in July and August 1961 in a small northerly trending cirque valley at an altitude of 5,300 feet. During August and September 1961, Conwest trenched, Packsack diamond-drilled, surveyed, and sampled eight of the nine cirque showings on Eagle claims 1-6, and discovered and prospected six other showings that lie up to 4,000 feet to the northwest. In December 1961 and January 1962 the company built a 110-mile winter road to the property from a point on the Alaska Highway about 15 miles southeast of Teslin, and freighted camp and mining equipment to the property. In February 1961 an adit was collared at an altitude of about 5,375 feet to be driven about 900 feet S20°W to intersect No. 8 vein about 250 feet below its outcropping. By May 15, 1961, the adit had been advanced about 600 feet; at 290 feet it intersected a mineralized zone thought to be the westward extension of No. 5 vein. A crosscut, driven southeastward 155 feet from a point 190 feet from the portal, intersected a 4 1/2- to 5-foot galena-sphalerite vein, also believed to be the westward extension of No. 5 vein.

The most impressive of the cirque valley showings, No. 8 vein, is the southernmost one, which is on the west side of the valley at an altitude of about 5,600 feet. It consists of up to three subparallel galena-sphalerite-tetrahedrite-greenockite (?) replacement veins, 1 foot to 3 feet thick, within a shear zone up to 15 feet wide in limy slate. The veins are exposed over a length of 200 feet, strike about N60°W and dip 60 to 70°SW into a 35-degree, northeasterly sloping hillside. A 52-foot section averaged 35.1 ounces of silver a ton, 19.9% lead and 4.9% zinc, across an average of 6.4 feet. Another 112-foot section averaged 33.0 ounces of silver a ton, 15.7% lead, and 10.6% zinc, across an average of 3.7 feet.

Another important showing, No. 6 vein, lies in the cirque valley bottom 400 feet northeast of No. 8 vein, at an altitude of about 5,450 feet. It consists of galena, sphalerite, tetrahedrite, and some chalcopyrite and vein quartz—all replacing slaty grey, orange-weathering limestone and limy argillite along their contact. The average strike of the main vein, which is about 90 feet long, is north, but a 40-foot section of it lies 20 feet to the northeast and trends northeasterly. A 70-foot section of the main vein averages 88.8 ounces of silver a ton, 24.8% lead, and 4.5% zinc, across an average width of 4.3 feet.

No. 5 vein lies 200 feet north of No. 6 vein and consists of massive galena, sphalerite, and tetrahedrite, which replace grey, slaty, orange-weathering limestone. The vein has been exposed over a length of 100 feet; the western half strikes N70°E, the eastern half S55°E, and the dip is about 60° in a southerly direction. A 75-foot length of this vein averages 36.9 ounces of silver a ton, 15.1% lead, and 16.0% zinc, across an average width of 4.8 feet.

No. 3 vein lies 1,450 feet due north of No. 8 vein near the bottom of the cirque valley, at an altitude of about 5,300 feet. It consists of galena, sphalerite, and tetrahedrite, which replace grey, slaty, orange-weathering limestone. It strikes mainly S85°E and dips 30-40°S, but 15 feet of the west end of it strikes southerly. A 95-foot section of the vein averages 36.8 ounces of silver a ton, 13.4% lead, and 9.2% zinc, across an average width of 6.6 feet.

No. 4 vein lies 40 feet south of the west end of No. 3 vein, strikes easterly and dips southward at 40°, and replaces grey, slaty, orange-weathering limestone. A 25-foot section averages 35.6 ounces of silver a ton, 17.9% lead, and 10.3% zinc, across an average of 2.2 feet.

No. 1 vein lies about 100 feet north of No. 3 vein and has been exposed over a length of 95 feet. It replaces grey slaty limestone along or near the contact with graphitic slate along a northwesterly trending shear zone that dips 75°SW. No. 2 vein is about 80 feet east-northeast of No. 3 vein, has been exposed over a length of about 30 feet, and replaces grey slaty limestone along a northwesterly trending shear zone. No. 9 vein is about 180 feet southwest of No. 4 vein at an altitude of about 5,525 feet. Exposed over a length of 35 feet, it replaces calcareous slate and strikes northerly. No. 7 vein system lies about 600 feet east-northeast of No. 8 vein at an altitude of 5,450 feet. It consists of two parallel east-northeast-striking galena-sphalerite veins. They are 15 feet apart and replace grey slaty limestone. The northern vein is exposed along a length of 60 feet, and the southern one for 90 feet.

Three parallel east-northeast-trending silver-gold-bearing quartz veins lie about 200 feet southwest of No. 7 vein system. From north to south they are 50 feet, 100 feet, and 140 feet long, and cut limy argillite.

Six silver-lead-zinc showings were discovered northwest of the cirque valley showings. They are within a 600-by-3,400-foot belt trending N50°W and lying 2,000 feet N50°W from No. 9 vein. Little exploratory work has been done on them.

Preliminary estimates indicate a total length of 429 feet of vein material averaging 4.8 feet in width (250 tons per vertical foot) grading 42.4 ounces of silver a ton, 16.9% lead, and 9.3% zinc.

The country rocks are tightly folded northwesterly trending Cambrian slates, argillites, and limestones, which have been intruded by a small biotite granodiorite stock about 5,000 feet northwest of the cirque valley showings. The Tintina fault, a major northwesterly trending structural feature of the district, lies 10 miles to the northeast. Near the cirque valley showings the slate-argillite-limestone assemblage

has been contorted into a number of tight minor folds that plunge to the southeast at about 15 to 20 degrees. The schistosity in the slates commonly strikes northwest and dips steeply to the southwest. Two northerly striking diorite dykes, 10 to 15 feet wide and about 250 feet long, cut argillite immediately south of No. 6 vein; and a northwesterly trending one, 20 to 50 feet wide and 350 or more feet long, cuts graphitic slate 400 feet northeast of No. 3 vein. Two or more northwesterly trending lamprophyre dykes, 2 to 4 feet wide and about 50 feet long, cut limestone and graphitic slate between No. 8 and No. 3 veins. Northeasterly trending faults cut and displace the country rocks, the No. 8 and No. 6 veins, and possibly other veins.

Fire Lake (*Fyre Lake*)

Fire Lake Copper Deposit (lat. $61^{\circ}13\frac{1}{2}'N$, long. $130^{\circ}31'W$)

References: Wheeler, Green, and Roddick (1960b); Skinner (1961, p. 42).

The Fire Lake copper deposit is 95 miles northwest of Watson Lake and $2\frac{1}{2}$ miles east of the north end of the largest lake (locally called "Fire Lake") on North River. It is at the head of a southerly flowing tributary of the lake, at an altitude of about 4,800 feet. The property comprises 272 claims and is owned by Cassiar Asbestos Corporation Limited.

The showing was discovered in August 1960 by prospectors of Cassiar Asbestos Corporation in the bed of a westerly flowing creek. In 1961 the company explored the showing and immediate vicinity (claims Top No. 5, No. 22, and No. 32) by geological, magnetometer, and electromagnetic surveys, and trenched, drilled, and sampled the main showing. The main showing has been trenched for about 250 feet along the creek, for about 350 feet parallel to and about 50 feet north of the creek, and for about 200 feet north at the west end of the showing. Eighteen Packsack and ten AX diamond-drill holes were drilled to test magnetometer and E.M. anomalies over the main showing, and four Packsack and two AX holes to test an anomaly 600 feet east of the main showing. Another anomaly lies about 600 feet southeast of the main showing, but it was not drilled.

The main showing consists mainly of fine-grained pyrite and quartz that has replaced a 20- to 30-foot-thick zone of nearly flat lying mica and chlorite schist. The upper exposed part of the showing has been leached to pyrite and consists of white porous quartz; the lower part, exposed in the creek and cuts, consists of rusty, disseminated sulphides and quartz in schist. The diamond-drilling shows that the sulphide zone is up to 30 feet thick. The upper 20 feet consists of disseminated pyrite and quartz; the lower 10 feet of chlorite schist partly replaced by quartz, pyrite, pyrrhotite, chalcopyrite, and some sphalerite. A small amount of magnetite is present in the chlorite schist. The geophysical surveys and drilling indicate that the mineralized zone trends northwesterly and is about 400 feet long and 125 to 150 feet wide.

Two small sulphide showings are situated upstream from the main showing. One is 650 feet $S70^{\circ}E$ from the east end of the main showing and the other is 550 feet $S47^{\circ}E$ from the same point.

A fine-grained pyritic zone is reported to be 3,000 feet north-northwest of the main showing. Very little exploratory work has been done on these three showings.

Drilling over the magnetometer and electromagnetic anomaly 600 feet west of the main showing cut a promising sulphide zone. A vertical Packsack drill-hole over the centre of the anomaly cuts 23 feet of disseminated sulphides in chlorite schist and 10 feet of magnetite iron-formation. The sulphides are mainly pyrrhotite and pyrite, but two sections—one 9 feet long, the other 3 1/2 feet—contain moderately high concentrations of chalcopyrite. The underlying magnetite zone also contains a chalcopyrite-rich section, which is 5 1/2 feet northeast of the hole described above, but neither of these cut sulphides; however, the hole 20 feet northeast cuts iron-formation. The anomalies indicate that the mineralized zone trends northwestward and is about 500 feet long. Lateral dimensions are not known.

The country rocks near the showing are pre-Jurassic or pre-Cretaceous phyllites, chlorite schists, and sericite schists whose schistosity commonly dips about 15°NE. These rocks have been intruded by a large granodiorite stock 1 mile to the east and smaller ones a mile to the north and 4 1/2 miles to the south. Immediately west of the main showing along the creek, and southeast of the showing on the hillside, the dip of the schists changes abruptly eastward from about 15°NE to 40 or 50°NE, possibly indicating a northwesterly trending fault through this area. Near the head of the cirque valley about 1,200 feet east-southeast of the showing the dips are about 45° easterly.

Cassiar Asbestos Corporation also had a six-man party exploring and mapping the area between the Sixtymile Road and Circle, Alaska, west of Yukon River, during the summer of 1961.

North Lakes

North Lakes Copper Showing (lat. 61°21'N, long. 130°36 1/2'W)

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

The North Lakes copper showing is 110 miles north-northwest of Watson Lake, about 1 1/2 miles south-southwest of the southernmost of the North Lakes, at an altitude of 5,750 feet. Conwest Exploration Company owns the 96-claim property.

The showing was discovered by Conwest prospector Ole Hauge in June 1961 in the face of a northwesterly facing cirque. The mineralized zone consists of slightly banded, massive and disseminated chalcopyrite with pyrrhotite with some sphalerite that replaces a bed of nearly flat lying quartz-mica schist, on a small N60°E trending drag-fold. In places the mineralized zone appears to be up to 30 feet thick and in other places it is a foot or less thick. In places, irregular lenses of quartz and sulphide veinlets extend into the unreplaced schist. The sulphide zone is exposed across the face of the cirque for a distance of about 500 feet and has been traced for 1,000 feet. The western part of the showing has been down-faulted about 100 feet below the eastern part.

The eastern part of the showing was tested in August 1961 with two vertical AX diamond-drill holes, drilled from a saddle about 120 feet above the showing. The holes were drilled to a depth of about 300 feet, but no mineralized material was cut.

The country rocks are flat-lying quartz-biotite schists that have been intruded by a granodiorite plug about 2 miles east of the showing. Above the showing, aplitic sills up to 2 feet thick are present in the schist. Numerous small drag-folds in the schist indicate that these rocks have been overthrust to the southeast. A large, steeply dipping, northerly trending fault cuts the schists on the west side of the showing.

PELLY PLATEAU AREA

Traffic Mountain

Norken, Fool, Peak, and Rain Groups (lat. 62°14'N, long. 130°41'W)

References: Green and Roddick (1961a); Skinner (1961, p. 43).

The Norken, Fool, Peak, and Rain Groups of 40 mineral claims lie about 60 miles east-northeast of Ross River and about 12 miles northwest of Traffic Mountain at an altitude of 4,500 to 5,000 feet.

The showings were formerly held by Kennco Explorations Limited. In 1959 they were restaked and acquired by Canadian Yukon Mining Company Limited. That year the company mapped the Norken and Fool Groups and trenched and sampled showings on these claims. In 1960 and 1961, electromagnetic and magnetometer surveys were made of all four groups and some prospecting and trenching was done; in 1961 about 1,800 feet of diamond-drilling was done.

It is reported that high-grade copper-zinc and lead float zones up to 100 feet wide have been traced for 10,000 feet and that there is a continuous E.M. and magnetometer anomaly along this mineralized zone. The country rocks are Ordovician or Silurian thin-bedded argillites and quartzites that strike northwesterly and dip steeply.

LOGAN MOUNTAINS AREA

Upper Flat River, District of Mackenzie

Flat River Tungsten Deposit (lat. 61°57 1/2'N, long. 128°15 1/2'W)

References: Green and Roddick (1961b); Brown (1961); Skinner (1961, pp. 43-46).

The Flat River Tungsten deposit lies 130 miles north of Watson Lake airport on the west side of upper Flat River at an altitude of about 4,750 feet. Access is by wheel-equipped aircraft from Watson Lake and, by the autumn of 1962, by all-weather road from Watson Lake. The 145-claim property is owned by Canada Tungsten Mining Corporation Limited.

The deposit was discovered in 1954 by Axel Berglund and investigated by Northwestern Exploration Limited in 1955 and 1956. The property was relinquished in 1958 and restaked by Mackenzie Syndicate the same year, after one of the syndicate's parties identified scheelite in the deposit. From 1959 to 1961 the deposit was diamond-drilled and sampled. Final estimates of ore reserves are 1,176,400 tons of 2.47% tungsten trioxide before dilution.

Transportation of personnel, equipment, and supplies to the property had been entirely by air until the winter of 1961-62 when about 3,200 tons of freight was trucked from Watson Lake over 125 miles of all-weather road and 70 miles of winter road. Until April 1960, Beaver aircraft and helicopters were used; in April a Bristol and two C-46 aircraft freighted 400 tons to a landing strip on the ice of Flat Lake. Two airstrips were constructed in 1960 and joined in 1961 to form one strip 4,100 feet long. During the summer of 1960 the property was supplied by light wheel-equipped aircraft, and in 1961 by an Anson aircraft, except for 600 tons of heavy equipment and fuel freighted in July and August 1961 by a Douglas C-46 and a Bristol aircraft. In 1962 a DC-3 will supply the mine and road-construction crews.

A 130-mile all-weather access road is being constructed from mile 67 on the Ross River - Watson Lake development road. During the summer of 1961, 62 miles were completed—37 from the development road and 25 from the mine. During the winter of 1961-62 an additional 12 miles of road were completed beyond mile 65, and Canada Tungsten Corporation rough-graded 7 miles in an area that is swampy during the summer. Culvert and bridge materials were also transported over the winter road to building sites.

Exploration on the main orebody during 1961 consisted of the driving of an 80-foot adit and 310 feet of drifting under the east-limb section, which lies under a talus slide. Four diamond-drill holes were drilled on north-south sections from each of the four drill stations. Fifteen to forty-five feet of ore was cut in the holes drilled from the two western stations indicating a reserve of about 25,000 tons of ore in this section.

A structure, 1,600 feet southeast of, and similar to the main orebody (an overturned fold involving the limestone-ore horizon and cut by a fault), was explored with two diamond-drill holes, but no ore was cut.

An alluvial fan near the mouth of a small creek that crosses the orebody was sampled with a churn drill to determine its scheelite content. It has an estimated 450,000 cubic yards of gravel grading 0.03% WO_3 , to a depth of 20 to 30 feet. This deposit is considered too low grade to mine.

The mill site for the 300-ton-per-day mill was prepared and a townsite was laid out, both immediately northeast of the airstrip in Flat River valley. A total of 1,397,000 board feet of lumber was produced in the company's sawmill, 372,000 feet of which was used in road building and construction.

Test work carried out in the Dorr-Oliver laboratories at Westport, Connecticut, yielded a final flow sheet from which concentrator and crushing-plant design and requisition of equipment has been completed. It is anticipated that 86% of the tungsten in the ore will be recovered, 75% of this amount by tabling and the rest by flotation with subsequent acid treatment.

Studies of the ore zone resulted in the selection of an open-pit mining method and subsequent negotiation of a 3-year mining contract calling for delivery of 320,000 tons of ore following stripping of some 197,000 tons of waste and 186,000 yards of overburden. The mine is expected to be in production by October 1962.

During the field season of 1961 the company maintained four 2-man prospecting parties, prospecting mainly the following four Northwest Territories prospecting concessions: 105 I/1, 105 I/2, 105 H/16, and 95 E/13. Prospecting was confined chiefly to granodiorite-limestone contacts. Several scheelite-bearing skarn zones were found in area 95 E/13 around a 4-by-8-mile intrusive body cutting a limestone-bearing anticline in such a way that the contact is concordant with the limestone. A Bell G-2 helicopter was used to support the prospecting parties.

A brief outline of the geology of the Canada Tungsten Mining Corporation property is given in Skinner (1961).

MACKENZIE MOUNTAINS AREA

Redstone River, District of Mackenzie

Nahanni Sixty Syndicate

Reference: Northern Miner (Nov. 9, 1961, p. 1).

Nahanni Sixty Syndicate is reported to have discovered about 30 showings of lead, zinc, copper, and silver in 1961 along a 14-mile-long zone about 80 miles west of Wrigley and 220 miles north-northeast of Watson Lake, near Dal Lake in the Redstone River area. The syndicate is financed by Fort Reliance Minerals, Rio Tinto Canadian Explorations, Northfield Mines Incorporated, Rayrock Mines, National Explorations, Premium Iron Ores, and others.

The syndicate's prospecting parties, supported by helicopter in 1960, prospected in the central South Nahanni River area and in the upper North Nahanni River area; in 1961 they prospected north of the latter area as far as Dal Lake on Redstone River.

High silver and copper assays are reported from the showings near Dal Lake. The Mac showing consists of narrow veins of massive tetrahedrite filling fractures in calcite bodies. A composite sample of one mineralized lens assayed 220 ounces of silver along a length of 30 feet. Grab samples from another vein 12 inches wide assayed 187 ounces of silver and 37% copper. Another showing of tetrahedrite in brecciated limestone appeared to have a width of 9 feet. A selected grab sample from it assayed 34 ounces of silver a ton and 34% copper.

A number of mineralized shear zones were exposed at Copper Ridge; one of these, the Johnson vein, assayed 13.03% copper across 5 feet.

About 50 miles south and east of the Redstone area is the McBean gossan, discovered in 1960. Grab samples from a trench along 32 feet averaged 7 ounces of silver a ton, 73% lead, 0.47% zinc, and 0.50% copper. The exposure is estimated to represent about 20,000 tons of oxidized material per vertical foot. Drilling is recommended to determine the size of the deposit.

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