

This document was produced
by scanning the original publication.

Ce document est le produit d'une
numérisation par balayage
de la publication originale.

CANADA
DEPARTMENT OF MINES AND RESOURCES
HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

MINES AND GEOLOGY BRANCH
JOHN McLEISH, DIRECTOR
BUREAU OF GEOLOGY AND TOPOGRAPHY
F. C. C. LYNCH, CHIEF

GEOLOGICAL SURVEY

MEMOIR 218

MINING INDUSTRY OF YUKON, 1937

BY

H. S. Bostock



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1938

Price, 10 cents

No. 2450

CANADA
DEPARTMENT OF MINES AND RESOURCES
HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

MINES AND GEOLOGY BRANCH
JOHN McLEISH, DIRECTOR
BUREAU OF GEOLOGY AND TOPOGRAPHY
F. C. C. LYNCH, CHIEF

GEOLOGICAL SURVEY

MEMOIR 218

MINING INDUSTRY OF YUKON, 1937

BY

H. S. Bostock



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1938

Price, 10 cents

No. 2450

CONTENTS

	PAGE
Introduction.....	1
Placer mining.....	2
Lode mining.....	9
Coal mining.....	13
Recent publications.....	17

Illustrations

Plate I. A. Grand Forks, Bonanza Creek; during the Klondike gold rush this place had a population of several thousand.....	19
B. Ditch carrying water from South Klondike River to North Klondike River for the hydroelectric plant.....	19
II. A. Stripping muck, frozen peat, and silt off of placer gravel with an hydraulic monitor.....	21
B. A barge on Stewart River loaded with more than 200 tons of ore and concentrates from the silver-lead mines of Mayo district.....	21
Figure 1. Value of the annual mineral production of the Yukon, 1890 to 1937, inclusive.....	2
2. Klondike mining area showing locations of chief operations.....	4

Mining Industry of Yukon, 1937

INTRODUCTION

Information for this report on mining activities in Yukon during 1937 was gathered by the writer during the field season and by correspondence throughout the year. The writer expresses his appreciation to all who assisted him. In August a visit was paid to Mayo district, and in the course of the field work in the Ogilvie map-area, which includes most of the Klondike mining district, visits were paid to all the placer operations in the district and to the coal mine on a tributary of Rock Creek.

The season of 1937 began with a hot, dry period in June, but July and August were wet months and September unusually mild. Although the wet weather made the hauling of freight on the roads difficult it was of great advantage to both placer mining and silver-lead mining. For the former, the wet weather kept the water-level on the creeks up throughout the season and the mild autumn prolonged the season for stripping, thawing, and dredging. For silver-lead mining, the rainfall kept the water in Stewart River at a high level throughout the season, facilitating the shipping of the silver-lead ore and concentrates down the river.

MINERAL PRODUCTION

The accompanying figure (Figure 1) shows the annual value of the mineral production of Yukon since 1890. Although in the earlier years the placer gold production eclipsed everything else, much silver was recovered in the process of refining the gold, and in 1900, when placer gold production reached a maximum of \$22,275,000, the silver recovered had a value of \$177,857. In 1900 copper mining began in the Whitehorse copper belt and 9 tons of copper¹ ore, said to run 46.40 per cent copper, was shipped. Copper continued to be mined from this locality off and on up to 1930. The production of the peak year, 1916, was 2,807,096 pounds of copper, worth \$763,586, and during the whole period of operations the total value of the copper from these mines was \$2,712,000. In 1906 veins carrying silver and lead were discovered in Mayo district², and in 1913 or 1914 production of these metals began. Since then, with the exception of 1919 and 1920, there has been each year some silver-lead production from Mayo district, and this has accounted for far the greater part of the silver obtained in Yukon. The aggregate value of the mineral production to the end of 1937 is as follows:

Gold (placer gold, including a small amount recovered in refining the silver-lead ores).....	\$192,500,000
Silver (mainly from silver-lead ores).....	16,590,102
Lead (entirely from silver-lead ores).....	3,742,233
Copper	2,712,000
Total mineral production.....	<u>\$215,544,335</u>

¹McConnell, R. G.: The Whitehorse Copper Belt, Yukon Territory; Geol. Surv., Canada, 1909, p. 2.

²Cairnes, D. D.: Geol. Surv., Canada, Sum. Rept. 1915, pt. A, p. 27.

These figures are mainly compiled from reports by the Bureau of Statistics, but for 1937 and in part for 1936 the gold, silver, and lead production has been estimated. Small amounts of zinc recovered from the silver-lead ores, as well as very small amounts of tungsten, mercury, and other minerals, have not been taken into account. It is interesting to note that prior to 1921 the annual production of gold greatly exceeded in value that of all other minerals combined, whereas from, and including, 1921 Yukon has produced approximately \$17,700,000 in gold and \$18,500,000 in silver and lead.

PLACER MINING

The washing of placer gold was the first mining carried on in Yukon and it was the main factor that led to an influx of population and the development and settlement of the country. The unglaciated areas of Yukon contain by far the most important placer ground in Canada. At the present time the Klondike placer field, the main field in this unglaciated area, is being developed along modern engineering lines, and this is showing that the Klondike contains much larger reserves of placer gravels than was formerly regarded as probable. Extensive areas in the Klondike district likely to contain reserves still remain to be tested and outside the Klondike area, with the exception of Black Hills Creek, none of the formerly prominent placer creeks in the unglaciated area has been properly tested by modern methods. From the results so far obtained in the Klondike it is certain that sufficient reserves have been proved to keep most of the dredges now operating or under construction in operation for over 15 years. In some instances the reserves will last longer and large areas of probable and possible gravels still remain to be tested. From this it is to be expected that the placer gold mining in the unglaciated area of Yukon will continue to be an important industry for half a century and more to come, although the annual production probably will begin to decline after the next decade or so.

FORTYMILE RIVER

During the last few years Mr. H. G. Blankman endeavoured to develop a dredging property on Fortymile River. In 1937 his company, under the management of Mr. P. Fosbery, started to drill the Fortymile Valley 16 miles from the mouth and 7 miles from the International Boundary. A light gasoline drill was used and ten holes were drilled despite unusually high water that lasted through most of the summer. Mr. Fosbery reports that the thickness of the gravels averaged 17 feet and that the bedrock is schist cut by numerous quartz veins. He believes that the results of the drilling warrant further prospecting and that the valley is suitable for dredging with a boat of the right type.

SIXTYMILE RIVER DISTRICT

The Holbrook Dredging Company continued their operations in the Sixtymile Valley, against the west slope near claim 12 above Discovery. The dredge, which for a good many years has been the only steam dredge

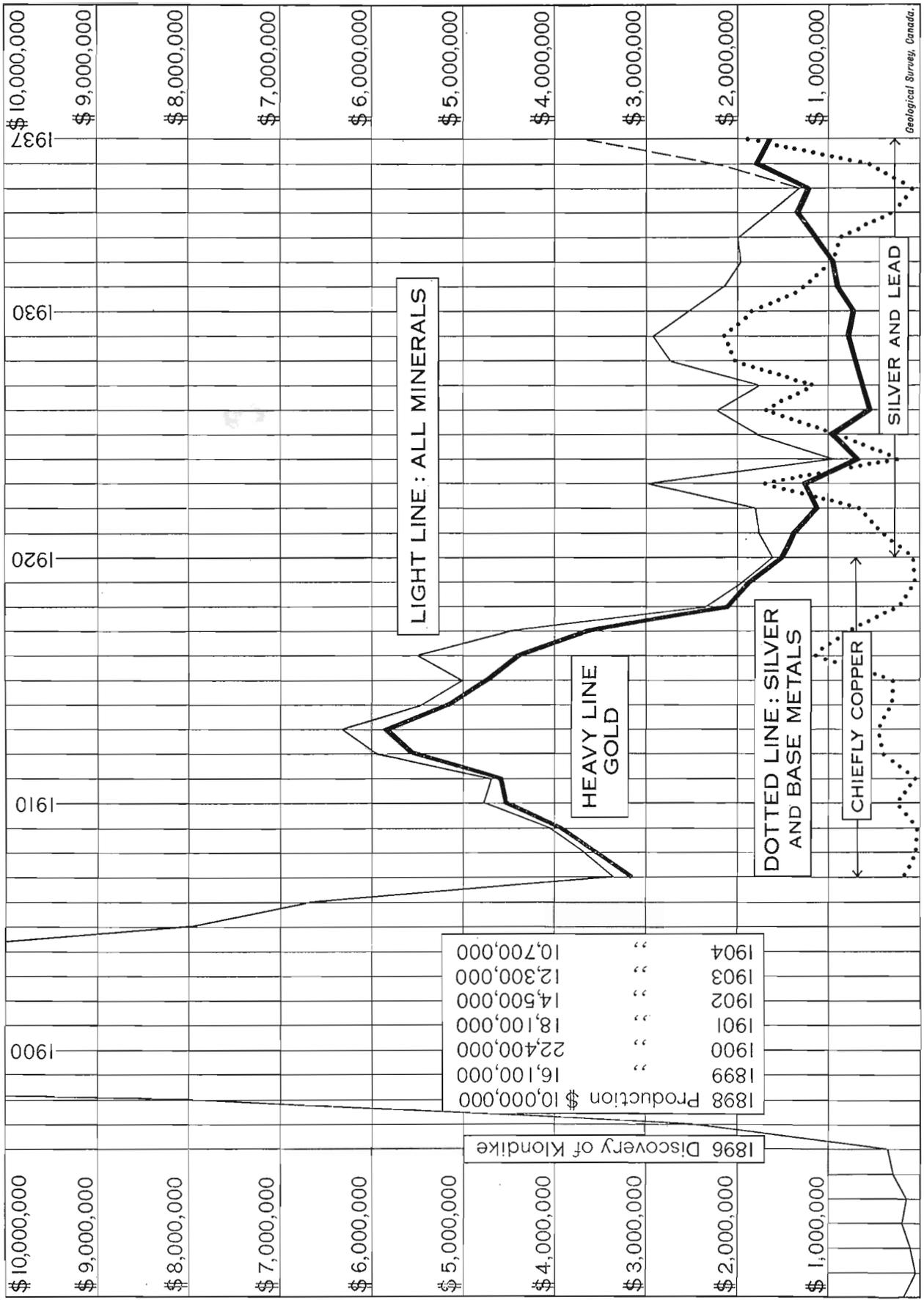


Figure 1. Value of the annual mineral production of the Yukon, 1890 to 1937, inclusive.

Geological Survey, Canada.

in Yukon, was equipped with diesel power during the first part of the season and did not begin digging until August, but continued until late in the autumn. The change has proved very satisfactory. Up to this time the fuel used was wood and the supplies in the immediate vicinity have been exhausted, so that the cost of the wood that has had to be hauled for greater distances each year has now become prohibitive. No recent news of the operations has been received, but it was reported that the dredge was making good recoveries.

KLONDIKE DISTRICT

The Yukon Consolidated Gold Corporation, under which the former smaller placer gold companies operating in the Klondike mining district have been amalgamated, holds practically all the known reserve areas in the district. Since 1932 reorganization and development have been in progress. The five dredges operating in 1932 have been reconditioned, five other dredges have been built or projected, a new unit in the hydroelectric power plant has been installed, many miles of canal supplying water to the plant have been built, power lines have been reconstructed, and large stripping and thawing plants, with miles of ditches as well as camps, workshops, etc., have been built. In 1932 there were virtually no proved gravel reserves. Since then extensive drilling has been carried on and as a result the corporation has today 100,513,100 cubic yards of proved gravel reserves, believed to contain \$43,181,200 in gold. From 1933 to 1937, inclusive, more than 24,000,000 cubic yards were dredged.

During 1937 the corporation continued to expand their operations, and altogether spent approximately \$2,200,000. The operations of the corporation embrace a number of different enterprises, including generation of power, prospecting, construction of camps and power and telephone lines, preparation of proved ground by stripping and thawing, and, finally, production by dredging.

The head office of the corporation is in Dawson, but the operating offices, repair shop, gold room, etc., are at Bear Creek. The three largest dredges are distributed along the Klondike Valley, or close to it, from near the mouth of Bonanza Creek to Hunker Creek. For these dredges no preparation of ground, in the way of stripping and thawing, is being done except at the Arlington area close to the mouth of Hunker Creek. Here, with stripping, thawing, and dredging in progress, a new camp has been recently built. Some 30 miles up the Klondike Valley, on the north side of the river, is the hydroelectric power station. It is reached by road and a ferry. A camp is maintained there for those operating the station and caring for the ditches supplying it with water. On the upper part of Dominion Creek, referred to as the upper Dominion area, there is a dredge and camp, etc. Another camp is on the middle Dominion area, where stripping and thawing are being done in preparation for dredging.

There is a large camp at the junction of Dominion and Sulphur Creeks for those operating the lower Dominion and lower Sulphur dredges, with their accompanying stripping and thawing plants. Camps have been

recently built on middle and upper Sulphur areas where preparations for dredging are being made. On Quartz Creek there is a dredge with its attendant stripping and thawing plants, camp, etc. These various camps, as indicated on the accompanying map (Figure 2), are linked by roads.

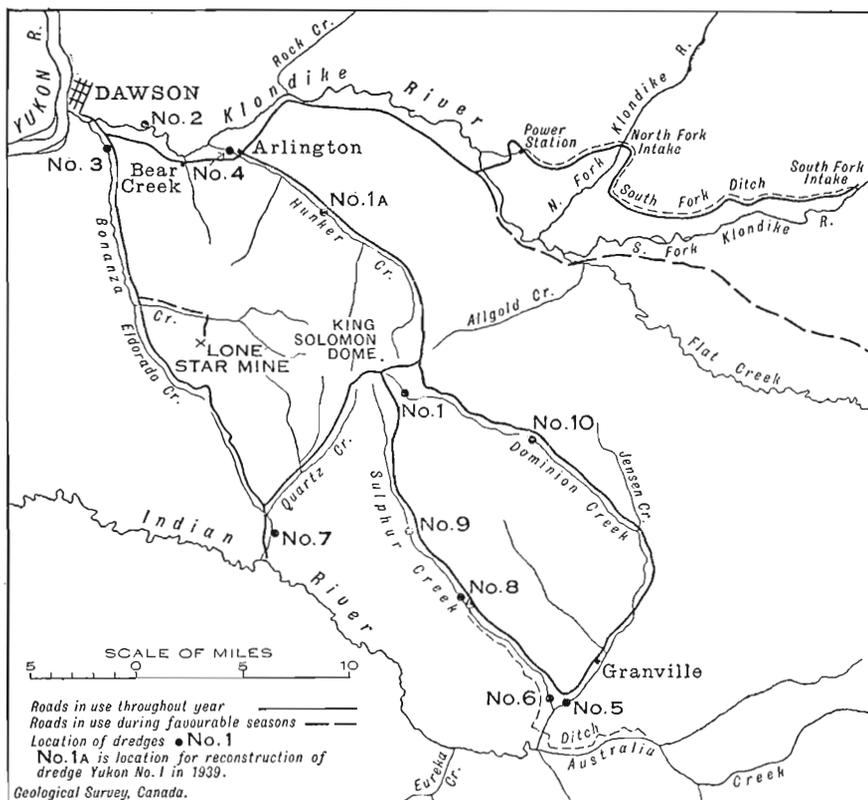


Figure 2. Klondike mining area showing locations of chief operations.

The power for the operations comes from the corporation's hydro-electric plant in the Klondike Valley. For this plant water is brought from North Fork Klondike River by a ditch approximately 6 miles long, and when the supply in the North Fork is not enough additional water is brought from the South Fork of Klondike River from a point 14 miles above the junction. The volume of water used is relatively small, as the head is considerable. The power plant contains three 5,000-horsepower units. During the year 25,049,530 K.W.H. were generated, and of this output 84.5 per cent was used by the placer operations, the remainder by the Dawson City Utilities Company. During 1937 the ditch from the North Fork to the power plant was widened and strengthened, the South Fork ditch was completed, and the intake gate house constructed. A road runs

along the bank on one side of these ditches, making it possible to drive from Dawson to the South Fork intake. Seven and one-half miles of 33,000 volt power transmission line were constructed from Hunker Summit to claim 2 below Discovery on Sulphur Creek, and 2½ miles were constructed to the middle Hunker area. The power lines in service at the end of the year totalled 101 miles of primary 33,000 volt lines and 28 miles of secondary 2,300 volt lines. The rebuilding of the telephone line from Bear Creek to Granville was completed.

Prospecting was carried on with two Keystone drills, which were operated from April 22 to September 30. Drilling was done on Hunker Creek up to claim 46 below Discovery, on Eldorado Creek from claim 27 to claim 45, on the lower Bonanza and lower Dominion areas, and on Indian River down stream from Australia Creek. A total of 20,611 feet of drilling proved 11,637,000 cubic yards on Hunker Creek and 10,487,000 cubic yards on Dominion Creek. For the year, with these and other areas, a total of 27,184,000 cubic yards, estimated to contain \$10,438,000, were added to the gravel reserves of the corporation.

Hydraulic stripping to wash away the muck, frozen peat, and silt, and to facilitate thawing and dredging was continued on the Arlington area of Hunker Creek, on the upper, middle, and lower Dominion areas, on lower, middle, and upper Sulphur areas, and on Quartz Creek. Preparations were made to begin stripping in 1938 on the middle Hunker area where the new dredging ground was proved this year. Omitting that done on the upper Dominion area, a total of 1,871,624 cubic yards of muck was stripped off. For these operations a great volume of water is used and as the rainfall was well distributed over the latter part of the season the supply was better than usual. Stripping started on May 9 and stopped on October 2.

The thawing plants were operated on the Arlington area, the upper and lower Dominion areas, and the middle Sulphur area. A thawing plant was installed and started on the middle Dominion area. The natural water supply of the creeks at most of the thawing localities is not sufficient for the thawing, stripping, and dredging operations, but the deficiency is overcome by using large, electrically driven, centrifugal pumps whereby the water in the streams is used over and over again. In these operations "Rex" travelling water screens are used to filter the water. A total of 3,843,638 cubic yards of gravel were thawed. The thawing plants were operated from May 7 to September 25.

There are now eight dredges built or being built and two others planned. Since 1935 the dredges have been renamed as follows:

- Yukon No. 1, formerly Northwest No. 1, 7 cubic foot buckets, now in upper Dominion area, to be moved and reconstructed on middle Hunker area for operation in 1939.
- Yukon No. 2, formerly Canadian No. 2, 16 cubic foot buckets, in Klondike Valley.
- Yukon No. 3, formerly Canadian No. 3, 16 cubic foot buckets, in lower Bonanza area.
- Yukon No. 4, formerly Canadian No. 4, 16 cubic foot buckets, in Arlington area.
- Yukon No. 5, formerly Northwest No. 2, 7 cubic foot buckets, in lower Dominion area.
- Yukon No. 6, new dredge, 7 cubic foot buckets, placed in operation in 1936 in lower Dominion area, now in lower Sulphur area.
- Yukon No. 7, new dredge, 5 cubic foot buckets, placed in operation in 1935 on Quartz Creek.

- Yukon No. 8, new dredge, 7 cubic foot buckets, built in 1937 on middle Sulphur area.
 Yukon No. 9, new dredge, 5 cubic foot buckets, to be constructed early in 1938 and put in operation on upper Sulphur area June 1938.
 Yukon No. 10, new dredge, 5 cubic foot buckets, to be built on middle Dominion area in 1938 and ready in 1939.

Yukon No. 1 is now on claim No. 4 above upper Discovery and sufficient ground remains above that point to keep the dredge working there during the season of 1938. In 1937 the dredge began operating on May 6 and closed down on November 9, after digging 426,411 cubic yards. During the winter of 1938-39 this dredge will be dismantled and the machinery moved to a new hull on claim 46 below Discovery on the middle Hunker area, from there it will work downstream continuing until the upper 5,800 feet of the Anderson concession has been worked over.

Yukon No. 2 has been digging on the Klondike flats below Bear Creek on the north side of the river and is working downstream. During the season, from May 1 to December 3, 1,811,924 cubic yards were handled.

Yukon No. 3 is on Bonanza Creek close to claim 89 below Discovery, and has been digging old tailings with, it is said, good results. From May 6 to November 24 this dredge handled 2,721,044 cubic yards.

Yukon No. 4 is on the Arlington area. During most of the season this dredge was still digging towards the pay area and, therefore, gold recovery was very low. From July 11 to December 2 the dredge handled 1,089,377 cubic yards.

Yukon No. 5 was fitted with a new hull in the early part of 1937 and did not begin digging until August 3. It closed down on November 12 after handling 310,971 cubic yards. This dredge, operating on Dominion Creek, is now close to the mouth of Sulphur Creek and will continue down Dominion Creek.

Yukon No. 6 at the beginning of the season continued digging on the lower Dominion area, but later started to work up Sulphur Creek where a large reserve has been proved in the lower Sulphur area. This dredge began digging on May 4 and closed down on November 14, handling 579,701 cubic yards.

Yukon No. 7, on Quartz Creek, has been digging downstream on the west side, but will start on the east side and work upstream in 1938. This dredge began operating on April 27 and closed down on November 14 after handling 504,357 cubic yards.

Yukon No. 8 is under construction on the middle Sulphur area on claim 49 below Discovery where the valley bottom for a stretch of 5,000 feet downstream has been stripped and partly thawed. On September 1, the digging of the dredge pond was nearly finished and by November 1 the hull was completed. Much of the machinery was installed by November 13 when work ceased for the year. It is expected that this dredge will start digging by June 15, 1938, and will work upstream to claim 27 below Discovery.

Preparations have been made to build Yukon No. 9 on a claim close to Discovery in the upper Sulphur area. This dredge will dig downstream to claim 27 below Discovery. As soon as Yukon No. 8 is completed the building of Yukon No. 9 will be started, and this dredge is scheduled for completion October 1, 1938.

During the winter of 1938-39 the construction of Yukon No. 10 will be begun on claim No. 17 below lower Discovery in the middle Dominion area. This dredge will work up to claim 11 below lower Discovery where Yukon No. 1 began and then work downstream on the large area of dredging ground that has been proved to reach at least as far as Jensen Creek, but whose lower limit is not yet determined. During the winter of 1938-39 Yukon No. 1 will be moved to the middle Hunker area, and both these dredges are to be ready in the summer of 1939.

During the season the seven dredges operating handled 7,443,785 cubic yards of gravel, which yielded 36,849.65 fine ounces of gold and 8,814.02 ounces of silver. It is reported that this production, though less than that of 1936 due to the late start of Yukon No. 5 and the low-grade ground Yukon No. 4 was in at the beginning of the season, was considerably over that estimated last spring. This year it is said a considerably larger production is expected. The five dredges that began work at the beginning of the season operated for an average of 200 days each.

In addition to the operations mentioned during the last 2 or 3 years, much camp construction has been carried on at practically all the dredging localities on Dominion, Hunker, Sulphur, and Quartz Creeks. During 1937 at the main camp at Bear Creek a new repair garage and two cottages were constructed. A camp to accommodate seventy men was constructed on the upper Sulphur area at claim No. 12 below Discovery. This consists of a mess-house to seat one hundred men, three bunk-houses for twenty men each, a foreman's house, and a combined stable and garage. A camp to accommodate ninety men was constructed on the middle Dominion area at about claim No. 19 below lower Discovery. This camp is a duplicate of the one built on the upper Sulphur area except that it has one additional bunk-house for twenty men.

The construction of the ditch that supplies water from Australia Creek to Sulphur Creek was practically completed and in use on August 18. The head of this ditch is approximately 5 miles up Australia Creek. It crosses Dominion Creek by an inverted siphon, and at the lower end of the siphon the water is brought up 200 feet or higher by electrically driven pumps to the ditch level. The water is carried by the ditch approximately 10 miles up Sulphur Creek to claim No. 49 below Discovery. The construction of a water supply system to deliver water from Indian River to Quartz Creek was also completed and in operation on June 8.

The corporation employed from January 1 to April 15 an average of 150 employees, from April 16 to November 15 an average of 512, and from November 16 to December 31 an average of 131, the total amount of salaries for the year being \$1,020,404.

A few individual miners continue to work on Bonanza, Hunker, Dominion, and Quartz Creeks. The operations of the Yukon Consolidated Gold Corporation gave employment to virtually every man who desired it and was physically fit.

No work has been done by the corporation on any of the outlying creeks during the year, but the drilling of Eureka and Henderson Creeks is projected.

On Black Hills Creek, Mr. J. H. Carpenter and associates have been preparing ground for hydraulicking and open-cut work to be operated during 1938.

A few individual miners are scattered on Henderson and Eureka Creeks.

Allgold Creek, a tributary of Flat Creek, was subject to examination by Mr. E. N. Patty, manager for General A. D. McRae of Vancouver, British Columbia. Preparations are now being made to prospect the creek by drilling during 1938.

On Stewart River two miners have built a small boat which they have equipped with apparatus to facilitate the working of the river bars. Starting near Scroggie Creek in August they worked upstream and are reported to have obtained good results.

During the year a number of prospectors worked on Clear Creek and its tributaries. The Fairbanks Exploration Company started prospecting Clear Creek at the mouth of Barlow Creek with a light drill, but the results were not satisfactory as the drill proved unsuited to the type of ground.

MAYO DISTRICT

In Mayo district the placer gold production has come chiefly from Hight, Haggart, Ledge, and Duncan Creeks and Dublin Gulch. On Haggart Creek Mr. E. Barker and associates have acquired more ground, and additional equipment is being taken in to be on the creek before break-up. In the district about twelve to fifteen men find employment during the year in placer mining.

OTHER DISTRICTS IN CENTRAL YUKON

South of Stewart River placer miners have been working on a number of streams, including Brewer, Barker, Scroggie, Thistle, Kirkman, Canadian, Issac, and Rude Creeks and Selwyn River and farther southeast on Seymour, Nansen, and Victoria Creeks.

Mr. Gould has been working for several years about $2\frac{1}{2}$ miles up Brewer Creek. Here during the last 2 years he has recovered over 95 ounces of gold. The gold is coarse and of high assay value. The workings are all in the creek bottom.

One miner worked on Barker Creek, and two on Scroggie Creek. Three miners are working on the lower part of Thistle Creek.

Kirkman Creek is receiving rather more attention than the others, seven miners working there. Mr. and Mrs. Britton and Mr. Mann are working together 5 miles up the creek. They are drifting in the valley bottom in well-frozen ground from a shaft 40 feet deep. The pay gravel is said to be 2 to 3 feet thick and lies on a soft decomposed schist. During the winter of 1936-37 they recovered slightly over 40 ounces from one small pocket. The ground is patchy and there seems to be no well-defined pay-streak. During this winter they intend to drift upstream through some old workings to a patch of virgin ground. Two men are working one mile above them and two prospecting on different parts of the creek.

One or two placer miners are reported to be working on Canadian Creek.

On Issac and Rude Creeks Messrs. Leslie and Stevenson are still prospecting and doing some placer work.

Mr. G. Devore and associates did some work on the east branch of Selwyn River and are reported to have recovered a number of nuggets.

No news of placer mining or lode prospecting has been received from Pelly River and its tributaries.

SOUTHERN DISTRICTS

Little information has been obtained about the placer mining in southern Yukon, though the gold turned in at Whitehorse this year was 84 ounces more than that turned in last year. The chief creeks contributing to this production are believed to be those of the Livingstone Camp, Bullion Creek, and those of the Ruby Creek area.

PRODUCTION

The total placer gold production in Yukon for 1937 was 58,348.70 crude ounces, which is 4,391.59 ounces less than last year. Of the total, 724.70 ounces were turned in at Mayo and 680.30 ounces at Whitehorse. The totals for Mayo and Whitehorse together are practically the same as last year, but the returns at Dawson are considerably lower, due mainly to the lower production of the Yukon Consolidated Gold Corporation. The estimate of the corporation made last spring was, however, considerably below their actual production and their estimate for next year is reported to be higher than their production of either of the last two years.

LODE MINING

Production from the mines on Galena Hill continued steadily throughout the year and a large tonnage of ore was treated in the mill of the Treadwell Yukon Corporation, Limited,¹ at the Elsa mine. The resumption of larger scale shipping of silver-lead concentrates and ore from Mayo was the most important mining event of the year in Yukon. No new lode mining locality was discovered, but a strike was made on the west side of Freegold Mountain.

KLONDIKE DISTRICT

Some surface prospecting is reported to have been done by the owners at the Lone Star mine, located on the ridge between Upper Bonanza and Eldorado Creeks. This property has been described in several previous reports, the most recent of which is "Mining Industry of Yukon, 1935."²

MAYO DISTRICT

During 1937 the Treadwell Yukon Corporation, Limited, continued developments, operated their mill at the Elsa mine, and maintained production from the Elsa and Silver King mines. Two or more smaller operators produced small tonnages of ore and a number of prospectors were working on their claims on Galena Hill. In August during the writer's visit the Elsa mine was handling about 180 tons a day. Due to the use of new chemicals and the addition of a number of new flotation cells, the

¹ Formerly the Treadwell Yukon Company, Limited.

² Geol. Surv., Canada, Mem. 193, p. 7 (1936).

concentration ratio has been considerably improved, so that the concentrates made during the latter months of the year are of considerably higher grade than those made formerly. During the summer a total of 9,080 tons of concentrates and ore were shipped to the smelters by the corporation and other operators. This is reported to be the second largest tonnage ever shipped in a year and only 660 tons short of the maximum reached in 1930. By far the larger part of the 9,080 tons was high-grade concentrates and only a small part hand-picked ore. With the higher average grade of the concentrates it is probable that the total value of the ore will be close to that of the better previous years when market prices were higher. In August there was a large tonnage at Mayo and also a considerable tonnage piled at various points on Galena Hill, so that though the actual amount shipped exceeded the 8,000 tons that the White Pass and Yukon Route Company contracted to handle for the Treadwell Yukon Corporation a considerable tonnage is left over for shipping in 1938. It is reported that the transportation company plan to move over 10,000 tons in 1938.

Keno Hill

No prospecting has been reported from Keno Hill during 1937.

Galena Hill

At the Silver King mine of the Treadwell Yukon Corporation, Limited, the shaft has been carried down to the 300-foot level and drifting at this level has been started. Since last year the ore has been traced 200 feet farther northeast on the upper levels. The 100-foot level on the south vein has been extended and a large tonnage has been blocked out above the 200-foot level. Above the 100-foot level in the north vein much ore has been mined, but some remains. On the 200-foot level the north vein is being developed and shows a large body of ore, 20 to 30 feet wide in places. At this property a large new mess-house has been built.

At the Elsa mine ore is being drawn from the stopes and from a raise between the 200- and 400-foot levels. Some building has been in progress at the camp, and a large Fairbanks oil engine has been added to the power plant.

On the Hector group an adit is being driven south to intersect the vein 300 feet below the shaft collar. This adit will be used in mining the high-grade ore developed on the property last winter. No other underground development is being done at present on this property. A number of buildings have been erected at the adit and a road built connecting it with the main roads.

Other developments carried out by the corporation include the building of a power line between the Elsa power-house and the Silver King mine and the gravelling of the road between these two points.

On the Arctic group of Messrs. Settlemier and Bermingham some exploration and mining have been in progress under Mr. C. H. Bermingham. The vein has now been followed for a length of over 1,050 feet and is found to be formed of fine faulted segments. It is reported that a considerable tonnage of milling ore and approximately 750 tons of high-grade ore suitable for direct shipping have been proved on this property. The

shipping ore is in widths up to 8 feet and the milling ore up to 50 feet. During the summer approximately 275 tons of ore were shipped, which yielded 267·720 dry tons with an average assay value of 251·25 ounces of silver and 52·5 per cent lead a dry ton.

On the northeast slope of Galena Hill Messrs. D. Morrison, T. McKay, and Colley have traced a vein, believed to be the continuation of that being developed on the Hector group, for 1,200 feet across their property and have found ore minerals at intervals throughout this length.

Mr. Oscar Millar on the Dragon mineral claim, a little farther northeast, has traced a vein for approximately 1,200 feet. This may also be the same vein.

On the east face of Galena Hill Mr. J. Sugiyama has mined and sacked for shipping between 20 and 30 tons of ore from his vein found last winter.

On the northwest side of the hill Mr. W. Jeffreys, Jr., has picked up a vein on his ground and has done some prospecting on it.

CARMACKS DISTRICT

During the earlier part of the year the Mount Free Gold Yukon Mines, Limited, which had acquired, under the direction of Mr. T. Bee, an option on the Brown-Fairclough group on Freegold Mountain, installed a small mill and started an adit. It is reported that the mill was operated for about 10 days, but was forced to close down owing to lack of ore and water. The mill site is high above Seymour Creek. Word has recently been received that this company also plans to take over the adjoining Laforma group.

During the summer a number of prospectors were occupied on their claims doing assessment work and some fresh areas were prospected, chiefly by Mr. W. Thier and Mr. P. F. Guder. In the latter part of the summer Mr. Thier prospecting on Caribou¹ Creek found a boulder of vein quartz, samples of which are reported to have yielded spectacularly high assays in gold. A specimen sent to the writer shows patches of thickly scattered fine crystals of pyrite and flakes of gold embedded in fine-grained vein quartz. This discovery created a stampede in September and October, but no new discoveries have been reported as the result of the stampede though a great many claims were staked. It is reported that a showing of numerous large and small stringers of quartz, perhaps the source of the rich quartz, has been discovered by Messrs. Thier and Guder.

During the autumn Mr. Guder found some gold-bearing quartz float on the ridge between Bow and Big Creeks. This is the first time any discovery has been made in the neighbourhood west of Bow Creek.

The work done in this locality, including the whole prospecting area around Freegold Mountain, has proved the presence of a large number of quartz veins carrying gold over a considerable area. It has also shown that some of these veins contain very rich patches and that at least one, that on the Laforma group, is of persistent character both as regards length

¹ Caribou Creek enters Seymour Creek from the south side about 2½ miles above the junction of Seymour and Bow Creeks.

and depth. The most difficult task, proving whether these veins contain workable ore-bodies, has not yet been seriously attempted. The area is in a readily accessible part of Yukon and its transportation problems will be comparatively slight compared with those of Mayo district.

WHITEHORSE DISTRICT

A few men have been prospecting in Whitehorse district off and on for many years. The Wheaton River and Windy Arm sections have received the most attention. Though there has been very little activity and no production from this district for a good many years it is certainly one of promise. Many good prospects have been discovered in it and it is this district from which the copper production of Yukon has come. The southern and western parts of the district include a part of the Coast Range belt, with many miles of irregular contacts of intrusives and large areas of older sedimentary and volcanic rocks partly surrounded by intrusives. The district is traversed in the central part by the White Pass and Yukon railway, which gives it easy access to the seaport of Skagway.

In the Wheaton River section during the last 2 years or more Mr. J. O. Stenbraten has been prospecting the Combination group, on the slopes of Mount Reid between the forks of Skookum and Berney Creeks. The group was visited by Cockfield¹ in 1922, and the following information is partly taken from his report and partly from Mr. Stenbraten's correspondence. The property is 5 miles beyond the end of the wagon road that leads up Wheaton River and 36 miles from Robinson station. The property is on a steep mountain slope facing east. Two veins have been located, which extend up the slope in a direction a few degrees south of west. The veins are exposed between elevations of approximately 4,800 and 5,600 feet. At the lower level the two veins are approximately 300 feet apart and at their highest workings about 100 feet apart. The veins are mainly in granodiorite, but traverse also an inclusion of andesite. The north vein has about 2 feet of solid vein matter, though in places the fracture zone it follows is 25 feet wide. Little work has been done on it. In the south vein there is 10 to 15 feet of vein matter and gouge between the solid wall-rock. Pits and cuts have exposed the south vein for a horizontal distance of about 1,000 feet and a vertical distance of 650 feet. In 1937 an adit was started near the lower exposures of this vein and driven along it. At a distance of 45 feet from the surface a crosscut shows the vein to be 9 feet wide and another at 70 feet shows the vein 8 feet 6 inches wide with nearly vertical walls. During the winter this work was being continued. Mr. Stenbraten has submitted the figures of a number of assays, with diagrams showing when and how the samples were taken. Of twelve channel samples across widths from 1 to 5 feet from a trench at the upper end of the south vein the values in gold and silver vary between \$6.50 and \$85.70. Six of the samples carried over \$10 in gold. Lead varies from 0.2 per cent to 11.1 per cent and zinc from 0 to 6.2 per cent. The samples running highest in gold and silver are also highest in lead and zinc. Twelve channel samples across widths of 2 to 5 feet from a cut near the lower end give up to \$15.30 in gold, 59.90 ounces of silver, 11.8 per cent lead,

¹ Cockfield, W. E.: Geol. Surv., Canada, Sum. Rept. 1922, pt. A, p. 7.

and 8.4 per cent zinc. These twenty-four assays were taken in 1930. Only one is as low as a trace in gold, all show some silver. Two samples from vein matter 1,100 feet west of the upper trench on the south vein give \$4.50 and \$4.95 in gold and 31.60 and 90.80 ounces of silver, respectively. Seven channel samples taken in September 1936 average 0.277 ounce of gold and 17.34 ounces of silver.

On Windy Arm of Tagish Lake, close to the British Columbia boundary, the Inca Mining Company of Carcross under Mr. L. W. Staples carried out some exploration and development on the Broken Hill group, which lies a quarter of a mile south of the Big Thing group. Mr. Staples reports that seven open-cuts were put in over a length of 6,000 feet along the strike of the vein and that indications of ore were found for the whole distance. Values from channel samples gave from \$2 to \$35 in gold and silver. The ore sulphides are pyrite, arsenopyrite, and galena.

COAL MINING

Coal has been found in many places in Yukon south of the 65th parallel. The coals are of Mesozoic and Tertiary ages.

The Mesozoic coals are confined to the drainage basin of Lewes River, south and east of Selkirk, and are of Upper Jurassic or Lower Cretaceous age. Perhaps coals of both periods are present. The Mesozoic coals are good grade bituminous and have been produced from the neighbourhood of Carmacks where three mines, the Tantalus, Five Finger, and Tantalus Butte, have been operated. In recent years the Tantalus Butte mine has been the only one operating. It has produced from 300 to 900 tons of coal a year. Its market is in Dawson and the surrounding neighbourhood, though formerly the coal from the mines near Carmacks was used on the river boats for a few years and production reached as much as 10,000 tons a year.

The Tertiary coal areas are in the Yukon and White River drainage areas west of the 138th meridian. These coals are lignites. There has been some production from Cliff Creek, from Coal Creek, which enters Yukon River from the northeast below the mouth of Fortymile River, and from Coal Creek, a tributary of Rock Creek which is the first large creek from the north entering Klondike River above its mouth. It was once planned to use the coal from the first of these localities to generate electric power for the Klondike placer mining, but the enterprise proved a failure. A little mining was also done on the Rock Creek locality, but the mine has been closed down for many years.

During the last few years it has been very difficult to arrange transportation for Carmacks coal to Dawson, and with the increased activity of the Yukon Consolidated Gold Corporation, and the steadily diminishing supply of readily accessible firewood and its increase in price, the demand for coal has increased. This has led to the search for coal accessible to Dawson, and not subject to the uncertainty of the river transportation and available in winter as needed.

The mine on the tributary of Rock Creek, known as the Rock Creek coal mine, offers possibilities in this direction, and during the last year Mr. J. D. Simpson and associates organized a company to develop it.

The mine is 7 miles from Klondike River at the crossing above the mouth of Rock Creek, which is about 13 miles from Dawson. A winter road follows the bottom of Rock Creek Valley to the mine, and another road that could be used in dry weather in summer follows the ridge on the southeast side of Rock Creek.

The mine was originally prospected before 1900, and in September of that year Mr. F. C. Liddle examined and reported on the mine for the Alaska Exploration Company. He described the workings as consisting of a main entry, an inclined shaft about 400 feet long, and an old prospecting tunnel which was used as an air shaft. The main entry was apparently started on the outcrop, but beyond a few feet it intersected a fault which cut off the coal. The fault was then followed for 170 feet where the coal was again picked up. At 215 feet from the entry a crosscut extended about 60 feet to the south to the old prospecting tunnel and another at 250 extended 80 feet to the north. There was at that time a 12-horsepower boiler for hoisting and 150 tons of coal on the dump to be sacked. In 1901 R. G. McConnell reported on the mine.¹ The mine was continuing to operate, but no mention is made of shipments and after a year or so the mine closed down and remained so until last year.

When work was resumed it was found that the main entry had become over half filled by the rising of the floor. At the time of the writer's visit this entry had been dug out and retimbered for about 400 feet, and the face was still in the old workings. The direction of the entry is about south 30 degrees east and it slopes down at 30 degrees for the first 100 feet and then becomes gradually flatter until at the lower end the slope is only 3 or 4 degrees. In the upper part of the incline only a few patches of coal in soft, shaly wall-rock are present. The coal appears to be fragments of seams sheared in a fault zone. Farther in the fault is more distinct and dips at first less steeply than the incline, but at 75 feet becomes steeper. Farther in the coal becomes more continuous and is followed by the slowly flattening incline. A few slight rolls and swells are present in it, but at 350 feet from the head of the incline it shows as two solid, continuous seams. In the face of a short crosscut here on the west side of the incline the following section is exposed:

Top	Patches of coal in shale
	White clay seam
Top seam.....	3 ± feet coal
	2 to 3 feet grey shale
Bottom seam.....	3 + feet of coal, lower limit not exposed in face.
	Floor of crosscut grey shale a few feet back from the face.

At the time of the writer's visit neither the end of the old workings nor the limit of frost had been reached. Since the autumn Mr. Simpson writes that the main entry has been connected with the old prospect tunnel by

¹ McConnell, R. G.: Geol. Surv., Canada, Sum. Rept. 1901, pt. A, p. 45.

a crosscut 30 feet long, and that a crosscut has been driven to the east into the old workings at about 385 feet from the head of the entry. Recently the main entry has been continued and at 425 feet appears to be close to unfrozen ground, and the coal is much improved.

In October six samples were taken by Mr. Simpson and the analyses by the Fuel Testing Laboratories of the Bureau of Mines of the Department of Mines and Resources have given the following results:

Laboratory No.	18,595		18,600	
	As received	Dry basis	As received	Dry basis
Condition of sample				
Proximate analysis:				
Moisture..... %	31.1		30.7	
Ash..... %	13.1	19.0	9.6	13.9
Volatile matter..... %	25.4	36.9	28.1	40.5
Fixed carbon (by difference)..... %	30.4	44.1	31.6	45.6
Ultimate analysis:				
Sulphur..... %			0.5	0.8
Calorific value:				
Determined in B.T.U. per lb., gross.....			7,540	10,880
Coking properties.....		Both non-coking		
Softening temperature of ash..... °F.	2,060		1,940	

Remarks: 18,595—top seam; main entry; sta. 4 + 25
18,600—bottom seam; main entry; sta. 4 + 25

Laboratory No.	18,596		18,599	
	As received	Dry basis	As received	Dry basis
Condition of sample				
Proximate analysis:				
Moisture..... %	29.3		25.1	
Ash..... %	11.4	16.1	9.6	12.8
Volatile matter..... %	28.1	39.8	28.8	38.5
Fixed carbon (by difference)..... %	31.2	44.1	36.5	48.7
Ultimate analysis:				
Sulphur..... %	0.5	0.8	0.6	0.7
Calorific value:				
Determined in B.T.U. per lb., gross.....	7,430	10,510	8,150	10,880
Coking properties.....		Both non-coking		
Softening temperature of ash..... °F.	2,210		2,000	

Remarks: 18,596—bottom seam; east wall; main entry; sta. 3 + 00
18,599—lower seam coal, mined 9 months ago, left to weather in sacks

Laboratory No.	18,597		18,598	
Condition of sample	As received	Dry basis	As received	Dry basis
Proximate analysis:				
Moisture..... %	30.5		33.6	
Ash..... %	12.5	17.9	10.2	15.4
Volatile matter..... %	26.0	37.4	25.8	38.8
Fixed carbon (by difference)..... %	31.0	44.7	30.4	45.8
Ultimate analysis:				
Carbon..... %			41.9	63.1
Hydrogen..... %			7.1	5.0
Ash..... %			10.2	15.4
Sulphur..... %			0.5	0.8
Nitrogen..... %			1.4	2.1
Oxygen (by difference)..... %			38.9	13.6
Calorific value:				
Determined in B.T.U. per lb., gross.....			7,220	10,880
Coking properties.....				
Softening temperature of ash..... °F.	2,025	Both non-coking		2,010

Remarks: 18,597—top seam; west entry; face; 3 + 60
18,598—bottom seam; west entry; face; 3 + 60

RECENT PUBLICATIONS

The following is a list of recent reports and maps of Yukon. In many instances other reports and maps have been published covering some part or parts of the areas dealt with in those mentioned. References to them will be found in those given below, but many of the older reports are now out of print.

Whitehorse district—latitudes 60° to 61°, longitudes 134° to 136°.

Cockfield, W. E., and Bell, A. H.: Whitehorse District; Geol. Surv., Canada, Mem. 150 (1926). A description of the general geology and lode prospects, accompanied by a geological map, scale 4 miles to 1 inch, showing drainage only.

Teslin-Quiet Lake-Big Salmon area.

Preliminary report and map covering a stretch of country from latitude 62 degrees along the west face of Big Salmon Mountains southward to Teslin River as far as Teslin Lake and eastward to Quiet Lake.

Bostock, H. S.: Prospecting Possibilities of Teslin-Quiet Lake-Big Salmon Area; Geol. Surv., Canada, Paper 36-2, 1936. Mimeographed and accompanied by blue-print map.

Teslin-Quiet Lake area—latitudes 60° to 61°15', longitudes 132° to 134°.

Lees, E. J.: Geology of Teslin-Quiet Lake Area; Geol. Surv., Canada, Mem. 203 (1936). Describes the geology and lode and placer prospects. Accompanied by a map, scale 4 miles to 1 inch, 500-foot contour, and geology of part north of the north end of Teslin Lake.

Carmacks district—latitudes 62° to 63°, longitudes 136° to 138°.

Bostock, H. S.: Carmacks District; Geol. Surv., Canada, Mem. 189 (1936). General geology and prospecting. Accompanied by geological and topographical map, scale 4 miles to 1 inch, with 500-foot contour interval.

Freegold Mountain, Carmacks district.

A prospecting area 28 miles northwesterly from Carmacks. Johnston, J. R.: Geology and Mineral Deposits of Freegold Mountain, Carmacks District; Geol. Surv., Canada, Mem. 214 (1937).

Pelly River—Selkirk to Hoole Canyon.

For lower part, to longitude 136 degrees, *See* Carmacks District, Mem. 189. For area on each side of river, from longitude 136 degrees to Hoole Canyon, *See* Johnston, J. R.: A Reconnaissance of Pelly River between Macmillan River and Hoole Canyon, Yukon; Geol. Surv., Canada, Mem. 200 (1936). Description of general geology and accompanied by geological map, 8 miles to 1 inch, with topography shown by form lines.

Klondike and country stretching to Los Angeles and Rosebud Creeks.

Ogilvie sheet, latitudes 63° to 64°, longitudes 138° to 140°. Topographical map, scale 4 miles to 1 inch, 500-foot contours, now available. Geological map and memoir of same area in preparation.

Mayo district—latitudes 63° to 64°, longitudes 134° to 136°.

Topographical map, scale 4 miles to 1 inch, 500-foot contour. Preliminary blue-print copies now available.

In addition, the annual mining developments in Yukon are described in short annual reports as follows:

Mining Industry of Yukon:

1934; Geol. Surv., Canada, Mem. 178.

1935; Geol. Surv., Canada, Mem. 193.

1936; Geol. Surv., Canada, Mem. 209.



A. Grand Forks, Bonanza Creek; during the Klondike gold rush this place had a population of several thousand.



B. Ditch carrying water from South Klondike River to North Klondike River for the hydroelectric plant.



81599

A. Stripping muck, frozen peat, and silt off of placer gravel with an hydraulic monitor.



B. A barge on Stewart River loaded with more than 200 tons of ore and concentrates from the silver-lead mines of Mayo district.

