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MEMOIR 220

MINING INDUSTRY OF YUKON, 1938

BY

H. S. BOSTOCK

**GEOLOGICAL SURVEY
DEPARTMENT OF MINES AND RESOURCES
OTTAWA
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GEOLOGICAL SURVEY

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Mining Industry of Yukon, 1938

INTRODUCTION

Information for this report on mining activities in Yukon during 1938 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 visits were paid to the Klondike and Sixtymile districts, and in the course of the field work in Mayo map-area visits were paid to placer and lode properties in that district.

The spring was late and the summer dry and cold throughout the earlier part, but the weather became very warm in August and continued so causing a late and mild autumn. The weather was very helpful both in keeping the roads in good condition and in constructing new roads, but resulted in water shortage on the placer creeks and rather low water in the rivers in the latter part of the season. However, Stewart River maintained an unusually even, moderate level well into August, and by then the greater part of the silver-lead concentrates and ore from the Mayo district had been taken to the mouth of the river.

The more important mining events during the year were: an increase in gold production of over 50 per cent, by the Yukon Consolidated Gold Corporation from their gold placers in the Klondike district; the continued production of silver-lead at capacity scale in the Mayo district and, in the same district, the development of the Hector mine and acquisition of the Rio property by the Treadwell Yukon Corporation; and the acquisition of a number of properties in the Freegold Mountain area in Carmacks district by Mr. T. C. Richards of Whitehorse, and associates. At the end of the year a brick, 84 ounces in weight, of crude gold carrying 20 per cent silver was produced from Freegold Mountain ore. This was the first production from the area, and the first gold in many years produced from a lode gold property. During the first 3 months of 1939 approximately 250 ounces of fine gold has been produced by the mill in the Freegold Mountain area, and it is confidently expected that at least 300 to 400 ounces of gold a month will be recovered from May onwards. This development promises to make the Freegold Mountain area the third important producing area in Yukon, and to establish lode gold mining in the territory.

MINERAL PRODUCTION

In earlier years, placer gold production far outstripped everything else but 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 copper ore, said to run 46.40

per cent copper, was shipped.¹ Copper continued to be mined from this locality off and on until 1930. The production of the peak year, 1916, was 2,807,096 pounds of copper, worth \$763,586, and during the whole period of operation the total value of the copper from these mines was \$2,712,000. In 1906 veins carrying silver and lead were discovered in Mayo district,² 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 1938 is as follows:

Gold (placer gold, including a small amount recovered in refining the silver-lead ores).....	\$ 195,050,680
Silver (mainly from silver-lead ores).....	17,826,285
Lead (entirely from silver-lead ores).....	3,917,107
Copper	2,712,000
Total mineral production.....	\$ 219,506,072

These figures are mainly compiled from reports by the Bureau of Statistics, but for 1937 and in part for 1938 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, other metallic minerals, and coal 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 to 1937 Yukon produced approximately \$17,700,000 in gold and \$18,500,000 in silver and lead. In 1938 a considerable increase in the placer gold production took place and gold has again taken the lead.

The total mineral production for 1938 is estimated to be \$3,961,737, as follows:

Gold	\$ 2,550,680
Silver, estimated value.....	1,236,183
Lead from silver-lead ores.....	174,874
	<u>\$ 3,961,737</u>

Of the gold produced in 1938, 1,064.8 ounces are from the refining of the silver-lead ores. The total shows an increase of over \$177,000 above the figure for 1937 and is due to the considerable increase in production of the Yukon Consolidated Gold Corporation in the Klondike area and to the maintenance of the silver-lead production of the Treadwell Yukon Corporation in Mayo district, though this did drop nearly \$500,000.

No new discoveries were reported during the year but more veins were found in the Freegold Mountain property area near Carmacks, extending the area known to contain gold-bearing veins westward 3 or 4 miles.

¹ McConnell, R. G.: The Whitehorse Copper Belt, Yukon Territory; Geol. Surv., Canada, 1909, p. 2.
² Cairnes, D. D.: Geol. Surv., Canada, Sum. Rept. 1915, pt. A, p. 27.

PLACER MINING

During the 1938 season placer gold production from the smaller camps remained approximately the same as last year. A little more gold was turned in at Whitehorse and Mayo this year, but at Dawson the amount of gold turned in was 50 per cent greater than in 1937. The total production during 1938 was 89,128.57 crude ounces.

FORTYMILE RIVER

The dredging lease of the area above Fortymile River Canyon has been allowed to lapse. A few men prospected on Moose Creek, a tributary of Fortymile River, entering it from the south close to the 141st Meridian.

SIXTYMILE RIVER DISTRICT

The Holbrook Dredging Company continued to operate in Sixtymile Valley close to the west slope, and the dredge is now on claim No. 8 above Discovery. The dredge, which for many years was the only steam dredge in Yukon, was equipped with diesel power during 1937 and the change has proved to be a great improvement, except that as yet it has been necessary to run the dredge at somewhat less than capacity. A 125-horsepower diesel engine drives the bucket line and a similar engine supplies power for the pumps, etc. A thawing and hydraulic stripping plant with 600 thawing points is working ahead of the dredge. This is supplied with water by a pumping plant driven by an 84-horsepower diesel engine. The ground is 10 to 16 feet deep. A few feet of muck lies on top of the gravels. It is said to have been found easier to thaw the gravels with points before hydraulicking off the muck than after removing the muck, as is done in the Klondike district where the gravels are harder to thaw. A lease has been taken of ground along Sixtymile River for 5 miles above Miller Creek, and during the summer preparations were being made to drill this ground where it is thought a pay-streak that may carry sufficient values for dredging follows down the river valley from Bedrock Creek. The present dredging is said to show a pay-streak extending down stream from Miller Creek near the slope on the west side of the valley, and another more on the east side of the valley, which is thought to lead up to Bedrock Creek. These operations employed twenty-four or more men during the summer season.

On Miller Creek Messrs. McCormick and Stewart continued to work their ground. On claim No. 4 below Discovery on the north side of the creek a bank from 6 to 25 feet high was worked by hydraulicking.

Below the roadhouse on Miller Creek, in recent years a pay-streak under the bench on the north side has been followed down the valley by means of a number of shafts sunk at 300-foot intervals. At present work is being done on claim No. 29 below Discovery, where a shaft 110 feet deep to bedrock is being operated with a self dumper. Here the pay channel is from 50 to 100 feet wide. The shaft shows about 40 feet of muck, 10 feet of slide rock, and 60 feet of gravel. The gold is fairly fine and nuggets are scarce. It lies on the first 3 inches of gravel above bedrock, but in a few places has been found as high as 8 feet above bedrock.

This year 17,921 cubic yards of materials were taken from the underground workings and 22,853 cubic yards were worked in the hydraulic operation. Ten to fourteen men were employed during the season.

Five or six miners were working on their claims on Miller and Glacier Creeks.

During the year prospecting leases were located on Little Gold Creek and were transferred to the North American Mines Company, who operated a dredge on Jack Wade Creek in the adjoining district in Alaska. It is reported that this company plans to carry on a drilling program in the district in search for a dredging area.

KLONDIKE DISTRICT

The Yukon Consolidated Gold Corporation since 1932 has reorganized and developed its operations year by year, and has now increased its production very considerably. Four of the five dredges operating in 1932 have been reconditioned, five other dredges have been built, dredge Yukon No. 11 is in the process of construction, a third unit has been added to the hydroelectric power plant, 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 was carried on until the end of 1937, and as a result the corporation has today approximately 92,000,000 cubic yards of proved gravel reserves, believed to contain over \$40,000,000 in gold. From 1933 to 1938, inclusive, more than 32,500,000 cubic yards were dredged.

During 1938 the corporation continued to expand their operations, and altogether spent approximately \$2,500,000. The operations of the corporation embrace a number of different enterprises, including generation of power, 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 in lower Bonanza Creek, Klondike River, and lower Hunker Creek. For these dredges no preparatory stripping and thawing of the ground is being done except at the Arlington area, close to the mouth of Hunker Creek, where a thawing plant was operated. The power for the operations comes from the corporation's hydroelectric plant in Klondike Valley. For this plant water is brought from North Fork Klondike River by a canal approximately 6 miles long, and when the supply in the North Fork is not enough additional water is brought from the South Fork Klondike River from a point 14 miles above the junction. During 1938 additional gravel reinforcement was placed on the south banks of the canals and parts of the intake gate and their houses completed and repaired. The gate houses are insulated and electrically heated to enable them to be used at extremely low temperatures. The towers of the cable ferry by which Klondike River is crossed to reach the power plant were rebuilt. Extensive maintenance work was done on the 33,000-volt transmission lines and the

Dawson telephone line was extended from the Upper Dominion camp to the camp at Middle Dominion, a distance of $7\frac{1}{2}$ miles. A sub-station and secondary power lines were constructed for the Middle Hunker area.

Sufficient reserves for the dredges for their estimated lives have been proved and, therefore, prospect drilling was not continued in 1938.

Hydraulic stripping to remove the muck, frozen peat, and silt, and to facilitate thawing and dredging was continued on the seven dredging areas on the Indian River side of the district, and a new stripping plant was constructed and operated on Middle Hunker area. These plants operated from early May to October, and a total of 2,818,268 cubic yards were removed. Some stripping was also done on Upper Dominion ground. In nearly all the plants the water of the local streams is used over and over again, being filtered and pumped back to the stripping plant. On Middle and Lower Sulphur areas the supply from Sulphur Creek is supplemented by water brought by ditch and siphon from Australia Creek. This water was used at the Lower Sulphur stripping plant all season and for part of the season at the Middle Sulphur plant when the pressure was increased by pumps.

The thawing plants on the Arlington area on Hunker Creek, on Upper, Middle, and Lower Dominion areas, and on Middle and Lower Sulphur areas were operated, and in addition new thawing plants were installed and operated on the Upper Sulphur and Quartz areas. The water for these plants is obtained from the local creeks; the pressure is provided and recirculation is maintained by electric pumps. A total of 4,140,821 cubic yards was thawed, and most of the plants operated from early in May to the third week of September.

During the season nine dredges were operated. A tenth dredge was partly constructed.

Yukon No. 1 dredge, stationed in Upper Dominion area, was delayed a short time in the early part of the season by ice, and in June progress was slower than had been expected due to the cold weather. However, by October 2, when digging stopped, all prepared ground had been dug and the dredge was abandoned, after being completely dismantled. This dredge was constructed in 1905, was moved to new dredging areas twice, and has been operated every season since being built. Like the other dredges in the district her hull was wooden. In 1938 operations began on May 12 and ceased October 2, after digging 268,123 cubic yards.

Yukon No. 2 dredge operates on the Klondike flats on the north side of the river below Bear Creek. The ground is naturally thawed and the dredge is reported to have done surprisingly well this season. Digging began on April 29 and ended December 24, a total of 207,824 cubic yards being handled.

Yukon No. 3 dredge has worked up Bonanza Creek to the hydraulic tailing of Lovett Gulch and is dredging these tailings. In August, when the dredge was visited, the bank of tailings on the upstream side of the dredge was nearly 30 feet high in places, and the stacker was raised to its maximum height in order to dispose of the tailings. Most of the ground being dredged has already been worked by hand and by small dredges, but Yukon No. 3 is able to dig much deeper and despite the previous working of the ground is doing well indeed. Some small areas of virgin ground

remain here and there in the worked areas, and from them over 100 ounces a day was recovered for over a week at a time. The dredge was said to be digging 10 feet of bedrock with very good results. The success of the operation on Bonanza Creek has been largely due to the well thawed state of the old tailings and bedrock in most of the area dug. The dredge started digging on April 29 and ended on December 9 after handling 2,045,872 cubic yards.

Yukon No. 4 dredge is now on the right limit of Hunker Creek at the mouth of the valley on the Arlington area. In the early part of the season much trouble was caused by frozen ground, due in part to the fact that freezing during the winter extended deeper than usual and in part to the late cold spring. As a result, in some good sections of ground a depth only sufficient to float the dredge was dug this season. This resulted in poor recoveries for part of the season, but when thawed ground was reached the dredge is reported to have made very good recoveries. The area only partly worked will be re-dredged later. Digging began on May 3 and ended December 26, when 1,756,372 cubic yards had been handled.

Yukon No. 5 dredge is operating in the middle of Dominion Creek Valley about half a mile above the mouth of Sulphur Creek Valley. The dredge dug 798,890 cubic yards between April 27 and November 21.

Yukon No. 6 dredge is on the left limit of Sulphur Creek at the mouth of the valley. Digging began on April 28 and ceased on November 9 after 708,768 cubic yards had been handled.

Yukon No. 7 dredge on Quartz Creek was digging downstream in 1937 and has now turned upstream. During the season from April 21 to November 19 she dug 389,936 cubic yards.

The building of Yukon No. 8 dredge, on the Middle Sulphur area, was completed during the early spring and dredging commenced on May 28. The hull of this dredge is rather shorter than the older ones of its size, and is 50 feet wide with nearly 3 feet freeboard. Dredging started on claim 49 below Discovery, where the valley bottom has been stripped and thawed over a length of several thousand feet downstream. The dredge will dig downstream leaving a strip 125 feet wide on the right or southwest side and will then work upstream to claim 27 below Discovery. During the season, which lasted from May 28 until November 5, the dredge handled 455,453 cubic yards.

Yukon No. 9 dredge, on the Upper Sulphur area, was constructed during the summer and started operating on September 15, continued to dig until November 5, and during this time 55,414 cubic yards were handled. This dredge is close to Discovery claim and will dig downstream to claim 27 below Discovery.

In early autumn the construction of Yukon No. 10 dredge was commenced on claim No. 17 below Discovery, in the Middle Dominion area. This dredge will be completed early in 1939. A large area of stripped and thawed ground has been prepared for it and it will work upstream to claim 11 below lower Discovery where Yukon No. 1 dredge 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.

In 1938 the nine dredges handled 8,550,652 cubic yards of gravel, which yielded 60,055·77 ounces of fine gold and 14,411·98 ounces of fine silver. The volume of gravel handled was greater than that of 1937 by slightly over 1,100,000 cubic yards, but gold production was nearly 50 per cent greater. The greatly increased gold production is said to be due partly to Yukon No. 4 dredge having reached the pay ground toward which the dredge has been digging during the last two seasons, and partly to the higher grade of the ground handled on Dominion, Sulphur, and Quartz Creeks, and which now supplies a greater percentage of the total than formerly.

In 1938 a camp to accommodate twenty-five men was built on the Middle Hunker area opposite claim 60 below Discovery. The Sulphur Creek end of the Sulphur-Australia ditch was completed, including the finishing of approximately 6 miles of ditch, the construction of an inverted siphon of steel pipe across Dominion Creek Valley, and a pumping station at the end of the siphon to boost the water another 285 feet up the valley side to the ditch. A considerable amount of road maintenance work was carried on during the year, which consisted principally of re-locating and surfacing with gravel the Quartz Creek road and that between Quartz Creek and the Hunker summit.

The corporation employed an average of 104 employees from January 1 to March 31, 606 from April 1 to October 31, and 262 from November 1 to December 31. A total of \$1,071,000 was expended for salaries, wages, and power.

A few miners continue to work on Bonanza, Hunker, Dominion, Quartz, and Eureka Creeks.

MAYO DISTRICT

In Mayo district the placer gold production has come from Hight, Ledge, Steep, Owl, Haggart, Davidson, and Duncan Creeks, and Thunder and Dublin Gulches.

Hight Creek, a tributary of Minto Creek, has been worked by Mr. E. Middlecoff for nearly 30 years. His camp is now about 100 yards below the dredge and 11½ miles from Minto Bridge. A wagon road extends up the north side of Minto Creek and turns up Hight Creek. During this summer the road was unusually dry and a truck was taken to Mr. Middlecoff's camp. Since 1932, when the writer visited the creek, the camp has been moved to its present position from a point a little over a mile upstream. The former site of the camp has been worked and the workings are progressing downstream. At present an area three-quarters of a mile above the camp on the right limit is being worked and preparations were in progress to work ground close to the camp above the dredge. The ground is being cleared and a drain has been put in through the dredge tailings. Mr. Middlecoff continues to use a method devised by him¹, by which the gravels are forced by a jet of water into and up an inclined box whose bottom is a grating through which the gold and fine materials fall into the sluice-boxes. This method has proved successful at this locality where a great head of water is available, but it is admitted that the

¹ Bostock, H S.: Geol. Surv., Canada, Sum. Rept. 1932, pt. A II, p. 5.

percentage of gold lost is probably high. Mr. Middlecoff employs a crew of eight men.

A little over 2 miles below Mr. Middlecoff's camp, at the lower end of the canyon on Hight Creek, Messrs. Harvey and Irvine Ray have been working a hydraulic cut in a bench of silts. The bench is approximately 150 feet high and appears to fill a former channel of Hight Creek, which now flows through a rock canyon southwest of it. The hydraulic cut shows a section consisting of about 75 feet of silts, horizontally bedded with cemented seams in places. Below the silts are some 25 feet of poorly bedded, typical stream gravels resting on bedrock. In the upper part the pebbles are about 1 inch long, but in the lower part are larger and vary in size up to 2 inches long. At the base a layer of gravel about 2 feet thick lying on bedrock contains no gold. Most of the gold is in a 3-foot layer overlying the barren layer. The bedrock surface slopes northeast away from the canyon. There is no sign of glacial boulder clay and it is thought that only the lower part of Hight Creek was occupied by ice, which moving west up Minto Creek pushed into the mouth of Hight Creek Valley damming it and causing it to be filled with stream gravels and silts washed into it by ice margin streams. With one monitor and a head of over 90 feet, a method of working the gravels is employed similar to that developed by Mr. Middlecoff. Messrs. Ray have been working here for three seasons and report that they have obtained very satisfactory returns.

On Haggart Creek Mr. George F. Potter and associates hauled by tractor and wagons a considerable amount of equipment and supplies to a point about 2 miles above the mouth of Lynx Creek. Here, in the early part of the season, several hundred feet of ditch was repaired and built, and a large flume and sluice-box was constructed on a trestle into which the gravels from a low bench on either side of the flume were to be hoisted. In the middle of the season the work was closed down. In Dublin Gulch Mr. Fred Taylor, with two other miners, worked a cut in the southeast bank of the creek. The gravels are about 10 to 15 feet thick. The pay gravel is reported to form a broad channel and a cut 60 feet wide is being worked upstream by laying the sluice-boxes in the form of an L. The gold is distributed throughout the gravel to within a few feet of the surface with little or no concentration on bedrock. A moderate number of boulders are encountered and are moved by derrick. A layer of compact, angular fragments of local bedrock cemented with a hard, sticky clay lies on bedrock and seems to act as a false bedrock. Mr. Taylor reports that in 1937 with the assistance of one other miner he worked 4,000 cubic yards of ground yielding approximately 100 ounces of gold and several hundred pounds of scheelite. In 1938 approximately 5,500 cubic yards were worked, yielding 140 ounces of gold and a corresponding amount of scheelite. No market has yet been found for the scheelite.

Owl Creek, a tributary of Mayo Lake, has been prospected by Mr. Hester at intervals during the past 20 years. In the summer of 1938 he was working a cut on the west side of the creek just below where the creek leaves its narrow valley and enters that of Mayo Lake about three-quarters of a mile from the lake shore. The cut exposes at the top glacial drift with large boulders and underneath 2 to 3 feet of gravels resting on bedrock. The gold is very coarse and the particles are flat with rounded edges.

Several old dams, adits, and cuts have been made in the lower part of the creek valley 1 to 1½ miles from the lake and a few old dams are scattered along the creek up to a point 2½ miles from the lake.

During the last few years some work has been done by Mr. McCowan on Anderson Creek, but no work was in progress when it was visited in 1938.

Mr. Gagnon has continued to work on Steep Creek and Mr. and Mrs. George Reynolds on Ledge Creek. Ledge Creek of all the creeks running into Mayo Lake is the one on which work has been most nearly continuous. Most of the gold has come from the lower part of the creek just above where it leaves its deep, narrow valley and flows into the lake. This lower part of the creek has been worked practically continuously for three-quarters of a mile. Mr. Reynolds is working just below the fork of the creek and there is little sign of much work having been done above this point, although there are some old cabins above the forks. The cut made by Mr. Reynolds shows grey, muddy, boulder-bearing gravel, probably of glacial origin, overlying 10 feet of very hard, tightly packed, rusty gravel or conglomerate composed of fragments of rock of local origin. This material lies on a bedrock (schist and diorite dykes) and carries coarse gold with some nuggets.

Five miners were working during the 1938 season on Davidson Creek. Mr. J. Ross, and his son, were working in the canyon about a mile above where the valley broadens, and Messrs. S. Hardy and D. Ferguson half a mile farther up. These miners have worked here for several years. A few other miners have worked on the creek from time to time in recent years. The placers are in a canyon cut partly in glacial drift and partly in bedrock. The gold is in patches, generally in the creek bed among boulders. A hard layer of boulders and clay 2 to 4 feet thick on bedrock is impervious to the gold and acts as bedrock. Some parts of the canyon show practically no work and the distribution of the workings suggests that the gold has been found in the creek where it cuts across or coincides with an old channel.

In the last few years one or two miners have been working on Duncan Creek from time to time, but recently no steady work has been done. One miner has recovered a little gold from Thunder Gulch, a tributary of Lightning Creek.

OTHER DISTRICTS IN CENTRAL YUKON

On Black Hills Creek, Mr. J. H. Carpenter worked throughout the summer by himself and recovered 23 ounces of crude gold. He reports that he now has two men with him and that they are working in good pay on claim No. 1 above Discovery. Some of the ground that had been allowed to lapse on the creek has recently been taken up again.

No work has been done on Allgold or Goldbottom Creeks. It had been proposed to prospect these creeks using drills, but the options have been dropped.

On Clear Creek the Dumont brothers continued to do work and are reported to be obtaining very satisfactory results. Mr. E. N. Patty, manager for General A. D. McRae of Vancouver, is reported to have carried out some drilling during the season on their ground.

During the latter part of the season a number of miners worked on the bars of Stewart River.

South of Stewart River placer miners have been working on a number of streams, including Brewer, Barker, Scroggie, Thistle, Kirkman, and Britannia Creeks and Selwyn River. No news has been received of work having been done this year on Nansen and Victoria Creeks, where during the last few years two or three miners have been operating. Three miners worked on Brewer Creek, three on Scroggie Creek, one on Barker Creek, and two or three on Thistle Creek. Mr. J. Britton continued work on Kirkman Creek. Messrs. J. Meloy and H. Colley have taken up ground on Britannia Creek. Some work has been in progress on the east fork of Selwyn River testing the ground for a placer development of some size. Some small placer operations, the most notable being those of Klines Gulch, have been carried on in this section from time to time since 1898, but though coarse gold has been found the working of the ground has nearly always presented difficulties, generally due to boulders or lack of frost in winter leading to flooding.

On Seymour Creek, on the south side of Freegold Mountain, Mr. P. F. Guder has been prospecting for placer and has found an old placer channel on a bedrock bench about 20 feet above the present water-level.

SOUTHERN DISTRICTS

Little information is available about placer mining in southern Yukon. The workings are scattered on many widely separated creeks from west of Kluane Lake to the headwaters of Liard River. Many of the creeks are only worked intermittently by solitary miners.

In the Teslin-Big Salmon district, a number of men are working in the creeks of Livingstone Camp; the work is being done chiefly on Cotteneva, Lake, and Summit Creeks. Two men are reported to be prospecting for placer in the vicinity of Rainbow Creek on Liard River. Others are reported in the neighbourhood of Victoria Creek in the Dezadeash country and others in the Jarvis River country and on Squaw Creek. These small scattered placer operations have produced the greater part of the total of 731·85 crude ounces of gold turned in this year at Whitehorse.

PRODUCTION

The total placer gold production in Yukon for 1938 was 89,128·57 crude ounces, which was 30,779·87 crude ounces more than last year. There was a slight increase over 1937 in the amounts turned in at both Mayo, 775·85 crude ounces, and Whitehorse, 731·85 crude ounces, but the increase is mainly due to the production of the Yukon Consolidated Gold Corporation, which rose from 36,849·65 ounces of fine gold in 1937 to 60,055·77 ounces for 1938.

LODE MINING

As already mentioned, the beginning of production from Freegold Mountain area in Carmacks district was the most interesting new development of the year in lode mining. During the year, 62 claims were staked, most of them being on Galena Hill. At the end of the year there were 530 quartz (lode) claims in good standing.

Production from the mines on Galena Hill in Mayo district continued steadily and a large tonnage of ore was treated in the mill of the Treadwell Yukon Corporation, Limited, at the Elsa mine. A few small operators also shipped silver-lead ore from that district. Some lode prospecting was carried on by individuals in other districts, but no new developments were reported.

During the summer of 1938 the shipments of galena ore and concentrates from Mayo district were as follows:

	Wet Tons
Treadwell Yukon Corporation, Limited.....	9,350·88
Messrs. Bermingham and Settlemier.....	128·06
Messrs. Formo and Carthum.....	20·35
Mr. E. Bjønnes.....	17·87
	<hr/>
Total	9,517·16

The total shipment was only 223 tons short of that of the record year, 1930, when approximately 9,740 tons were shipped.

The improvement in economy and speed in transporting ore and concentrates to Mayo during the last 20 years is interesting to note. The first ore is said to have been brought to Mayo from Keno Hill by pack-horses taking several days. Later it was brought by teams and wagons and sleighs, a saving in cost if not in time. Later still tractors were employed, hauling several wagons or sleighs carrying perhaps as much as 70 tons in winter while the ground was frozen, but the journey to Mayo still required several days. Steadily the roads were improved, and about 1930, 10-ton gasoline trucks were introduced by the Treadwell Yukon Corporation for summer haulage. These made the round trip between Mayo and the mining camps in one day. As the roads continued to be improved the trucks were used longer and longer each year until by 1937 the period during which they could not be used was only a few weeks. Early in the summer of 1938 a 12-ton diesel truck was brought to Mayo, and it is reported that the cost in fuel and lubricating oil for the round trip from Mayo to the Elsa mill is approximately one-third of that for the 10-ton gasoline trucks. During 1938 a new all year road was completed from Mayo to the Silver King mine and thence connecting with the Elsa camp. The route followed by this road has been well laid out and not only is the journey from the Elsa camp to Mayo reduced from 36 miles to 29 miles, but a climb of 800 feet over the summit between Flat Creek and Duncan Creek has been eliminated.

KLONDIKE DISTRICT

Some surface prospecting is reported to have been continued by the owners this year on 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."¹

¹ Geol. Surv., Canada, Mem. 193, p. 7 (1936).

MAYO DISTRICT

During the year there was some prospecting for silver-lead deposits on Galena, Keno, and Bunker Hills and in some neighbouring areas. There was also a little prospecting for lode gold in an area near the head of Hight Creek. The Treadwell Yukon Corporation, Limited, continued their operations on Galena Hill, including the Silver King, Elsa, and Hector mines. The "Rio" group of mineral claims of Mr. W. C. Sime of Keno was optioned in September by the corporation. Three small operators made shipments of high grade silver-lead ore.

Galena Hill

Mining operations in the Silver King mine were continued by Treadwell Yukon Corporation, Limited. Development work on the 300-foot level was continued and a raise was put up following a shoot of good ore. The drifts have now connected with the old prospect workings of Mr. Aitkin on the east side of the mine. In all, 820 feet of drifts and raises were put in. About two-thirds of the ore mined by the corporation during the year came from this mine and the remaining third from the Elsa mine. In the Elsa mine a branch vein extending to the northeast of the original Elsa vein has been developed on the 400-foot level. The workings on the 200-foot level have been extended so as to pass under Porcupine Creek on the east end of the property. In all, some 2,036 feet of development work, mainly drifting, was done in this mine. The work done in the Silver King and Elsa mines was for the purpose of delimiting the ore-bodies already known. At the Hector mine the adit started in 1937 has been extended to the vein, which it intersected approximately 2,000 feet from the portal and 400 feet below the surface. Drifts are being extended along the vein and raises put up towards the prospect workings above. In all, some 1,673 feet of drift and raise were put in this year on the Hector. No work was started on the Rio group by the corporation. The group is on the east face of Galena Hill at an elevation of approximately 3,800 feet.

During the summer and autumn an aerial tramway 14,000 feet long, with terminal buildings and having a difference in elevation of 1,337 feet between terminals, was built between the Elsa mill and the portal of the Hector adit. This tramway will carry the ore from the Hector and nearby properties to the Elsa mill. At the portal of the Hector adit a camp has been built, including a new compressor house with compressor and 120-horsepower diesel engine, and a water tank. At the Elsa a large addition was made to the machine shop, including a welding shop. A new steel-sharpening shop was built where the steel will be sharpened for all the corporation's properties on Galena Hill. A large garage has also been erected. Six new flotation cells were added in the mill during the latter part of the year to improve the recovery and concentration ratio. The road between the Elsa and Silver King mines was gravelled. It is interesting to note here that this year a school was built at the Elsa camp and that there were sixteen pupils when it opened in the autumn. A hockey rink and recreation hall have also been established at the camp.

The total tonnage mined in 1938 by the Treadwell Yukon Corporation, Limited, was 60,240 tons, of which 759 tons were shipped as crude high

grade ore and 59,090 tons were concentrated in the Elsa mill, yielding 5,988.12 tons of dry concentrates, 200 tons less than in 1937. The total production of ore and concentrates from the mines was 6,747.39 tons, containing 3,061,763 ounces of silver and 4,075,424 pounds of lead, but not all this ore has left Mayo yet. The mill operated 95.3 per cent of the year and treated 162 tons each 24 hours. On account of the oxidized condition of the ore, most of which came from near the surface in the Silver King mine, the recovery of silver was low. During the summer the corporation shipped to the smelter in Idaho 5,410 tons of concentrates and 2,702.6 tons of crude high grade ore, of which more than 2,000 tons were from the Hector mine and had been produced in 1937. The total shipment of 8,112.6 tons yielded 1,064.816 ounces of gold, 2,872,824.7 ounces of silver, and 5,365,686 pounds of lead, having a gross value of \$1,533,912.31. At the close of navigation 1,370.7 dry tons of ore remained on the river bank at Mayo for shipping in 1939. During 1938 a total of 235 men were on the pay-roll and an average of 179 men a day were employed throughout the year.

On the Arctic group of Messrs. Bermingham and Settlemier, Mr. Bermingham reports that he carried out some development and mining. In July, August, and September 200 tons of ore were sacked that is stated to average 200 ounces of silver a ton and 60 per cent lead. This ore was obtained from a new ore-body developed by following a stringer exposed in the wall of the shaft 24 feet from the surface. The vein was drifted on for 70 feet and about 200 tons of ore remains in this section. Some 600 tons have been developed on the lower level. The work this summer proved that the zone carrying the shoots of ore is considerably wider than 30 feet and the foot-wall has not yet been reached. There is a considerable tonnage of low grade ore in the dump and also underground. Fifty samples taken from the dump by driving a 2-inch pipe into it to depths of 10 to 12 feet, averaged 100 ounces of silver a ton. One hundred and twenty-eight wet tons of high grade ore were shipped from Mayo during the summer.

A number of groups of claims stretching over the northwest and northeast parts of Galena Hill, along the belt that contains the Treadwell Yukon Corporation properties, show veins similar to those that have developed in the mines. Prospecting is continued each year on these properties, and the number of known veins and the knowledge of their extent have steadily increased. Mr. W. Jeffreys has been prospecting a vein on his claims lying between the Silver King mine and Elsa mine. Farther eastward between the Elsa and Hector mines are the No Cash, Arctic, and other properties. The Arctic group has already been mentioned. In the past a considerable tonnage of ore was shipped from the No Cash property, and on it there is a large dump of milling ore. At present no work is in progress on the No Cash, but the Treadwell Yukon Corporation's aerial tramway between the Hector and Elsa mines runs across the property and it is reported that milling ore at the No Cash will be put through the Elsa mill. East of the Hector mine, between it and the Rio group, two veins have been traced by trenches and shallow shafts for over 1,000 feet, though no areas of mineralization rich enough to constitute ore have yet been found. On McAngus McLeod's group, close to the west side of the Rio group, a vein carrying high grade galena

has been prospected during the last few years. It is reported that the Rio group has been taken over by California interests. North of the Rio group, at an elevation of 3,650 feet on the Happy mineral claim, Mr. J. Sugiyama has exposed two veins in shafts. In 1937 he shipped 25 tons to the smelter at Trail, B.C. This year his work has been confined to prospecting, and some good galena ore has been discovered. Nearby Messrs. V. Grant and C. Brefalt have uncovered two veins reported to carry high grade ore.

Keno Hill

Little new work has been done on Keno Hill during the last few years but many promising properties, some partly developed, are being held awaiting a revival of interest in the district. Each year a little prospecting is done and assessment work is done on many of the claims. During the year Messrs. Formo and Carthum produced and shipped 20 tons of high grade ore from the Shamrock group. Near Wernecke, Mr. Clarke has exposed a small vein on the Sherril mineral claim. On the southwest side of the hill, south of Crystal Creek, Messrs. Corp and Ryon have exposed a number of veins by means of trenches and shafts. The veins contain mineralization like that of the productive properties, but as yet no parts rich enough to make ore have been found.

Bunker Hill

On Bunker Hill, which stands on the south side of Lightning Creek opposite Keno Hill, Mr. G. Andison and associates have been prospecting a group of claims, and he reports that some years ago a few tons of galena ore running 200 ounces of silver to the ton were shipped from the property, and that there is a good showing of galena ore believed to be a good mill ore. Some float found on the property carries over 7,000 ounces of silver to the ton and the recent work has been done in an endeavour to find its place of origin. The property is close to 4,000 feet above sea-level. A trail to it leads from the Lightning Creek road.

Highet Creek

In the areas around the head of Highet Creek, lode prospects have been known for many years. Here Mr. R. Rasmussen has a group of claims on which he has exposed a number of veins. Quartz is the chief vein material. Stibnite, arsenopyrite, and pyrite are present in many of the veins, and in one tetrahedrite and galena are also present. Assays are reported to have yielded values up to \$20 a ton in gold. As yet the group is in the initial stage of prospecting, the veins being exposed by shallow trenches and side hill cuts. The area is $\frac{1}{2}$ mile to 1 mile south of a body of granodiorite and contains many quartz porphyry and granite porphyry dykes. Highet Creek is the most important gold placer creek in the district, and gold placer deposits were also found in Johnson Creek, which runs northwesterly from this area. It is interesting to note that the placer deposit of Johnson Creek is reported to carry much scheelite and that a vein carrying scheelite is said to have been found on the ridge to the north of this creek. The area is reached from the road up Highet Creek.

CARMACKS DISTRICT

*Freegold Mountain Area*¹

Lode gold deposits were discovered in Freegold Mountain area by Mr. P. F. Guder in 1930. Mr. Guder's discovery was followed by a stampede and much staking, and during the next 2 or 3 years prospecting resulted in the discovery of many metalliferous deposits of various types. Many of the prospects had promising showings with gold values, and on the Laforma group of Mr. W. J. Langham and his associates a vein of considerable length carried particularly high gold values. In 1934 the N. A. Timmins Corporation acquired the Laforma group and at once began operations.

During the winter of 1934-35 the corporation built a winter tractor road into the locality and began underground development on the Laforma group. In the summer of 1935, however, the corporation dropped its holdings, which were taken over almost immediately by the Yukon Consolidated Gold Corporation. Throughout the winter of 1935-36 this corporation continued the development of the Laforma group, but in May 1936 dropped its option and withdrew from the area. The following winter funds were raised by some of the owners and associates to develop the Brown Fairclough group adjacent to the Laforma group, and a 10-ton mill was built on it but was closed down after running for a few days only. In the summers of 1936 and 1937 interest in the area in general decreased and many claims were allowed to lapse. A few prospectors remained in the area and continued to find over a widening area new showings yielding gold values.

The following account of present conditions is based on information received from operators and prospectors in the area.

In the summer of 1937 Mr. Teare, prospecting on Caribou Creek, a southern tributary of Seymour Creek, found a boulder of vein quartz in which free gold was visible. Later a showing of numerous, closely spaced, small stringers of similar quartz, believed to be the source of the rich quartz was discovered and staked by Mr. Teare.

In 1938 Messrs. T. C. Richards and E. F. Keobke of Whitehorse secured from Mr. W. Teare and his partner Mr. C. Miller an option on the Caribou Creek property and installed a 2-ton Straub mill. An aerial cableway approximately 350 feet long was built from the vein showing to the mill where the ore was crushed and treated by amalgamation. The power for the plant was supplied by two gasoline engines. The ore was mined from an open-cut. From 14 tons of ore milled a brick of 84 ounces of crude gold carrying 20 per cent silver was made. This is said to be the first gold brick made from a lode gold deposit in the southern part of Yukon. The 14 tons mined represented most of the high grade ore in sight, and winter coming on it was decided to cease mining. During the winter of 1938-39 Messrs. Teare and Miller continued to

¹ Bostock, H. S.: "The Mining Industry of Yukon, 1931"; Geol. Surv., Canada, Sum. Rept. 1931, pt. A, and for subsequent years to 1933: Sum. Rept. 1932, pt. A, Sum. Rept. 1933, pt. A. For the years 1934 to 1937: Mems. 178, 193, 209, 218.

Bostock, H. S.: "Carmacks District, Yukon"; Geol. Surv., Canada, Mem. 189 (1936).

Johnston, J. R.: "Geology and Mineral Deposits of Freegold Mountain, Carmacks District, Yukon"; Geol. Surv., Canada, Mem. 214 (1937).

prospect the property and are reported to have found a fault crossing the vein. Above the fault the system of quartz stringers is about 2 feet wide but below the fault the vein has not yet been found.

Soon after bonding the property on Caribou Creek Messrs. Richards and Keobke took over the Laforma group and purchased the mill of the Yukon Gold Mining Syndicate that had been erected on the Brown Fairclough group. In November 1938, the rebuilding of the mill at a new site was begun and on January 16 operation of the mill began. A few additional pieces of machinery were added to the mill during reconstruction. The free gold is extracted by amalgamation and the sulphides concentrated by jigging and flotation. To February 28, 1939, the mill worked 33 shifts or eleven 24-hour days and produced a brick of crude gold weighing 143 ounces and containing 8 per cent silver, 2 per cent base metals, and 128 ounces of fine gold. In addition to the brick 6 tons of concentrates were produced and shipped to the Tacoma smelter. The brick and concentrates were made from 112 tons of ore, which averaged close to 2 ounces of gold a ton but there was a loss of 0.25 ounce a ton in the tailings. To improve the recovery a six-cell flotation unit was installed in March. During 10 days' run in March there was produced a brick of 88.85 ounces of crude gold and 3 tons of concentrates containing approximately 30 ounces of gold a ton. The chief reason that the mill was not run longer during the first 3 months was a shortage of water, the autumn of 1938 having been dry and mild. It is expected that in 1939 there will be sufficient water to enable the mill to be run steadily. The terms of the option on the property secured by Messrs. Richards and Keobke call for the instalment of a 25-ton mill by September 1, 1939.

The mine workings are in the steep south face of Freegold Mountain. The vein is exposed in open-cuts, adits, and raises. The adits and raises between the 300-foot and 600-foot levels develop sufficient ore of the same grade as that already put through the mill to keep the mill running steadily for over a year, even when enlarged to 25-ton capacity. The ore in this section varies from 26 to 66 inches in width and samples run from 0.80 ounce to 2.20 ounces of gold a ton. Other parts of the workings show the presence of other ore-bodies of equal grade, but their extent is not known. Fifteen to twenty men have been employed on the properties in this area under Mr. Richards' management during the winter.

During the year Mr. Guder continued to prospect and reports that he has found some large gold-bearing veins west of Bow Creek.

WHITEHORSE DISTRICT

In Whitehorse district some lode prospecting has been done in the Wheaton River area. Mr. J. O. Stenbraten continued the prospecting of the Combination group on Mount Reid, 36 miles by road and trail from Robinson station. He has put in some open-cuts and trenches, but reports no new finds.¹ The Mascot group,² owned by Messrs. M. Watson and E. Johnson, is on the west of Mount Reid at an elevation of approximately

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

Bostock, H. S.: "Mining Industry of Yukon, 1937"; Geol. Surv., Canada, Mem. 218, p. 12 (1938).

² Cockfield, W. E.: Geol. Surv., Canada, Sum. Rept. 1922, pt. A, pp. 5-7.

Cockfield, W. E., and Bell, A. H.: "Whitehorse District, Yukon"; Geol. Surv., Canada, Mem. 150, p. 44 (1926).

4,500 feet. Mascot Creek, a tributary of Watson River, runs across the group, and it may be reached either from Watson or Wheaton River Valleys. On the group a vein has been exposed by trenches and a 200-foot adit for a length of nearly 2,000 feet. Twenty-five assays made from samples taken in 1934 by Mr. D. W. M. Ross from thirteen trenches along this distance average 0.344 ounce of gold and 8.36 ounces of silver a ton over an average width of 2.1 feet. The lowest assay was 0.04 ounce of gold a ton and the highest 0.88 ounce. Fourteen samples were taken in 1916 by Mr. R. Small; the lowest assay value was a trace and the highest 1.86 ounce of gold a ton.

In September a visit was paid by the writer to the Hidden Ore group of Messrs. T. Brooks and M. Watson of Carcross, where Mr. Brooks has been prospecting for some years. This group adjoins the upper side of the Midnight group,¹ on the southeastern face of Stevens Mountain overlooking Wheaton River Valley about 8 miles from Lake Bennett, from which it is reached by a good trail but on the way the river must be forded. The group lies close to the contact of a large mass of granodiorite, which forms the base of the mountain and also outcrops in its western side. Schists intruded by the granodiorite are cut by numerous dykes of granite porphyry and quartz porphyry. These dykes are much fractured, altered, and silicified, so that in places they are like breccias in which the fragments are cemented together by quartz, which commonly forms a network of veins $\frac{1}{4}$ inch to 2 inches wide. The quartz is accompanied by native gold, galena, pyrite, and, in places, sphalerite and chalcopyrite. Workings exposing dykes exhibiting this brecciation and mineralization and containing native gold are distributed from the summit of the ridge, at an elevation close to 5,500 feet, down to below 2,600 feet on the Hidden Ore and Midnight groups, and on other claims owned by Mr. Brooks and lying below the Midnight group. The workings on the Hidden Ore group are side hill cuts and trenches concentrated near the top of the ridge. They expose parts of dykes in which the silicification and mineralization form a large part of the rock, and in several of the workings specks of native gold were seen. The gold seen was in the quartz or in cubical cavities with limonite. Some good assays are reported from these workings, but much sampling would be required to determine if workable ore-bodies are present.

COAL MINING

A few hundred tons of coal were mined from the Tantalus Butte mine and shipped to Dawson in 1938. As this gave the city an ample supply no work was done on Rock Creek coal mine² during the winter.

¹ Cookfield, W. E.: Geol. Surv., Canada, Sum. Rept. 1922, pt. A, pp. 6-7.

Cockfield, W. E., and Bell, A. H.: "Whitehorse District, Yukon"; Geol. Surv., Canada, Mem. 150, p. 42 (1926).

² Bostock, H. S.: "Mining Industry of Yukon, 1937"; Geol. Surv., Canada, Mem. 218, pp. 13-16 (1938).

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, Yukon; 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.

Teslin-Quiet Lake-Big Salmon area.

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

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

Lees, E. J.: Geology of Teslin-Quiet Lake Area, Yukon; 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 contours, showing the geology of the part of the area north of the north end of Teslin Lake.

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

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

Freegold Mountain, Carmacks district.

Johnston, J. R.: Geology and Mineral Deposits of Freegold Mountain, Carmacks District, Yukon; Geol. Surv., Canada, Mem. 214 (1937).

Pelly River (Selkirk to Hoole Canyon).

For lower part, to longitude 136 degrees, *See* Memoir 189. For part 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 accompanied by geological map, 8 miles to 1 inch, with topography shown by form lines.

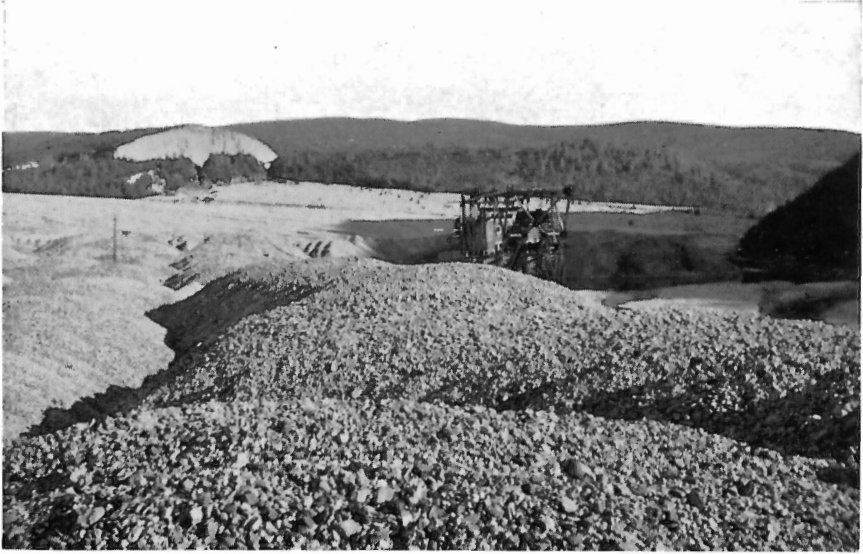
Klondike and country stretching to Los Angeles and Rosebud Creeks.

Ogilvie Sheet (latitudes 63° to 64°, longitudes 138° to 140°), topographical map, scale 4 miles to 1 inch, 500-foot contours.

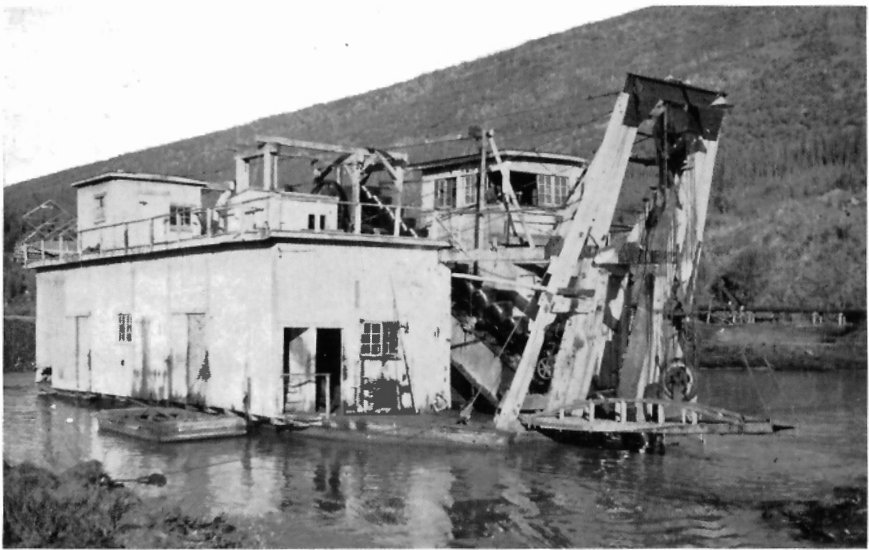
Mayo district (latitudes 63° to 64°, longitudes 134° to 136°).

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

Mining developments in Yukon are described in short annual reports published by the Geological Survey: Memoir 178 for 1934; Memoir 193 for 1935; Memoir 209 for 1936; Memoir 218 for 1937.



A. Dredge, Yukon No. 3, in Bonanza Creek Valley below Lovett Gulch.



B. Dredge on Sixtymile River.



A. Freight for placer operations in transit on the road extending west from Dawson.



B. Gold placer miners pouring a gold brick in the forge, Miller Creek, Sixtymile district.



A. Placer workings on Hight Creek. The coarse gravel is swept across the box and the gold and fine material fall through the grating in the bottom of the box into the sluice-boxes.



B. The Elsa mill and camp of the Treadwell Yukon Corporation, Limited, Galena Hill, Mayo district.

