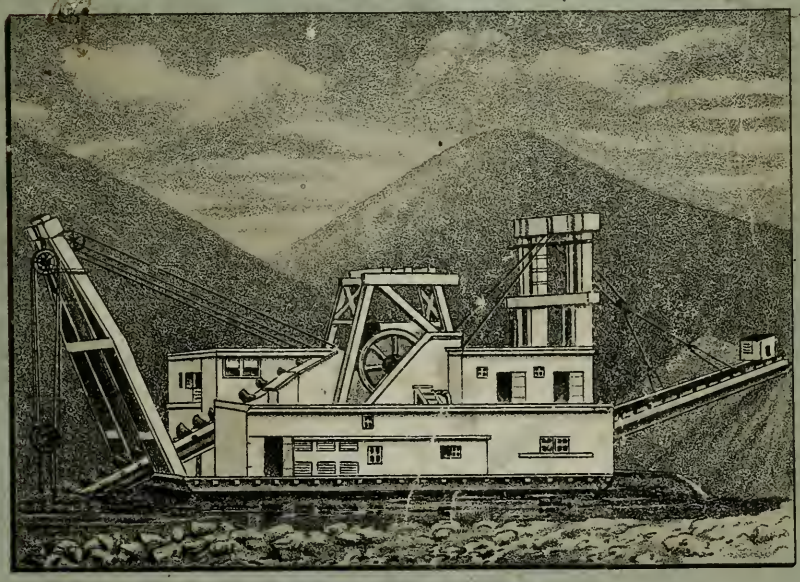
The Yukon Territory



Its History and Resources

ISSUED BY DIRECTION OF
THE HON. FRANK OLIVER, MINISTER OF THE INTERIOR,
OTTAWA.

F. J. Lipchard

MORLEY P. 293

NEW CHAPTER ON

NEW ILLUS. AND CHART

Dawson, Yukon Territory, Canada.

THE YUKON TERRITORY

ITS
HISTORY
AND
RESOURCES

OTTAWA : GOVERNMENT PTINTING BUREAU
1909

PREFACE

This pamphlet is, to a certain extent, a revised edition of 'The Yukon Territory, Its History and Resources' which was issued in 1907. The Mining Chapter, however, is entirely new, and has been prepared with the view of furnishing, in a clear and concise form, as complete information as possible in connection with the mining industry in the Territory.

Part I of the Mining Chapter contains a general description of the creeks under the headings of the various mining districts, and shows the output of gold for each year since 1885. Part II contains concise information dealing with general conditions as affecting mining. Part III deals with mining methods and working costs, the object being to furnish the miner and the dredging operator with as complete and accurate information as possible, of the cost of dredging and working by the ordinary placer mining method the frozen gravels of the Yukon.

Under the Chapter on Transportation will be found the cost of the transportation of freight from ports on the Pacific Coast to Dawson and from Dawson to almost every point of importance within the Territory. In Appendix 'I' will be found the tariff items relating to the importation of dredging and other mining machinery.

CONTENTS

Chapter 1.

HISTORICAL SKETCH.

The earliest explorations in the Yukon Territory must of necessity form part of the history of the Hudson's Bay Company after its coalition with the North West Company of Montreal in 1821. The original charter granted to the Hudson's Bay Company in 1670 imposed the task of exploration and discovery, but it was not until the appointment of Sir George Simpson as Governor that the company commenced to earnestly fulfill this part of its obligations. To contemplate the geographical position of the Yukon and its comparatively isolated position from the more settled portions of the Dominion, it is possible to form some idea of the difficulties which confronted the company's officers in their pursuit of the fur trade. The long distance from the base of supplies, the perilous journey up the Liard, and the establishment of trading posts in the

Yukon basin among tribes of suspicious and sometimes hostile Indians, necessitated the exercise of great patience and courage on the part of some of the most daring officers of the company. As early as 1853 eleven deaths had occurred in the passage of the Liard, and many of the employees of the Hudson's Bay Company on re-hiring endeavoured to be exempted from carrying on operations on this river.

Dease Lake Post, about 90 miles south of the northern boundary line of the province of British Columbia, was abandoned in 1839, and in the spring of the following year Mr. Robert Campbell was directed by Sir George Simpson to explore the north branch of the Liard to its source, and to cross the divide in search of any river flowing to the westward.

Mr. Campbell writes: 'In pursuance of these instructions, I left Fort Halkett (on the lower Liard) in May with a canoe and seven men, among them my trusty Indians, Lapie and Kitza, and the interpreter Hoole. After ascending the stream some hundreds of miles, far into the mountains, we entered a beautiful lake, which I named Frances lake, in honour of Lady Simpson. Leaving the canoe and part of the crew near the southwest (sic) extremity of this (west) branch of the lake, I set out with three Indians and the interpreter. Shouldering our blankets and guns, we ascended the valley of a river, which we traced to its source in a lake ten miles long, which, with the river, I named Finlaison's lake and river.'

From this point Mr. Campbell struck across to the Pelly, which he then named in honour of Sir H. Pelly, a governor of the company.

A fort was constructed at Pelly Banks in 1842, and in the following year Campbell floated down the Pelly in a birch bark canoe to the confluence of a river which he named the Lewes. This river was named by Campbell after John Lee Lewes, the

Confluence of Yukon and Klondike Rivers, showing Steamers in winter quarters, and Road around Bluff.

chief factor of the Hudson's Bay Company. At this point was encamped a large band of 'Wood Indians' who volunteered the information that the natives on the lower river were numerous and ferocious. Campbell returned to Pelly Banks where, during the winter of 1847-48, boats were built, and in the following June Fort Selkirk was established at the confluence of the Pelly and Yukon.

At this time, however, forts had also been established by the company in the Mackenzie basin, and in 1842 Mr. J. Bell had made three days' journey down the Porcupine river. Four years later Bell reached the mouth of the Porcupine 'and saw the great river into which it flows, which the Indians informed him was named the Yukon. In 1847 Fort Yukon was established at the mouth of the Porcupine by Mr. A. H. Murray.'

In answer to inquiries on the subject by Dr. Dawson, Campbell stated that the Stewart river was discovered in 1849 and that this river was named after James G. Stewart, son of the late Hon. John Stewart, of Quebec. Stewart was Campbell's assistant clerk, and had been sent out from Fort Selkirk in the winter of 1849 to follow the Indian hunters in quest of meat. He found them some distance north of the Stewart river, which he crossed on the ice. In 1850 Campbell descended the river from Fort Selkirk to Fort Yukon, being the first white man to pass the mouth of the famous Klondike and the site of the present city of Dawson. In this year the fort at Pelly Banks was abandoned, and Campbell decided to establish the headquarters of the Company at Fort Selkirk. The fur taken by the Indians to Pelly Banks could as easily be taken to Fort Selkirk, from which point they were taken to Fort Yukon and up the Porcupine to the Mackenzie. This route was considered preferable to the land transport from Pelly Banks to Frances lake and the

arduous and dangerous navigation of the Liard. In 1852, however, Fort Selkirk was the scene of an unfortunate disaster, which closed Campbell's career in the Yukon. Dr. Dawson presents the facts as follows:—

'The several ruined chimneys of Fort Selkirk, still to be seen, with other traces on the ground, are in themselves evidence of the important dimensions and careful construction of this post. The establishment consisted, I believe, in 1852, of one senior and one junior clerk and eight men. The existence of this post in the centre of the inland or "Wood-Indian" country had, however, very seriously interfered with a lucrative and usurious trade which the Chilcoot and Chilkat Indians of Lynn Canal, on the coast, had long been accustomed to carry on with these people; acting as intermediaries between them and the white traders on the Pacific and holding the passes at the headwaters of the Lewes with all the spirit of robber barons of old. In 1852 rumour was current that these people meditated a raid upon the post, in consequence of which the friendly local Indians stayed by it nearly all summer of their own accord. It so happened, however, that they absented themselves for a couple of days, and at that unlucky moment the coast Indians arrived. The post was unguarded by a stockade, and yielding to sheer force of numbers the occupants were expelled and the place was pillaged, on the 21st August. Two days afterwards Campbell, having found the local Indians, returned with them and surrounded the post, but the robbers had flown. Being now without means of support for the winter, Campbell set off down stream to meet Mr. Stewart and the men who were on the way back from Fort Yukon. He met them at the mouth of White river, and after turning them back with instructions to arrange for wintering at Fort Yukon, set out himself in a small canoe up the Pelly river, crossed to Frances lake, descended the Liard and arrived at Fort Simpson with the tidings of the disaster, amid drifting ice, on the 21st of October.

'Being anxious to obtain Sir George Simpson's permission to re-establish Fort Selkirk, Campbell waited only until the

river froze, when he left Fort Simpson on snowshoes and travelled overland to Crow Wing, in Minnesota, where he arrived on the 13th of March. On the 18th of April he reached London, but was unable to obtain from the directors of the company the permission he desired.

'In the autumn of 1853 one of Campbell's hunters arrived at Fort Halkett, on the lower Liard, by way of the Pelly and Frances. This is the last traverse of Campbell's portage of which I can find any record, though it may doubtless have been used by the Indians subsequently. From this man it was learnt that the buildings at Fort Selkirk had been all but demolished by the local Indians for the purpose of getting the ironwork and the nails. He also stated that the Chilkats, being unable to carry away all their plunder in the preceding year, had taken merely the guns, powder and tobacco. They had cached the heavier goods, which were afterwards found and appropriated by the local or Wood Indians.'

This remarkable journey, which was made by Campbell from Fort Selkirk to London, a distance of about 9,700 miles, over three thousand of which he travelled on snowshoes in the dead of winter through a practically uninhabited wilderness, is a splendid testimony of the intrepid spirit and determined character of those adventurous traders. In the history of the west the name of Campbell may well be classed with such explorers as Mackenzie, Thompson and Fraser, whose services in the cause of commerce have done so much to open up the wonderful resources of the western portion of the Dominion. Civilisation is indebted to these men not only on account of their remarkable daring in face of the enormous difficulties which they overcame, but for their straightforward dealings with the Indians. 'Their journeys were not marked by incidents of conflict or bloodshed, but were accomplished, on the contrary, with the friendly assistance and co-operation of the natives.'

Front Street Dawson Showing Tower Of Cable Ferry
Feb. June 1909.

In 1887 an expedition was organized by the government to explore that portion of the Northwest Territories which was drained by the Yukon river. This expedition was placed in charge of Dr. G. M. Dawson. To Mr. William Ogilvie was assigned the work of conducting instrumental measurements and astronomical observations in connection with the determination of the position of the 141st meridian which, by the Treaty of St. Petersburg, is designated as the boundary line from the vicinity of Mount St. Elias to the Arctic ocean.

Dr. Dawson entered the interior by the Stikine, Telegraph creek and Dease lake, which is practically the same route covered by Campbell in 1840, nearly fifty years before. He ascended the Frances river and crossed Campbell's portage to the headwaters of the Pelly, which he descended to Fort Selkirk. He then ascended the Lewes, crossed the Chilcoot pass and reached the coast at the head of Lynn canal. Dr. Dawson's report of his exploration in 1887 throws a flood of light on the country through which he traversed. He gives an excellent description of the Pelly river and its tributaries, and also a full description of the geological and general features of the country.

FIRST GOLD DISCOVERY.

As early as 1869 'minute specks of gold' had been found in the Yukon by some of the Hudson's Bay Company's men, but the first prospecting party of which there is record was organized by one Arthur Harper and a party who left British Columbia to prospect on several rivers in the Yukon Territory, and the result of this prospecting was summed up by Harper in a conversation with Mr. Ogilvie as follows: 'Nothing on the Nelson, prospects on the Liard, nothing on the Mackenzie, good prospects on the Peel, some on the Porcupine, and pros-

pects everywhere on the Yukon.' Harper and his party prospected for some distance up the White river, but not being successful they descended the river to St. Michaels, where some of them entered the service of the Alaska Commercial Company, then trading in the valley.

'The Alaska Commercial Company for many years subsequent to the retirement of the Hudson's Bay Company had a practical monopoly of the trade of the Yukon, carrying into the country and delivering at various points along the river, without regard to the international boundary line or the customs laws and regulations of Canada, such articles of commerce as were required for the prosecution of the fur trade, and latterly of placer mining, these being the only two existing industries. With the discovery of gold, however, came the organization of a competing company known as the North American Transportation and Trading Company, having its headquarters in Chicago and its chief trading and distributing post at Cudahy. This company has been engaged in this trade for over three years, and during the past season despatched two ocean steamers from Seattle to St. Michaels, at the mouth of the Yukon, the merchandise from which was at the last mentioned point transhipped into river steamers and carried to points inland, but chiefly to the company's distributing centre within Canadian territory. Importations of considerable value, consisting of the immediately requisite supplies of the miners, and their tools, also reach the Canadian portion of the Yukon district from Juneau, in the United States, by way of the Dyea inlet, the mountain passes and the chain of waterways leading therefrom to Cudahy. Upon none of these importations had any duty been collected, except a sum of $3,248.80 paid to Inspector Constantine in 1894 by the two companies mentioned above, and it is safe to conclude, especially when it is remembered that the country produces none of the articles consumed within it except fresh meat, that a large revenue was being lost to the public exchequer under the then existing conditions.' (Extract from report of Deputy Minister of Interior, 1895.)


Carnegie Library
June 1909

Between 1873 and 1885 various parties were prospecting on the Pelly, Lewes and their tributaries, and in 1885 mining was begun along the Stewart, and in the following year nearly all the miners in the territory were working on this river. In the autumn of 1886 coarse gold was discovered in the Forty-mile river, and as soon as the news of the discovery reached the Stewart the usual stampede occurred in the following year. In this year the number of miners in the Yukon basin may be stated at 250—200 on the Fortymile and about 50 on the Stewart. The Statistical Year-books of Canada give the output of gold in the Yukon during the years 1885 and 1886 as $100,000 and in 1887 as $70,000.

DISCOVERY OF THE KLONDIKE GOLD FIELDS.

In 1894 Mr. Robert Henderson, of Nova Scotia, and a small party were prospecting along the bars of the Yukon and from the gravels at the mouth of the Pelly they rocked out $54 in fine gold. When they reached the mouth of Indian river, Henderson ascended this stream alone. He prospected the gravels along the course of the river. He also prospected on Quartz and Gold Bottom. Good prospects were found on Gold Bottom, and in the spring of 1895 Henderson and a party of five men staked claims on this creek and commenced to work. During the summer of 1896 Henderson made a trip to Ladue's post at Ogilvie to obtain supplies, and returning to Gold Bottom by way of the Yukon river he came upon a number of Indians who were fishing at the mouth of the Klondike. Living with the Indians was one George W. Carmack, whom Henderson invited to stake on Gold Bottom. A few days afterwards Carmack and two Indians arrived at Gold Bottom and staked claims near to where Henderson and his party were working. Henderson advised Carmack and the Indians to cross over the

divide and do some prospecting in the gravels of what is now known as Bonanza creek. He asked Carmack to send back an Indian to inform him if good prospects were discovered. As a result of this trip rich prospects were discovered on Discovery Claim, which Carmack staked as well as No. 1 below. 'Charlie,' an Indian, staked No. 2 below and 'Tagish Jim,' the other Indian, No. 1 above. Carmack and the Indians at once proceeded to Fortymile and filed their applications with the recorder for the district. Up to this time the majority of the miners in the territory had been working on Fortymile, but as soon as the discovery on Bonanza became known all the miners in the Fortymile district stampeded to the new strike and in a short time Bonanza creek was staked from end to end. Meantime Henderson and his party were working on Gold Bottom, and did not hear of the new strike until all the creek had been staked. Extensive prospecting at once commenced on Bonanza, and in a few months was revealed the remarkable wealth contained in the gravels of Bonanza and Eldorado creeks.

As soon as the news of the rich strike reached the outside world, thousands of gold seekers immediately started for the Klondike. Probably never before in the history of gold mining camps has there been such a rush of people from almost every vocation in life as was seen in that irresistible stream of fortune-seekers, who climbed the Chilkoot pass and pressed on to Lake Lindeman, where the most rude boats and other flimsy craft were constructed for the journey of 500 miles down the Yukon river to Dawson. One of the saddest events in the history of this great stampede occurred one morning on the trail between the summit of the Chilkoot pass and Sheep Camp. For some distance between these two points the trail leads along the bottom of a steep mountain, and a long line of

The Tombstones.

gold hunters were laboriously toiling along this stretch of the journey, some bearing their heavy burden of supplies in packs and some on sleds, when suddenly a huge mass of snow came sliding down the mountain side, striking the line of travellers and burying between 50 and 60 men. Those who had escaped the catastrophe at once commenced to dig for their comrades, very few of whom were rescued, and some of the bodies were not found until the snow melted in the spring. Such is an instance of the dangers which confronted in the early days the thousands who had contracted the gold fever, and who were unaware of the innumerable hardships to be encountered on the journey to the new diggings.

As soon as the gold seekers began to arrive they at once staked claims and by the spring of 1899 all the creeks of any importance in the Klondike had been staked. There was no time to prospect and record. It was assumed that the other creeks in the district were as rich as Bonanza, and that it was only necessary to acquire a claim in order to obtain a fortune. Work was commenced on the different creeks, but where the gravels carried only moderate values, claims, which at the present day are being worked at a profit, were abandoned as worthless and a stampede occurred to some other creek. Had it not been that labour was in demand at a very high price, a most unfortunate state of affairs would have existed, as hundreds had spent the most of their limited capital, transportation was high and supplies were exorbitant.

Between 1898 and 1905 upwards of $100,000,000 were taken from the placers of Bonanza, Eldorado, Hunker, Dominion, Sulphur and their tributaries.

Since 1905 many of the claims which have been worked out by the placer method on Bonanza and Hunker have been grouped and acquired by companies, and are now being operated at a profit by the dredging and hydraulic methods.

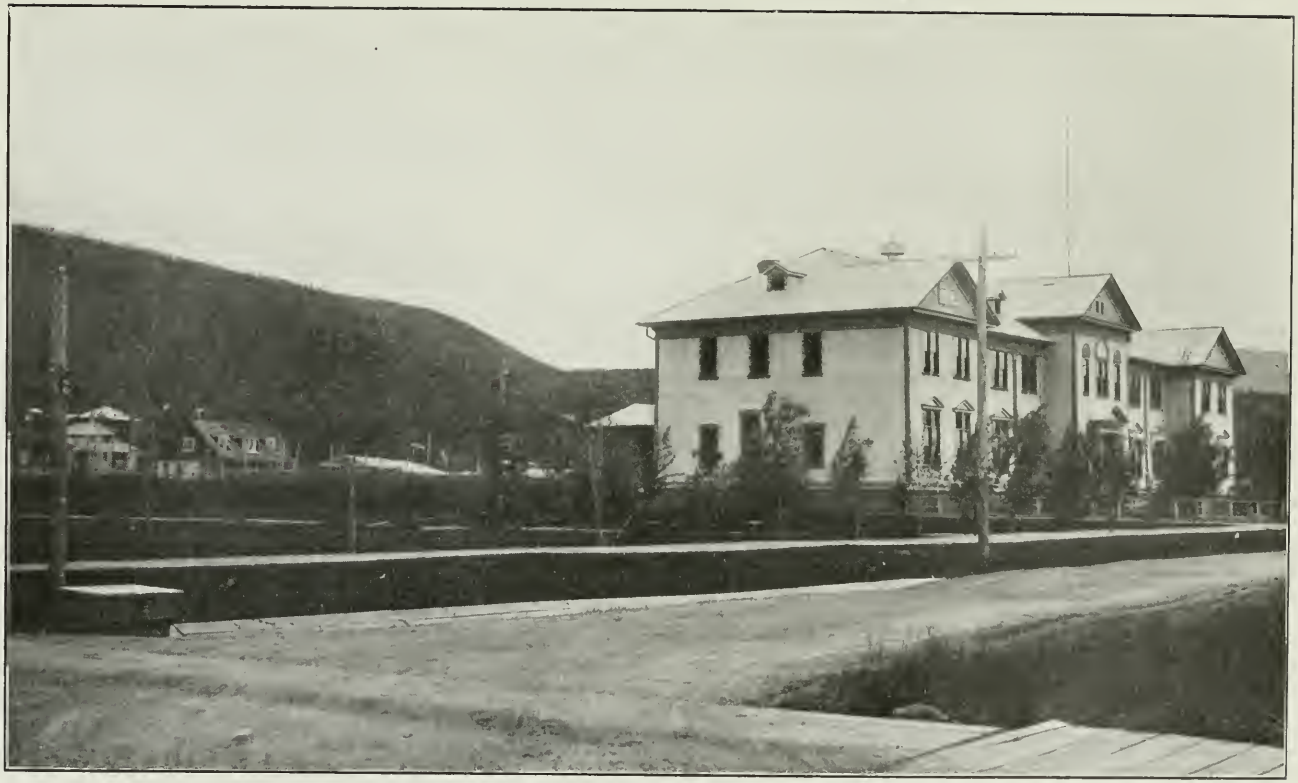
Territorial Court, Dawson.

Chapter 2.

CONSTITUTION AND GOVERNMENT.

THE YUKON TERRITORY ACT.

The Yukon Territory Act provides for the appointment of a chief executive officer to be styled and known as the Commissioner of the Yukon Territory. An administrator may also be appointed to execute the office and functions of the Commissioner during his absence or illness or other inability. The Commissioner shall administer the government under instructions from time to time given him by the Governor in Council or the Minister of the Interior. By an order in council of the 7th July, 1898, the Commissioner has power to suspend any official for neglect of duty or misconduct in his discretion and to replace such official temporarily pending a decision by the minister of the department to which the suspended officer is attached.



Administration Building from corner 5th Ave. and Harper.—Showing portions of Park.

The Yukon Council is composed of ten members elected to represent the electoral districts in the Territory. There are five electoral districts and two members are elected for each district. Any person who is qualified to vote is eligible for election as a member of the Council. All natural born or naturalized British subjects of the full age of 21 years and who have resided in the Territory for a period of twelve months prior to the date of the election, shall be entitled to vote.

Every Council shall continue for three years from the date of the return of the writs for the general election, but the Commissioner may dissolve the Council and cause a new one to be elected. The Council shall be convened at least once in every year after the first session thereof. The indemnity to each member of the Council shall not exceed $600.

THE YUKON PLACER MINING ACT.

The Commissioner may divide or change the boundaries of mining districts by proclamation. The Gold Commissioner shall have jurisdiction within such mining districts as the Commissioner directs. Mining recorders shall be appointed in each mining district and shall possess all the powers and authority of a mining inspector, who shall also have jurisdiction within such mining districts as the Commissioner directs.

Provision is made for the appointment of boards of arbitrators to settle disputes between owners of claims with respect to (*a*) the distribution of water, (*b*) boundaries of claims, (*c*) dumping privileges, and (*d*) overflow of water upon adjoining property. The board of arbitrators is appointed as follows: one arbitrator to be appointed by each of such owners, and, in the event of the total number of arbitrators so appointed being an even number, then an additional arbitrator to be selected

and appointed by all of such arbitrators appointed by the owners. In the event of the arbitrators appointed by the owners being an even number and being unable to agree upon the additional arbitrator, the Gold Commissioner, upon being requested so to do by such arbitrators, or by any of the interested owners, shall appoint the additional arbitrator. The judgment of the board shall be final as to facts but may be appealed from to the Territorial Court on any question of law.

The Supreme Court of Record is the Territorial Court, which is presided over by a senior judge and two other judges. It has appellate, civil and criminal jurisdiction. The Territorial Court en banc has appellate jurisdiction in appeals from the judgment of a police magistrate given under section 785 of the Criminal Code, 1892. In relation to mining disputes an appeal lies from the decision of the Territorial Court en banc to the Supreme Court of Canada. For the purposes of Part LII., Criminal Code, and amendments, an appeal lies from the judgment of the Territorial Court to the Supreme Court of Canada, unless the judges of the Territorial Court are unanimous, when there shall be no appeal.

Under Chapter 6 of the ordnances of 1906, the Commissioner may refer to the Territorial Court for an opinion upon constitutional or other territorial questions. The decision of the court, although advisory only, shall, for purposes of appeal, be treated as a final judgment of the court between parties.

The commissioner, members of council and judges of the Territorial Court, and every commissioned officer of the Royal Northwest Mounted Police, can exercise in the Yukon Territory all the powers of one or two justices of the peace, under any laws or ordnances, civil or criminal, in the Territory. All persons possessing the powers of two justices of the peace can act as coroners.

Hon. Alexander Henderson, K.C., Commissioner of the Yukon Territory.

The Commissioner can establish unincorporated towns, and arrange for the election of an overseer. Overseers shall hold office for the calendar year ensuing after the day on which the election is to be held, but may be removed by the commissioner.

LIST OF OFFCIALS.

Hon. Alexander Henderson, K.C., Commissioner of the Yukon Territory.

J. T. Lithgow, Comptroller.

E. C. Senkler, K.C., Legal Adviser and Public Administrator.

F. X. Gosselin, Gold Commissioner and Crown Timber and Land Agent.

C. W. Macpherson, Director of Surveys.

A. J. Beaudette, Government Mining Engineer.

C. B. Burns, Federal Secretary.

O. S. Finnie, Chief Clerk, Gold Commissioner's Office.

Napoleon Laliberte, Registrar.

I. J. Hartman, Postmaster.

J. A. McDougal, Collector of Customs.

S. A. D. Bertrand, Agent, Department of Public Works.

H. Gilchen, Superintendent Government Telegraphs, Whitehorse.

Royal Northwest Mounted Police.

Z. T. Wood, Assistant Commisisoner.

A.E. Snyder, Superintendent.

T. A. Wroughton, Inspector.

Territorial Court, Yukon Territory.

Hon. C. A. Dugas, Senior Judge.

Hon. James Craig, and Hon. C. D. Macaulay, judges.

R. J. Eilbeck, Sheriff.

C. Macdonald, Clerk of Territorial Court.

George L. Taylor, Naturalization Commissioner for the Yukon Territory and Police Magistrate at Whitehorse.

Admiralty Court, Yukon Territory.

Hon. James Craig, Judge. C. Macdonald, Registrar.

Commissioner's Residence, Dawson, Y.T.

Chapter 3.

PHYSICAL FEATURES.

Much of the Yukon region consists of numerous plateaux intersected along the watersheds and in the southwest of the territory by high and diversified mountain ranges. The greater part of the territory lies within the drainage-basin of the Yukon river, which has a watershed of 330,912 square miles, of which 150,768 square miles are in the Yukon Territory.

On the southwest is the Coast range of mountains, comprising part of the St. Elias and the Nutzotin mountains, in the vicinity of which is Kluane lake and the Kluane mining district. The highest summits of the St. Elias range are Mount Logan, 19,539 feet, and Mount Hubbard, 16,400.

On the southeast is the Cassiar range, with northwest and southeast trend, and a transverse width of nearly fifty miles. This range runs parallel to Teslin lake on the west and the upper Liard on the east, and forms the southern portion of the divide between the great Mackenzie and Yukon basins. North-

east of the Cassiar mountains and in the watershed of the Mackenzie are the Simpson and the Campbell mountains on the west of the Finlaison river, which drains along its course Finlaison and Frances lakes. Finlaison lake has an elevation of 3,105 feet above sea level, and is situated on the summit of the watershed or height of land, which at this point divides the upper Pelly from the Finlaison river, a tributary of the upper Liard. Southeast of the Pelly, between the height of land and the confluence of the Pelly and Macmillan are the Glenlyon and Pelly mountains, the latter range being described as 'a series of square outlined pyramidal peaks.'

Between the headwaters of the Pelly and Stewart is the Selwyn range, which for over a hundred miles divides the watershed of the Yukon and Mackenzie. From the Northern extremity of the Selwyn range and extending in a northwesterly direction is the Ogilvie range of mountains, which form the continuation of the divide between the two great watersheds. The principal summits of the Ogilvie range are: Mount Williams, 6,500 feet, on the eastern extremity; Mount Campbell, 8,200 feet, northeast of Dawson, and Mount Harper, 7,000 feet, northwest of Dawson. From a point about ninety miles north and slightly east of Dawson this divide or height of land runs in a northeasterly direction towards the delta of the Mackenzie and almost parallel for over a hundred miles with the Peel river in the Mackenzie basin and the headwaters of the Porcupine on the Yukon watershed. Northeast of Fort McPherson this height of land again curves to the northwest, and for some distance before reaching the boundary line is known as the Davidson mountains, dividing the waters which flow into the Arctic from the Yukon basin.

Between the eastern portion of the Ogilvie range and the

Whitehorse, Y.T.

That portion of the Yukon to the west of Dawson and extending south to the Nutzotin mountains and east to Fort Selkirk on the Yukon river, may be described as a part of the Yukon plateau, with rounded hills and irregular ridges but without any well defined mountain ranges.

Along the course of the Lewes river are the Dawson range, south of Fort Selkirk, the Semenof hills at the confluence of the Teslin and Lewes, and the Miners' range along the southwest of Lake Laberge.

'The country bordering the northeastern slope of the Coast range, including the Windy Arm mining district, may be characterized generally as consisting of a system of wide valleys, often interlocking in a peculiar manner, separated by mountain groups, and ridges rising from 4,000 to 5,000 feet above the valley flats. Most of the valleys are bottomed at intervals with long, narrow, deep lakes, due to the blocking of the channel at various points with glacial drift. The uplands are usually fairly regular in outline, but in places are exceedingly rugged, and are often deeply incised by the numerous small streams which flow down their sides.' (McConnell.)

Dr. Dawson, in his report of early explorations of the region along the northeastern edge of the Coast range, states that this system of lakes 'constitute a singularly picturesque region, abounding in striking points of view and in landscapes pleasing in their variety and impressive in their combination of rugged mountain forms.'

RIVERS AND LAKES.

The principal rivers in the Yukon Territory are the Yukon, the Lewes, the Pelly, the Stewart, the Peel, the White river and the Porcupine.

The Yukon is formed by the confluence of the Lewes and Pelly at Fort Selkirk, and flows in a northwesterly direction

Dredging on Lower Bonanza and Hydraulicking on Lovett Gulch, June, 1909. Photo. by J. Doody.

until it enters the United States Territory of Alaska at a point about 70 miles northwest of Dawson. Commencing at the mouth of Fortymile creek, a tributary of the Yukon on its left limit about 20 miles south of the point where the Yukon crosses the boundary line, 'the width of the river in the lower portion seldom exceeds half a mile, but above Fort Reliance it gradually enlarges and in the southerly reach occasionally exceeds a mile in width. In the expanded stretch, however, much of the surface is occupied by islands. The current is swift and uniform, and at a medium state of the water runs at the rate of five miles an hour. . . . The valley of the Yukon between Fortymile and the mouth of the Stewart and on to the Pelly is cut through an elevated undulating plateau, on which rest numerous low ranges of rounded and partially bare hills, but is not crossed by any well defined mountain range. It is somewhat uniform in appearance, but affords many picturesque and even grand views. Bluffs of rock of a more or less precipitous nature are of constant occurrence, and bold rampart-like ranges of interrupted cliffs, separated or continued upwards by steep grassy or wooded slopes characterize the banks for long reaches. The flats are few and unimportant, and as a rule the river washes the base of the banks on both sides. The width of the valley varies from one to three miles and its depth from five to fifteen hundred feet. Its great size, taken in connection with the hard character of the crystalline rocks through which it has been excavated, afford evidence of great age, and point to an origin long antecedent to the glacial period. The same fact is also emphasized by the remarkably uniform grade, which the river has worked across terraces of heterogeneous hardness, ranging through the whole geological scale in its long course from Rink rapid to the sea, a distance of nearly 1,700

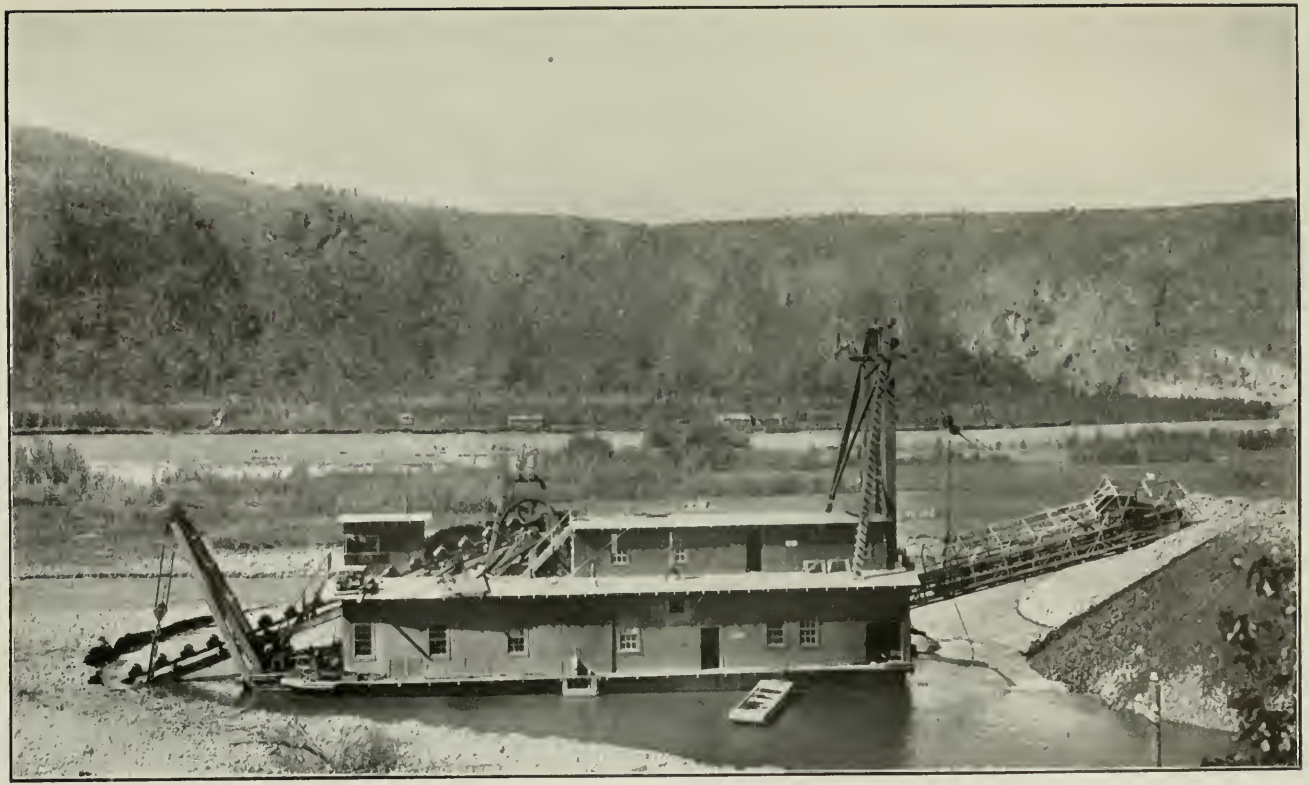
miles. . . . From the mouth of the Stewart the Yukon trends in a southwesterly direction for ten miles to its junction with White river. In this reach it averages a mile in width, and is filled with islands. The banks of the valley are steep and rocky, and were estimated at from 800 to 1,000 feet in height.' (Report of R. G. McConnell, 1887-88.)

In Mr. Ogilvie's report published in 1898 the cross sectional area and volume of water in the Yukon river are computed as follows: 'The cross sectional area at the boundary measured in December, 1895, is 21,818 feet. There is a channel 600 feet wide, not less than 22 feet deep, and one 400 feet wide, not less than 26 feet deep. During summer level those depths would not be less than four feet deeper, and the cross sectional area 27,000 feet. The discharge at this first level is approximately 96,000 cubic feet per second; at summer level it approximates 135,000 cubic feet, at flood level it approaches 180,000 cubic feet or more, possibly reaching for short times, 225,000.'

LEWES RIVER.

'The Lewes river, where it leaves Lake Marsh, is about 200 yards wide and averages this width as far as the Cañon. Below the Cañon proper there is a stretch of rapids for about a mile, then about half a mile of smooth water, following which are the Whitehorse rapids, which are three-eighths of a mile long . . . For some distance below the Whitehorse rapids the current is swift and the river wide, with many gravel bars. . . The reach between these rapids and Lake Laberge, a distance of 27½ miles, is all smooth water with a strong current.' (Ogilvie's report, 1887.)

'The total length of the route by the Lewes river from "the Landing" on Lake Lindeman to the site of Fort Selkirk is 357 miles. From the outlet of Lake Laberge to the same point is a distance of 200 miles, in which the total descent is 595 feet, or at the rate of 2·97 feet to the mile.' (G. M. Dawson, report 1887.)

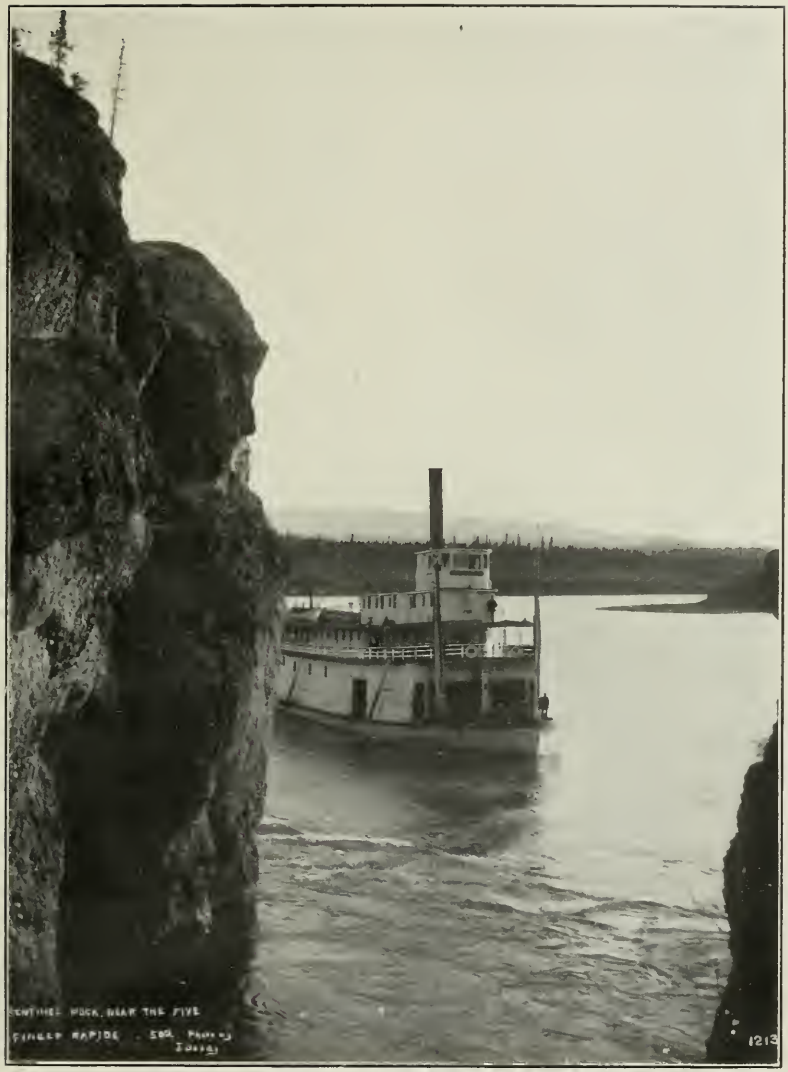


Bonanza Basin Dredge operating in the bed of the Klondike River, June, 1909.

divided by gravel bars. There are two rapids in this stretch, one about two miles east of Glenlyon and the other below the mouth of that stream. From Glenlyon to the Macmillan, measured by the course of the river, the distance is 61½ miles. On the north bank there are low irregular hills, showing extensive grassy slopes on their southern exposures. The Macmillan and Pelly valleys coalesce at an acute angle at the western point of the range of hills which alone has separated them for some distance, and the two streams must run parallel for many miles above their junction. The Macmillan is bounded to the north by a well defined range of low mountains which continues to the westward for about ten miles as the bordering range of the united streams. The distance from the Macmillan to its confluence with the Lewes measured along the course of the stream is 74 miles. For some distance below the mouth of the Macmillan the Pelly flows through a trough-like valley, and then through Granite cañon, about four miles in length, 'with steep, rocky scarped banks and cliffs' 200 to 250 feet in height. Below the cañon there is a wide belt of open country on both sides of the river, until within a few miles of Selkirk, when the river is bordered with low hills and ridges. The total length of the Pelly from Campbell's portage to its confluence with the Lewes is 320 miles.

STEWART RIVER.

The Stewart river rises in the northern extremity of the Selwyn range, and flows in a westerly direction until it reaches a point about 20 miles in a direct line northwest of Mayo lake, when it again flows east and makes a wide detour around Mayo lake, then northwesterly over Fraser falls and in a general westerly direction from Mayo to the Yukon river, into which it flows about 80 miles south of Dawson. The principal tribu-


SENTINEL ROCK, NEAR THE FIVE
FINGER RAPIDS
1213

taries of the Stewart are Lansing, Hess river or South branch of Stewart, and McQuesten river, a tributary on the right bank rising in a spur of the Ogilvie range north of Mayo lake. The volume of water flowing in the Stewart was measured by Mr. A. J. Beaudette, government mining engineer, at a point near Gordon's Landing, and computed to be 1,010,166 miner's inches, or 1,515,250 cubic feet per minute. There are no tributaries of any importance between Fraser falls and Gordon's Landing, so that this measurement is approximately the volume of water flowing over the falls. The Stewart river is navigable from its mouth to the falls, and during the summer small stern-wheel steamers ply between Dawson and Mayo Landing.

PEEL RIVER.

The Peel river rises in the northern extremity of the Ogilvie range, and flows in a general westerly direction to its confluence with Snake river, where it takes a wide curve and flows northward towards Fort McPherson. 'Below Fort McPherson the Peel river flows in a straight line northward for twelve miles; it then divides the eastern channel, which is a travelled route and has been surveyed by Messrs. McConnell and Ogilvie, joining the Mackenzie river by two mouths another twelve miles beyond. A careful estimate of the discharge of the Peel river was made at Fort McPherson on the 31st of July, when the level of the water was about medium stage. Though the watermark of the spring freshet is thirty feet above the level in July, the Peel river keeps at a fairly uniform level all summer, and scarcely falls more than three or four feet below the level when the discharge was taken. The figures obtained for the discharge were 49,206 cubic feet per second. The average velocity is about two miles an hour, and the greatest depth fifteen feet.' (Camsell.)

WHITE RIVER.

The White river is a tributary of the Yukon, into which it flows about ten miles north of Stewart. It rises in the Nutzotin mountains, and flows north and east. The current of the White river is estimated at about eight miles an hour. The mouth of the river is about 200 yards wide, but the main body of water is confined to a channel not more than 100 yards in width, and the water is so muddy that two miles below the point where it enters the Yukon the latter river is completely discoloured.

PORCUPINE RIVER.

The Porcupine rises north of the northern extremity of the Ogilvie range and flows north and sligthly east for about 150 miles when it takes a wide curve about 50 miles west of Fort McPherson and flows in a westerly direction, joining the Yukon on its right bank at Fort Yukon in the Territory of Alaska.

Besides the principal rivers already mentioned there are smaller rivers, which are well known throughout the territory on account of their proximity to the different mining districts. These rivers may briefly be described as follows:—

Teslin or Hootalinqua and Big Salmon, tributaries on the right bank of the Lewes, the former flowing in an almost direct northwest line from Teslin lake and entering the Lewes about thirty miles below Lake Laberge, and the Big Salmon flowing in a similar direction, slightly north and almost parallel to the Semenof hills.

Indian river, a tributary on the right bank of the Yukon about thirty miles south of Dawson. Quartz, Dominion and Australia creeks flow into Indian river, which may be described as the southern boundary of the Klondike gold-fields.

Klondike river, a tributary on the right bank of the Yukon at Dawson. This river rises in the Ogilvie range and flows in a south and westerly direction, constituting the northern boundary of the Klondike gold-fields proper. Bonanza, the richest creek so far discovered in the Klondike, as well as Bear, Hunker and Flat creeks, empty into the Klondike river on its left or south bank.

Sixtymile, a tributary on the left bank of the Yukon at Ogilvie. This river rises near the boundary line almost west of Dawson, flows easterly and northeast, almost parallel with the Yukon for upwards of thirty miles, but flowing southeast while the Yukon flows northwest.

Fortymile, a tributary of the Yukon at Fortymile. This river rises in Alaska, and was the most important mining centre in the Yukon before the discovery of the Klondike creeks.

LAKES.

The principal lakes in the Yukon Territory are situated in the Duncan, Kluane and Whitehorse districts.

In the Duncan district, south of the eastern extremity of the Ogilvie range, are Mayo lake and McQuesten lake.

In the Kluane district, northeast of the St. Elias range, are Kluane lake, Lake Aishihik, Dezadeash lake and Kusawa lake.

North of Whitehorse is Lake Laberge, thirty-one miles in length, drained by the Lewes river.

'Tagish lake forms part of a chain of long narrow lakes including, in order from north to south, lakes Lindeman, Bennett, Nares, Tagish and Marsh, which commence well within the coast range of mountains and extend northward and eastward for a distance of nearly seventy miles. The general direction of all these lakes is north and south, with the exception of Lake Nares and the upper part of Tagish lake, which have an east and west alignment. Windy Arm joins Tagish lake near its head, and extends south for a dis-

tance of twelve miles. Its course is nearly parallel to that of Bennett lake, and the two sheets of water inclose an area of high mountainous country about eight miles in width.' (McConnell's report, 1905.)

East of this system of lakes is Teslin lake, the half of which extends into the province of British Columbia. This lake is the source of the Teslin or Hootalinqua river. The Nisutlin river, which rises in the southern ranges of the Pelly mountains, flows into Teslin lake on its western shore.

The following is the area of several of the largest lakes in the territory:—

Kluane	184	square miles.
Laberge	86	"
Tagish	139	"
Teslin	245	"

VOLUMES OF STREAMS.

District and Stream.	Grade Feet Per mile	Volumes in Miners' Inches.	Remarks.
Dawson District.			
Klondike River	13.6	55,000-300,000	
Bonanza Creek	45·	68-17,641	
Eldorado Creek	50·	820	Above mean.
Hunker Creek	40·	156	Low water.
Bear Creek		65	
Dominion Creek		400	Mean water.
Sulphur Creek	40·	300	"
Gold Run Creek	50·	120	Below mean.
Rock Creek	40·	1,800	Low water.
12-Mile River	50·	20,000	Above mean.
Little 12-Mile River	150·	2,000	Low water.
Tombstone River	150·	5,500	"
Stewart District.			
Stewart River		1,100,000	Mean water.
Mayo River	10·	125,000	High water.
Duncan Creek		10,000	"
Conrad District.			
Montana River		3,600	"
Pooley Cañyon		3,000	"

Operating a "rocker."

Chapter 4.

MINING.

PLACER MINING.

PART I.

Placer mining in the Yukon commenced on the Lewes and Big Salmon rivers in 1881, and shortly afterwards productive bars were discovered on the Pelly and Stewart rivers. In 1884, Mr. A. H. Day, who is now operating on Lower Dominion, claims to have rocked out over $100 a day at the head of a bar on the Stewart river about five miles below McQuesten. At that time eleven men were rocking on the Stewart, and many of them are reported to have made as much as $100 a day. In the spring of 1885 between 30 and 40 miners came

into the Territory, and commenced to work on the head of the bars along the Stewart. It is estimated that the gold recovered in this way from the various bars amounted to over $100,000. In the fall of 1886 coarse gold was discovered on the Fortymile, and as a result the Stewart river was almost deserted the following year. During 1887 and 1888 between 100 and 350 miners were working on the Fortymile, and in the former year the yield of gold has been estimated all the way from $75,000 to $150,000. Bonanza creek was discovered in 1896, and the great rush commenced to the Klondike. The output of gold for the seven years commencing in 1898, amounted to almost $98,000,000, and the total output of the Yukon, including the early mining on the Stewart and the Fortymile, exceeds the enormous sum of $120,000,000. The richest creeks were Bonanza, Eldorado, Hunker, Dominion and Gold Run, the latter two creeks being in the watershed of Indian river. The yield of gold decreased, however, as the fabulously rich claims on Bonanza and Eldorado were worked out, and a large section of the mining population, dissatisfied with ground yielding moderate returns, migrated to other placer diggings in the north.

Officers of the Geological Branch of the Department of Mines have, from time to time, explored different portions of the Territory, and the reports which have been furnished, as a result of these explorations, indicate that the Yukon is a vast mineral belt, the greater portion of which has not yet been touched by the prospector. Colours* can be found almost everywhere in the Territory, and the work of the prospector is, therefore, confined to discovering the areas within which the gold is concentrated. In some districts the most of the gold is found in bedrock, on the upper Stewart it is often discovered

* Specks of gold.

A winter dump on Quartz Creek.

concentrated in the vicinity of the canyons on the different creeks, and in other districts the values are scattered through the vast bodies of high and low level gravels. These gravels, as classified by McConnell, of the Geological Branch of the Department, are fully described in Part II. of this chapter. At the present time placer mining by the ordinary method is, of necessity, confined to ground which was regarded as too low grade in the early days. As a result of this condition more economical methods of working have been devised. Instead of wealth being obtained by high values and haphazard management, the successful operator of the present day must exercise skill and judgment in the acquisition and development of his property.

The following table shows the value of the gold production in Yukon since 1885, namely:—

1885 } 1886 }	$ 100,000 00
1887	70,000 00
1888	40,000 00
1889	175,000 00
1890	175,000 00
1891	40,000 00
1892	87,500 00
1893	176,000 00
1894	125,000 00
1895	250,000 00
1896	300,000 00
1897	2,500,000 00
1898	10,000,000 00
1899	16,000,000 00
1900	22,275,000 00
1901	17,368,000 00
1902	11,962,690 00
1903	10,625,422 00
1904	9,413,074 00
1905	7,162,438 00
1906	5,258,874 00
1907	2,896,173 00
1908	3,200,288 00
Total	$120,200,459 00

Dawson Mining District.

This is the largest mining district in the Yukon. It includes the famous Klondike gold fields, and extends from the

northern boundary of British Columbia to the Arctic ocean. A glance at the map of Yukon will show the enormous extent of territory covered by this district, and the comparatively small area within which were discovered some of the richest placer claims in the world. It is probable that no more Bonanzas will be discovered in the district, but when it is considered that even on some of the well known creeks new discoveries are continually being made, it is reasonable to expect that rich placer deposits will yet be discovered in this district. When placer claims have been mined by the individual miner in a careful and systematic manner the gravels cannot under ordinary circumstances be again profitably handled by the same method. Many claims on Bonanza and Eldorado, however, are exceptions to this rule, and have been worked two and three times by the ordinary placer mining method.

Ever since the discovery of the Klondike gold fields there has been, during the greater part of the summer season, a scarcity of water, which affected the mining operations to a much greater extent as the rich creek claims on Bonanza and Hunker were worked out and miners turned their attention to the high level gravels. Some unsuccessful efforts were made to pump water from the creek to the hill and bench claims, but the values contained in the higher gravels would not warrant such a large expenditure. One of the many water schemes, which were advocated, was the construction of a ditch some 85 miles long from the head waters of the Klondike river. This undertaking would have cost in the neighbourhood of $7,000,000.

In 1903-4, however, the promoter of the enterprise, now known as the Yukon Gold Company, acquired certain water rights, which had been granted to divert water from the Twelvemile river and its tributaries, the right of way also

Part of Yukon Gold Co's., water ditch.

being obtained for the construction of a ditch from the head of the Twelvemile river to Gold Hill, on Bonanza creek, a total distance of 70·2 miles. The Twelvemile river, which it is claimed will furnish a constant supply of water, enters the Yukon some 18 miles below Dawson, and has its source in the Tombstone range, a spur of the Ogilvie mountains, which rise to an altitude of 7,000 feet. In connection with the proposed construction of a large water system it was necessary to acquire connected blocks of placer claims, which at this time were largely owned by individuals. The scarcity of water in the district may be said to have accelerated to some extent the sale of these claims to the company, as the individual owners found it very difficult to operate on account of the inadequate water supply during the greater part of the summer season.

The property, water rights and impounding privileges of several companies, which were operating by the hydraulic method on some of the Bonanza hills, were also acquired by the Yukon Gold Company, which, during the summer of 1907, grouped nearly 500 placer claims on Bonanza creek and some 300 claims on Hunker creek, Bear creek and the Klondike river. As a result of the purchase and grouping of these claims mining by the ordinary placer methods practically ceased on the claims so grouped, and representation work was performed on the Bonanza properties by the operation of dredges, by hydraulic work and the construction of a huge dam at the head of Bonanza creek, and on the Hunker properties by the construction, at a cost of over $3,000,000, of the large Twelvemile ditch, which will be completed during the summer of 1909.

During the period within which the Yukon Gold Company have been making large expenditures in connection with the installation of dredges and hydraulic plants and the construc-

tion of an immense water system, very little mining has been accomplished on the extensive properties now held by the company. The mining operations so far have consisted principally of hydraulicking on some of the hills along Bonanza and the Ackland farm group, the operation of three dredges on lower Bonanza, and during the latter part of the season of 1908, the operation of the hydraulic elevators. During the present season, however, the company expects to have its equipment working up to at least one-half of its ultimate capacity. For the first time the Twelvemile ditch will be thoroughly tested, and if a continuous supply of water can be carried along the ditch during the present summer without any serious accident, the successful accomplishment of this portion of the construction work will mark an era of engineering skill which, under similar conditions, has never been surpassed.

The purchase by the Yukon Gold Company of large blocks of claims on Bonanza and Hunker has practically depopulated these creeks. The rich paystreaks so far discovered on Hunker have been worked out. About two miles above Gold Bottom a steam elevator has been installed, and pay dirt is being hoisted by windlass from some of the adjoining creek claims. The principal gold-bearing tributaries of Hunker are Gold Bottom and Last Chance. During the past winter there have been more miners working on Gold Bottom than for several years, and many dumps have been taken out along the creek. Last Chance creek, on the left limit of Hunker, is gold-bearing for a distance of about four miles from the mouth, and has proved fairly rich in places. For a distance of two and a half miles along the left limit there are beds of white channel gravels, which are fairly rich in places. On this portion of the creek hydraulic work is being undertaken on a small scale.

No. 6. On Gold Run in June, 1909. Photo. by J. Doody, Dawson, June, 1909.

Dominion is the largest creek in the district, and is 30 miles in length. The principal tributaries are:

Right Limit.	Left Limit.
Caribou,	Lombard,
Portland,	Remington,
Laura,	Champion,
Hunter,	Nevada,
Gold Run,	Jansen,
Sulphur,	Kentucky,
	Rob Roy,
	Veronica.

On Lombard the pay, which is all in bedrock from 6 inches to 2 feet deep, is between 15 and 25 feet wide. Some two years ago $12,000 were taken out of a claim at the mouth of Lombard. The gold is coarse, a $10 nugget having been found on No. 10 last fall and smaller nuggets from $1 upwards. There is a body of muck and ice about 30 feet deep on top of the gravel. An effort will be made to open-cut some of the claims during the summer.

Along the left limit of Dominion gravel terraces have been traced from Lombard to Jansen creek. The owners of hill claim left limit No. 27-B below upper Discovery claim to have located quite recently three pay channels running along the bench parallel to the creek. It is also thought that the same channels have been located some distance up the creek on the same limit. By careful panning the owners of 27-B consider that the pay they have located will run $1.50 per foot on bedrock. The only water available for sluicing purposes on this claim is the snow water from the hillsides and a limited quantity in 21 Pup. On this portion of Dominion there are several groups of creek claims, which the owners consider will ultimately prove to be excellent dredging propositions. An application has been made for a water right from Caribou creek, a tributary of Dominion at 27 below upper Discovery, the water so diverted to be appurtenant to groups of claims on Caribou

and creek and hills claims on Dominion above lower Discovery. The application sets out that the water will be carried across Dominion creek by syphon, and the privilege is sought, of selling along the line of ditch. From lower Discovery to Jansen creek some of the creek claims have been worked at a profit, but this portion is interrupted by barren stretches. Between Jansen creek and the mouth of Gold Run very little, if any, pay has been found. From the mouth of Gold Run to some distance below the point where Sulphur joins Dominion the valley widens out and there is a pay streak of about 1,000 feet in width in some places. Along this stretch the pay gravel is quite rich. Last fall on 232-A and 232-OA $26,000 were taken out in about six weeks. This spring a very large dump will be cleaned up on these fractions, which the owner estimates will yield $1.50 per running foot on bedrock. The pay channel on these two fractions strikes directly across the creek almost at right angles to the base line. Some claim that the channel is part of the Dominion Pay-streak, and others that it comes from Veronica or Rob Roy—tributaries on the left limit of Dominion in the immediate vicinity. Several shafts were recently sunk on Rob Roy creek, which was also cross-cut for some distance, with the view of locating this pay channel, but nothing was discovered. The most feasible theory seems to be that the pay-streak in 232-A and 232-OA, is an off-shoot from Gold Run, and that the gold was concentrated in a narrow channel which struck across Dominion at this point and probably joined the main channel, at that time, some distance farther down the creek. The objection to this theory is that the gold found in these fractions differs from that recovered in the claims on Gold Run, but in discussing the grade of gold McConnell points out that the gold varies in grade not only

Hydraulicking.

on the different creeks but also along different portions of the same creek. On these two fractions the Messrs. Peterson employ a crew of 25 men during the summer, and the 50 h.p. boiler which thaws and hoists the dirt also pumps the water from the creek for sluicing. By this method the cost of water for sluicing purposes is practically reduced to the quantity of extra fuel consumed. On this stretch of Dominion, where the pay-streak is very broad, on many of the claims the bedrock and pay gravel are taken out by what is undoubtedly the most economical method of mining this class of ground. The only expenditures incurred are the services of two men in the drift, one on the windlass and the fuel consumed in thawing. A description of this class of mining is given under Mining Methods. Between Nos. 259 and 267 is a section of ground which has recently been opened up with the view of installing several self-dumpers. Other large dumps have been taken out on lower Dominion, notably, on 232 and 245.

* 'The yellow creek gravels representing the present wash of Dominion creek, are underlaid between Burnham and Sulphur creeks and for some distance farther down by a white compact siliceous deposit, similar in every way to the high level white channel gravels of Bonanza and other Klondike creeks, and probably belonging to the same period. At first glance it appears strange to find these gravels on some creeks resting on high benches and in others underlying the present valley flats. The explanation is, however, simple. The elevated position of these gravels on Bonanza and Hunker creeks is due, as stated before, to a recent general elevation of the country, which gave the streams increased grades and enabled them to cut deep steep-sided secondary valleys in the floors of their old valleys. Both Bonanza and Hunker creeks empty directly into the master valleys of the district and were affected immediately by the deepening of these. Dominion creek, on the other hand, empties into Indian river many miles above the

* R. G. McConnell, B.A., Report of the Klondike Gold Fields.

junction of the latter with the Yukon. Indian river is itself a comparatively small stream, and any increased cutting power which it acquired in common with the other streams after the elevation of the country, has been expended in the lower portion of the valley and has not so far, materially affected the upper portion. A secondary valley, in places narrowed to a cañon, is traceable from the mouth of Indian river up stream to a point above Quartz creek, where it merges with the older valley. The wide flats which bottom the valley of the main stream, and of the large tributaries like Dominion creek, above this point, correspond, therefore, in a general way to the old valleys of Bonanza and Hunker creeks, now represented by high benches, and not to the present valley bottoms.'

On creek claim No. 278 a sawmill, having a capacity of 6,000 feet per day, is manufacturing lumber for a large flume, which is being constructed by Mr. A. H. Day. This flume, which has cost so far $65,000, extends from No. 216 to No. 273 below lower Discovery. The applicant has the right to sell water, which can be delivered on the claims under pressure, at $1.25 per sluicehead per hour. From 216 to 242 the size of the flume is 6½ feet by 2 feet, with a grade of 1 inch to 100 feet, and from 242 the size is reduced to 3 feet by 2 feet. For some distance the height of the flume is 20 feet and at this height is built on mud-sills of 16 feet by 10 feet.

On No. 8 Gold Run a large dump of 18,000 buckets has been taken out. The depth of the shaft on this claim is 50 feet—15 feet of muck and 35 feet of gravel. A strip of 150 feet containing the coarse run of gold in this claim was taken out some years ago and the portion that is now being worked to such advantage was then considered too low grade to be handled. The pay dirt taken out of this claim last summer averaged $1 per foot of bedrock. The plant on No. 8 is one of the most up-to-date of its kind in the Territory. One 50 h.p. boiler furnishes power to thaw the face of the drift by water and hoist the dirt, while a dynamo connected with the


A STeam Scraper On 232 Below On Dominion, Creek
Foto By J. Dooay
Dawson June 1909

plant furnishes electric light in the mine. The largest dump in the Territory is on No. 12 Gold Run. On this claim the bedrock sinks abruptly and the overlying gravels and muck suddenly increase from 25 to over 50 feet in depth. The depression is filled with white gravels similar to those on Dominion. These gravels continue down to the mouth of Gold Run, and then along the right limit of Dominion. On the upper portion of Gold Run there are several self-dumping plants. The owners of No. 44 have taken out a dump of 12,000 buckets and claim that the ground will yield $1.50 per square foot of bedrock, the pay dirt consisting of 2 feet of gravel and 3 feet of bedrock.

Sulphur creek is 17 miles in length. The principal tributaries are: Green gulch, Friday, Meadow and Brimstone gulches on the left and Quin and Black Diamond gulches on the right. One steam elevator has been operating on No. 22 and it is reported another elevator will be installed on No. 80 during the summer. During the winter the majority of the miners haul wood and prepare generally for summer work.

Quartz.—Quartz creek during the past two years has been one of the most important in the district. Between 30 and 40 dumps have been taken out, and 21 self-dumping plants are operating on the creek. A gravel covered terrace follows the right limit from Cañon creek to Calder and then continues along the right limit of Quartz. 42,000 square feet of bedrock have been taken out of No. 16, and the owner estimates that this dirt will yield 80 cents per foot. During the last clean-up the pay dirt on Nos. 6 and 7 yielded $2 per square foot of bedrock. Many of the adjoining claims are equally as good as No. 16. On Nos. 6 and 7 the muck is 5 feet deep and the gravel 95 feet. From the mouth of Cañon along the right limit the muck is 12 to 25 feet and gravel 80 to 90 feet deep. On the lower portion of Quartz the creek claims are

being prospected, as well as the benches on the right limit. On 38 below A. Mack's, where the muck is 18 feet deep and the gravel about 6 inches, bedrock is taken out to a depth of 5 feet. On this portion of the creek the pay is between 300 and 400 feet wide. The laymen working on No. 38 have stripped 13,000 square feet of bedrock and estimate that the dirt will yield from 50 to 75 cents per foot. Occasionally there is found a reef of bedrock, which runs 25 cents to the pan. The total output on Quartz as a result of the spring clean-up, is estimated at $300,000.

Blackhills.—Blackhills is about 30 miles in length, and is a tributary of the Stewart river about 27 miles from its mouth. This creek was first staked in 1898, but all the claims reverted during the following year, and in 1900 a large number was sold by the government at public auction. The claims, which were acquired in this way, again reverted in 1901, and the creek was re-staked in 1906. Since that time persistent and successful prospecting has been in progress. Good pay has been found in a bench on Discovery and also on several adjoining claims. Outfits of supplies and machinery have recently been shipped from Dawson and extensive prospecting and development work is now in progress. On the main creek and tributaries there have been located over 400 claims, which are all in good standing. On claim No. 32 it is reported that gold to the value of $175 was taken out of fourteen prospecting shafts. The gravels on this portion of the creek are from 8 to 10 feet deep and 200 feet in width.

Barker.—Barker creek is a tributary of the Stewart river about 9 miles below the mouth of Blackhills and 18 miles from the mouth of the Stewart. The creek is 15 miles in length. On the upper portion of the creek the pay is in the benches on the left limit, but about one mile below Discovery the channel crosses to the right limit and follows the benches to the

Klondike Scene near the mouth of Bonanza. Photo by J. Doody, Dawson.

mouth of the creek. Good pay is reported to have been found on No. 19 and along the twenties below Discovery. Along this portion of the creek considerable prospecting work is in progress. Pay has also been found in some of the creek claims, the low level gravels having been enriched by the distribution of gold from the pay channel on the benches where they have been broken and eroded by the gulch streams.

The Dawson district presents a very wide and attractive field to the prospector. On the head waters of the Pelly, trappers and prospectors have been at work for several years. Gold is found on the bars of the rivers and colours are plentiful on the creeks. During the summer of 1908 Bob Henderson, the discoverer of the Klondike, and a small party prospected on the MacMillan and several other tributaries of the Pelly. They arrived in Dawson late in the fall and brought several specimens of coarse gold. Henderson is very enthusiastic over the prospects which he found in the locality, and hopes to return to the Pelly at an early date. 'Small "colours" of gold may be found in almost any suitable locality along the river, and "heavy colours," in considerable number, were found* as far up as the mouth of Hoole river, in the bottom of a gravel bed there resting on the basalt.'

Prior to the discovery of the Klondike the majority of the miners in the Yukon were working on the Stewart and Fortymile rivers, and particularly, at that time, on the latter stream. Now that the area of rich gold-bearing gravels in the Klondike district is diminishing, the miners are again retracing their steps to the Stewart and the Fortymile. The development work on Blackhills and Barker gives promise of the opening up of the lower Stewart. The Fortymile country, however, is now regarded as one of the most promising portions of the district, and it is reported that excellent pay has been found on

* Dr. G. M. Dawson, Rep. Yukon Dist., No. 629, p. 133.

some of the tributaries of the Fortymile river. Herbert creek, a tributary of Gates creek on the left limit about seven miles from its mouth, was staked in 1907, and it is reported that quite recently good pay has been found on Discovery on Herbert. Gates creek is a tributary of the Fortymile about 14 miles from its mouth, and has been all re-staked as a result of the discovery on Herbert. Some sixty claims have also been staked on Log Cabin creek, a tributary on the left limit of the Fortymile river about forty miles from its mouth.

During the fiscal year ending 31st March, 1909, seventy-six discoveries were made in the Dawson district. One of the most interesting of these discoveries was the location, by a Japanese named Wada, of a placer claim on High Cache creek, a tributary of Firth creek on the Arctic sea-board. Wada left Dawson early in the winter and made the trip by the old Hudson Bay route, via Rampart House and the Porcupine river, After spending a few days with the whalers near Herschell island Wada located a discovery claim on High Cache creek and returned by the Old Crow river and down Rapid river to the Porcupine. The time occupied on the return trip was nine days from Herschell island and Rampart, seven days from Rampart to Fort Yukon and from the latter point to Dawson, eight days.

Peel River.—Within the Dawson mining district is a very large tract of country which is yet practically unexplored. This area extends from the summit of the Ogilvie range of mountains to the Arctic ocean. The greater portion of this tract of territory is drained by the Peel river, which was named by Sir John Franklin (1825-1828) in honour of Sir Robert Peel. The Peel is within the drainage basin of the Mackenzie river but situated, along the greater part of its course, within the Yukon Territory. In a report by Mr. C. Camsell, of the Geological Survey Office, on his exploration of this region, in 1906, he writes:

'In panning for gold on a bar on the Peel river above the mouth of the Wind, half a dozen fine colours were obtained, showing that this stream contains more of that metal than the Wind river. Gold is reported to have been found by the Indians in the gravels of the Bonnet Plume river, and some specimens were exhibited; time, however, did not permit us to substantiate this report. This stream certainly carries a great deal of magnetic sand in its gravels, and for that reason it goes by the name of the Black Sand river among the Indians. A report is current that a certain prospector picked up a pebble of quartz, which showed some free gold, on a bar on the Peel river about thirty miles below the mouth of the Snake river; but if this is true, the specimen must have been carried there from beyond any part of the river that we were on, and was certainly not derived from any rocks near there.'

The principal tributaries of the Peel are the Blackstone, the Hart, the Wind, the Bonnet Plume and the Snake rivers. All these tributaries have their source in the Ogilvie range and flow northwards.

Duncan Mining District.

This district consists of all that portion of the territory within the watershed of the Stewart river above the mouth of and including the McQuesten river. Duncan creek, which was staked in 1901-1902, is a tributary of the Mayo river, which enters the Stewart river about 175 miles from its mouth. The miners have had considerable difficulty in reaching bedrock on Duncan creek owing to the shafts being flooded by water bedrock usually being at a depth of 100 feet. In order to aid the development of this district the territorial government furnished two pumps to enable the miners to control the water, and, if possible, to cross-cut the creek on bedrock. The pumping plant consists of a horizontal Cameron pump capable of lifting 400 gallons of water per minute to a height of 125 feet, and one light service pump, size of steam cylinder 12 inches, water cylinder 10½ inches and the stroke 18 inches. During

the past winter this plant was working on No. 54 below Discovery, but it failed to lower the water more than sixty feet. Persistent efforts, however, are still being made, and the miners and others interested in that portion of the district have shown great faith in the property by spending much time and money in what has hitherto been a fruitless endeavour to test the value of the creek. From prospects that have been obtained on the rims of the claims, it is the general opinion that good pay will be found if the water can be controlled either by the successful operation of pumps or by means of a bedrock drain. In the shallow ground along the sides of the creek, efforts are now being made to locate the pay, and on the left limit bedrock has been struck at 38 feet, where 3 feet of gravel runs from 1 to 4 cents.

Ledge, Steep, Edmonton and Cascade creeks, which are all gold-bearing, flow into Mayo lake. On these creeks, as well as on nearly all the gold-bearing creeks that have so far been discovered, are cañons, where the gold is concentrated and can easily be recovered. In the cañon on Ledge creek gold amounting to $1,000 was recovered in six weeks last fall.* Davidson creek is a tributary of the Mayo river about 2½ miles below Mayo lake. In the cañon on this creek there is the usual concentration of gold. The gravel is about 4 feet deep and carries values from 5 to 40 cents.* The flats and benches along the creeks have not yet been prospected, and work is generally confined to the beds of the creeks where gold can readily be obtained.

The Siberian method of sinking river shafts is employed on Davidson creek. 'The ground is found frozen on the surface, say four feet. A depth of two feet is thawed and taken out and the shaft abandoned to the frosts until another four feet is frozen. Then a depth of two more feet is thawed and taken out and the shaft again abandoned to the cold weather.'

* Report of A. F. George, Secretary Miners' and Merchants' Association.

Front view of Dredge No. 1 at Bear Creek. Photo. by J. Doody, Dawson, Y.T.

Haggart creek is a tributary of the south branch of the McQuesten river. In 1907 a new discovery was made on this creek, on the upper portion of which a well defined pay-streak has been located. The depth to bedrock is between 12 and 20 feet, and dumps have been taken out averaging 40 cents to the bucket. Dublin gulch, a tributary on the left limit near the head of Haggart creek, is also reported to have shown some good values. Other creeks in this portion of the district are Highet, which has produced a considerable quantity of gold, and Minto creek.

* 'The Stewart river above Fraser falls drains an area of about 12,000 square miles. During its course through this region it receives four important tributaries, the principal one being the Hess river, or south branch of the Stewart, which enters from the east a distance of fifty-five miles from the foot of Fraser falls, following the windings of the river. Twenty-eight miles farther Lansing river also enters from the east. Ladue river enters from the west at a distance of thirty-two miles above Lansing, and about seven miles farther on, Beaver river enters from the same direction.'

'In the area between Hess river and Lansing river east of the Stewart at least four creeks flowing into those streams are known to yield coarse gold. This portion was not examined by the writer,* but on Congdon creek, which comes into the Stewart from the east about six miles below Lansing, good prospects were obtained by one of the party in the surface gravels. The same difficulties which attend mining in the Duncan district, such as underground water and large boulders in the creek bottom, may be expected in these areas. Above the mouth of Mayo river the gravel bars on the Stewart, although slightly auriferous, do not yield gold in paying quantities. Beyond the mouth of the Beaver river the bars do not appear to be auriferous. The same may be said of the Beaver, and although fine gold was said to have been found in 1898 on the bars of Rackla river, its principal tributary, no colours could be obtained by the writer's party on that stream, but on

*Report of J. Keele, Geological Survey Officer, Ottawa. (16)Nos. 943, 951.

a small stream nearly opposite the mouth of Rackla river coarse gold was obtained in the surface gravels.'

'The entire drainage basin of the Stewart is of a mountainous character, and although much of the upland country in the area is composed of rounded and wooded hills, or low ridges, there are also high detached ranges or single isolated groups of mountains with peaks which measure from 6,000 to 7,400 feet above sea level, or quite as high as the more prominent peaks in the watershed ranges.'

Sixtymile Mining District.

This district comprises all the Sixtymile river above the mouth of and including Boucher creek. The principal gold-producing streams in the district are Glacier, Miller, Big Gold, Little Gold and Bedrock creeks. On Glacier creek, which is seven miles in length, all the creek and bench claims from 37 above to 33 below have been staked for some years and have been renewed annually. Quite recently a Discovery claim was staked on Big Gold creek near the mouth of Glacier. Prospecting work on this claim has resulted in locating what is believed to be the continuation of the pay channel of Glacier creek. Prior to this discovery the pay channel on Glacier had not been traced farther than 18 below. As a result of the new strike there has been a concentration of mining operations in that portion of the district. The pay channel has already been traced down Big Gold creek, and there is every indication that it will also continue down the Sixtymile. Within the past few months another new strike is reported to have been made on Miller creek, and it is claimed that pay from 8 to 10 cents to the pan of coarse gold has been obtained. 'Sixtymile creek or river shows gold in the bars as far as the Yukon. Ten dollars a day has been made on some of the bars near the Yukon by men with grizzlies and rockers. There has been practically no prospecting of the main extent of this river.'* A consid-

*Report of Secretary Merchant's and Miner's Association.

erable number of claims are owned and represented on Bedrock creek, which is reported to contain ground of considerable value. The high transportation rates have to a great extent retarded the development of the Sixtymile district. As soon as it is possible to obtain supplies at a more reasonable figure, many of the claims which have not even been prospected, will undoubtedly be worked at a profit. General reports which have been received from the miners working in the district, indicate that within the next few years there will be a considerable increase in the output of gold from this section of the territory. The office of the mining recorder for this district is situated on Glacier creek.

Whitehorse Mining District.

This district consists of the territory tributary to the Lewes river on its right limit above a point one mile above the mouth of Little Salmon river, and on its left, above a point one mile below the mouth of the Nordenskiold river, excepting the portion of the territory described as the Conrad mining district. Many creeks were staked in the Whitehorse district during the early rush to the Klondike, and since that time a considerable quantity of gold has been recovered in that section of the territory. The principal gold-bearing streams in the district are Livingstone, Cottoneva, Summit, Little Violet and Mendiceno creeks. The following statement shows in a condensed form the placer mining operations, at present in progress, in the Whitehorse and Kluane mining districts:—

*PLACER OPERATIONS—WHITEHORSE AND KLUANE MINING DISTRICTS.

	Number of claims under grant.	Number of men employed.	Surface Pay Gravels (Cub. yds.)	Estimated value per cub. yd.	Creek Channel Gravels. (Cub. yds.)	Estimated value per cub. yd.	Hill Channel Gravels. (Cub. yds.)	Estimated value per cub. yd.	Unprospected gravels. (Cub. yds.)	Total pay gravels. (Cub. yds.)	Estimated average value per cub. yd.	
WHITEHORSE.												
Livingstone	53	45	Nil.	Nil.	12,000	$4.00	4,000	$5 00	100,000	16,000	$4 50	Enough wood and saw
Cottoneva	18	6	"	"	10,000	3 00	Unprospected	.....	200,000	10,000	3 00	logs for use of camp
Summit	15	5	"	"	10,000	4 00	"	.....	50,000	10,000	4 00	are available in Big
Little Violet	7	5	"	"	10,000	4 00	"	.....	50,000	10,000	4 00	Salmon District.
Mendiceno	2	0	"	"	?	2 50	"	.....	500,000	.....	.....	
KLUANE.												
Bullion Creek	20	4	10,000	$1 00	Nil.	Nil.	Unprospected	.....	1,000	10,000	1 00	Limited quantity of fuel
Sheep Creek	35	10	150,000	1 00	"	"	"	.....	500,000	150,000	1 00	and saw logs available for Sheep and Bullion, 3 to 5 miles from working claims. Coal used for fuel on Sheep.
Fourth of July	30	15	50,000	1 00	?	2 50	"	.....	500,000	50,000	1 00	Plenty of fuel and limited
Ruby	10	5	10,000	1 00	Unprospected		"	.....	100,000	10,000	1 00	quantity of logs on 4th July and Ruby creeks.
Burwash	80	30	100,000	1 00	6,000	7 50	10,000	7 50	1,000	16,000	7 50	Very limited quantity fuel or logs near mining on Burwash. Sufficient timber below Canyon. Available in winter.

*Ann. Rep. R. C. Miller, Assistant Gold Commissioner, 1909.

4 Below Lower Discovery on Dominion "Hillside."

PART II.

GENERAL CONDITIONS.

1. Prospectors.—The prospectors are the most valuable asset of a mining community. To the early prospectors in the Yukon the credit is due for having contributed to the world's wealth the enormous quantity of gold which has been recovered from the auriferous deposits of the Klondike. Attracted by the possibilities of making their fortunes these sturdy pioneers manifest a courage equal, if not superior, to that of the soldier on the field of battle. They invade the fastnesses of nature, and with an untiring energy and an unconquerable will, they overcome the natural barriers which seem to guard the precious metal with such frigid jealousy. The simple fare and strenuous exercise enable them to endure occasional privation and hardships, while the rifle furnishes them with fresh meat from the vast herds of moose and caribou that roam over the Yukon plateau. Apart, however, from the economic phase of the prospector's life, there is a peculiar attraction in the solitary life of the wilderness. Remote from the restraints and conventionalities of civilization, they enjoy the freedom of solitude and the simple life of the forest. Prospecting in summer and trapping and hunting in winter, they are self-confident and independent. Their discoveries open up opportunities for the investment of capital and the employment of labour, while the merchant, the professional man and the artisan share in the profits of their industry.

2. Grub-staking.—To 'grub-stake' a prospector is to furnish him with an outfit and provisions on condition of participating in the profits of his discovery. Under the Yukon Placer Mining Act it is provided that if any person satisfies the mining recorder that he is about to undertake a bona fide prospecting trip and files with the recorder a power of attorney from

not more than two persons, authorizing him to stake claims for them in consideration of their having enabled him to undertake the trip, he may stake one claim in the name of each such person upon any creek on which he makes a discovery. Under this provision the man of moderate means and the capitalist, in any part of the world, are afforded an opportunity of exploiting the mineral belt of the Yukon and sharing in the profits of the discoveries without either having to undertake the strenuous life of the prospector or pay a high price for property after values have been established. There are three sources from which the prospector can usually obtain an outfit. He may be outfitted (1) by those who desire to furnish provisions and equipment on condition of participating in the profits of the discovery, (2) by trapping, hunting and selling the fur and meat, which he obtains in this way during the winter, and (3) by rocking on the heads of the numerous bars along the principal streams in the territory. The favourite streams, where a 'grub-stake' could be obtained in the early days, were the Stewart and the Fortymile.

3. Staking.—All claims must be as nearly as possible rectangular in form, and marked by two legal posts firmly fixed in the ground. The line between the posts must be well cut out, so that one post may, if the surface of the ground will permit, be seen from the other. One of the flatted sides of each post must face the claim and on each post must be written on the side facing the claim a legible notice stating the name or number of the claim, or both if possible, its length in feet, the date when staked, and the full Christian and surname of the locator. The posts, which are numbered 1 and 2 respectively, must not be moved except No. 2, which may be moved by a Dominion land surveyor if the distance between the posts exceeds the length prescribed by the Act, but not otherwise.

(a).—*Creek claims.*—On creek claims the posts must be fixed in the ground on the base line at each end of the claim.

Creek claims must not exceed 500 feet in length measured along the base line established or to be established by government survey. The rear boundaries of the claim shall be parallel to the base line, and shall be defined by measuring one thousand feet on each side of such base line. If the base line has not been established, the claim may be staked along the general direction of the valley of the creek, but when the base line is established, the boundaries thereby defined shall be conformed to.

(*b*) *Other claims.*—A claim situated elsewhere than on a creek must not exceed five hundred feet in length parallel to the base line of the creek toward which it fronts, by one thousand feet. A claim fronting on a creek or river must be staked as nearly as possible parallel to the general direction of the valley of the creek or river, and shall conform to the boundaries which the base line, when established, shall define.

(*c*) *Discovery claims.*—Any person locating the first claim on any creek, hill, bench, bar or plain, or locating a claim on any creek, hill, bench, bar or plain upon which there is no recorded claim, is entitled to a claim fifteen hundred feet in length. If, however, there are two locators, they shall be entitled to two claims, each of twelve hundred and fifty feet in length, but if there is a party consisting of more than two locators, they shall be entitled to two claims each of one thousand feet in length, and for each member of the party beyond two, a claim of the ordinary size only.

Claims must be measured horizontally irrespective of inequalities on the surface of the ground.

4. Emergency Recorder.—In the Yukon Placer Mining Act there are two provisions which safe-guard the rights of the prospector, when operating in a portion of a mining district not easily accessible to the recording office. An ordinary

application for a grant of a claim must be filed with the mining recorder for the district within ten days after the location, if the claim is situated within ten miles of the recorder's office, and one extra day is allowed for every additional ten miles. In the event of a claim, however, being more than one hundred miles from the recorder's office, and situated where other claims are being located, the locators, not less than five in number, are authorized by the Act to meet and appoint one of their number an emergency recorder, who shall act in that capacity either until a mining recorder has been appointed or until the arrival of the nearest recorder. In the event, however, of there being only one or two prospectors in a locality where a discovery is made, the Act provides that any person, upon satisfying a mining recorder that he is about to undertake a prospecting trip, may, upon payment of a fee of $2, receive written permission from the recorder, allowing him to record a claim within his mining district at any time within six months from the date of the staking.

5. Advantages to Prospectors.—Some of the advantages or privileges offered as an aid or inducement to prospectors in Yukon, may be enumerated as follows:—Instead of an ordinary creek claim of 500 feet by 2,000 feet, the prospector or discoverer is allowed a claim of 1,500 feet by 2,000 feet, and may obtain authority to stake by power of attorney as many as two ordinary claims upon any creek on which he makes a discovery. There is now an excellent system of roads throughout the territory, and an outfit can be delivered even at many points on the outlying creeks at a very moderate rate. Under 'Transportation' will be found a table of distances, showing the rate per pound for carrying freight between Dawson and almost every point of importance in the northern end of the territory. In the same chapter there is also another table showing the distances and cost of transportation between

Whitehorse and the most important mining centres in the southern end of the territory. During the close season miners and prospectors may lawfully hunt, take or kill, any of the beasts, birds or wild fowl in the territory, when such miners or prospectors are engaged in any mining operations and are in actual need of food. Fish are also plentiful in the streams and lakes of the territory. Every winter several tons of trout —some weighing 20 pounds—and white fish are brought to Dawson from lakes near Minto, and large quantities are also caught in Mayo lake and Lake Lebarge. In the Klondike river and also on such streams as Rock creek, trout and greyling are plentiful, and are caught by rod and line during the summer season. In a recent report on the Duncan district it is pointed out that 'in the matter of fish and wild ducks of every kind the district excels all other districts in Yukon. The greyling netted in the fall and frozen are round and fat as young porpoises. To feed them to the dogs seems a shame, but they were the cheapest uncooked feed there. The supply is quite inexhaustible. Caribou herds are not so numerous nor nearly so big as on the west side of the Yukon river. But the abundance of fish which can be readily caught under the ice, if a supply has not been laid in, and its altogether superior quality, makes up for the scantiness of caribou.'*

6. Transportation.—The cost of transporting machinery from the factory to the mine is an important item to the mine owner or the capitalist, and very often the launching of an enterprise may be retarded or checked by the question of transportation. A schedule showing the rates of the White Pass Company between Pacific coast ports and Dawson, and the cost of freighting to points on the different creeks, will be found in the chapter dealing with transportation. The mine owner or capitalist contemplating the installation of machinery will be

*Report of Secretary Merchants' and Miner's Association.

able to estimate the actual cost from any of the ports along the Pacific coast to Dawson, thence to almost every point along the excellent system of roads that have been constructed by the territorial government throughout the gold-bearing region of the territory.

7. Timber.*—Very little timber is available on the principal creeks in the Klondike district, where mining is being carried on. Large patches of spruce are still to be found at the head of some of the creeks. A considerable quantity of timber from 3 to 6 inches is available at the head of Gold Run, at the head of Quartz creek and along some of the tributaries on the left limit of Dominion. There is excellent timber along the Stewart and Pelly rivers and their tributaries. The chief supply for the mills at Dawson is obtained from the islands along the upper Yukon and from the Klondike valley, which is bordered at intervals from the mouth of Hunker to the mountains by groves and small tracts of well grown spruce timber. Good timber is also available along the Yukon, and can be easily and cheaply floated down to Dawson. In the Klondike and Indian river sections of the Dawson district, wood is delivered on the claims in 16 feet lengths at the following prices, namely:—

Bonanza	$14 00
Dominion—Caribou	12 00
33 below Lower Discovery	8 00
100 below lower Discovery	6 00
Granville	8 00
Gold Run	8 00
Hunker Summit	12 00
Quartz Creek	6 00
Sulphur —38 above Discovery	8 00
Discovery	9 00
50 below Discovery	7 00
Mouth of Sulphur	7 00

8. Frozen Ground.—Throughout almost all the mining districts in the territory, with the exception of Kluane, the gravels are covered by a body of black frozen muck, which varies from 4 to 20 feet in thickness. The muck can be picked, but no impression can be made on the frozen gravels, which

*For price of umber see Appendix III.

Thawing ground with steam.

have to be thawed. ' The thickness of the frozen stratum varies considerably, and is less on the ridges than in the valleys, and on southern than on northern slopes. A shaft sunk on the ridge south of Eldorado creek reached unfrozen ground at a depth of 60 feet, while one in the valley of Eldorado creek, was stopped by running water at a depth of a little over 200 feet. Another shaft sunk through gravel, on the plateau between Bonanza creek and the Klondike river, passed through the frost line at a depth of 175 feet.'* Near the head of Quartz creek a shaft tapped running water at a depth of about 216 feet. ' The summer heat has little effect on the frozen layer except in the few places where the surface is unprotected by moss. Exposed gravel beds in favourable positions thaw out to a depth of from six to ten feet, but where moss is present, frost is always encountered close to the surface.'* The depth of gravel varies from 3 feet on some of the creeks to 30 and 40 feet on lower Dominion and from 80 to 100 feet on Quartz creek. The frozen muck which overlies the gravels forms an exceedingly firm roof and no timbering is required in the drifts. The shafts in which self-dumpers are operating, however, are usually timbered as well as the tunnels leading from the bottom of the shafts to the face of the drifts. Underneath the frozen muck large chambers can be excavated during the winter. * ' In one case on Dominion creek a muck roof unsupported by pillars covered a vault said to measure 140 feet by 230 feet and remained unbroken until midsummer. Examples of muck roofs spanning vaults over 100 feet in width are quite common.'

9. Low Level Gravels.*—' The low level creek gravels are the most important gravels in the district. These gravels floor the bottoms of all the valleys to a depth of from four to ten feet. They rest on bedrock usually consisting of decomposed and

*R. G. McConnell, B.A., Report of the Klondike Gold Fields, 1905.

broken schists, and are overlaid by a sheet of black frozen muck ranging in thickness from two to thirty feet or more. They are local in origin and consist entirely of the schists and other rocks outcropping along the valleys. The schists pebbles are usually flat round-edged discs measuring one to two inches in thickness and two to six inches in length. They constitute the greater part of the deposit, but are associated with a varying proportion of rounded and sub-angular quartz pebbles and boulders, and, less frequently, with pebbles derived from the later eruptive rocks of the region. The pebbles are loosely stratified, are usually embedded in a matrix of coarse reddish sand and alternate in places with thin beds of sand and muck.'

(*a*) *Creek.*—'The creek gravels frequently inclose leaves, roots and other vegetable remains, and also the bones of various extinct and still existing northern animals, such as the mammoth, the buffalo, the bear, the musk-ox and the mountain sheep and goat.'

(*b*) Gulch.—'The gulch gravels occupy the upper portions of the main creek valleys and small tributary valleys. They differ from the creek gravels in being coarser and more angular. A considerable proportion of their material consists of almost unworn fragments of schist washed down from the adjacent slopes. They contain the same vegetable and animal remains as the creek gravels.'

(*c*) *River.*—'The only river gravels of the district proven, so far, to contain gold in paying quantities occur in the wide flats bordering the lower portions of the Klondike river below the mouth of Hunker valley. The river gravels consist of quartzite, slate, chert, granite and diabase pebbles largely derived from the western slopes of the Ogilvie range. They are harder and better rounded than the creek gravels, a necessary result of the greater distance travelled.'*

* R. G. McConnell, B.A., 14-B, Ann. R. Geol. Sur., Vol. XIV.

10. Terrace Gravels.*—'Rock terraces occur at various points cut into the steep slopes of the present valleys. They were produced during the deepening of the valleys, and are simply remnants of former valley bottoms. They are small, seldom exceeding a few yards in width and a few hundred yards in length, irregular in distribution, and occur at all elevations up to the bottoms of the old valleys. The terraces support beds of gravel, usually from six to fifteen feet in thickness, very similar to that in the creek bottoms, but showing somewhat more wear. The terrace gravels, like the creek gravels, are overlaid, as a rule, with muck, and at one point on Hunker creek were found buried beneath a hundred feet of this materal.'

11. High Level Gravels.*—'They consist, principally, of ancient creek deposits, overlaid near the mouths of some of the valleys by gravels laid down by the Klondike river, when it ran at a much higher level than at present, and occupied a somewhat wider valley. These gravels occur at various points along the Klondike river. In the Klondike district they are found covering the small plateaus in which the ridges separating Bonanza and Hunker creeks from the Klondike river terminate. They rest in both places, on high level creek gravels at an elevation of about 450 feet above the present valley bottoms. They have a thickness of from 150 to 175 feet, and consist principally of well-rolled pebbles, of quartzite, slate, chert, granite, diabase and conglomerate embedded in a matrix of gray sand, and derived, like those in the present stream, from the western part of the Ogilvie range.'

(*a*) *White channel gravels.**—The white channel gravels differ somewhat from the ordinary type of stream deposit. They are very compact as a rule and in some of the hydraulic cuts stand up in almost vertical cliffs, even when the face is

*R. G. McConnell, B.A., 14–B, Annual Report Geological Survey, Vol. XIV.

unfrozen. The white or light grey colouration, from which the deposit derives its name, is very conspicuous in most of the sections but is not universal, as red, yellow and dark grey beds frequently occur. The deposit is highly siliceous, the principal constituents consisting of rounded pebbles and rounded and sub-angular boulders of vein quartz. Flat schist pebbles and boulders, usually in a more or less advanced stage of decomposition, occur with the quartz, and also occasional pebbles derived from the various dikes and stocks outcropping along the valleys. No material foreign to the districts occurs in the deposit. The pebbles and boulders are usually small, seldom exceeding eighteen inches in diameter, and are embedded in a compact matrix consisting essentially of small sericite plates and fine angular quartz grains . . ' The uniformity of the deposit in composition and general character throughout sections a hundred feet or more in thickness is very striking. The bedding planes as a rule, are inconspicuous, and there has been no sorting of the various constituents into separate beds. The deposits, unlike the creek and gulch gravels, appear to be destitute of vegetable and animal remains. The thickness of the White Channel gravels varies from a few feet to 150 feet, and the original width from a couple of hundred yards to over a mile.

(*b*) Yellow Gravels.*—'The white compact gravel deposit described above is overlaid in places by loosely stratified gravels known as the yellow gravels. The latter are of a rusty colour, are more distinctly stratified than the white gravels and consist mainly of flat schist pebbles lying loosely in a coarse sandy matrix.'

12. White Channel.*—'The White Channel bench or hill gravels are the oldest in the district, and, excepting the present creek gravels, the most important from an economic

*R. G. McConnell, B.A., Geological Survey Reports Nos. 884 and 979.

Summer Sluicing, No. 8 Gold Run, June, 1909. Photo by J. Doody, Dawson.

standpoint. They were originally creek gravels, deposited in a similar manner to those occupying the low levels at present, and their elevated position is due to an uplift which affected the whole region bordering the Yukon from the Stewart river northwest to the Alaskan boundary and for a considerable distance beyond. This uplift, and a small depression which preceded it, produced many notable changes in the topography of the country. It is probably, although not conclusively proved, that during the White Channel period the lower portion of the Klondike valley, the portion into which the principal gold-bearing creeks discharge, was occupied by a small local stream and that the Klondike itself flowed either into the Stewart or into Twelvemile river. The White Channel deposits are remarkable in this respect that even when completely destroyed their former portion is marked by a trail of gold. They are traceable in this manner from the present mouth of Hunker, Bear and Bonanza creeks far out into the present valley of the Klondike, showing that the old valley was small, smaller than that of Hunker creek and unlikely to have contained a large rapid river such as the Klondike. At the close of the White Channel period the district was depressed and it was during this depression that the Klondike is considered to have broken into its present valley. It brought down an immense quantity of material from its upper reaches, and rapidly built up a wide gravel bed fully 150 feet in depth. These gravels at the mouth of Hunker and Bonanza creeks rest on the White Channel deposits and at other points, where not destroyed, are distributed along the hillsides at the same level. * The depression was followed by an uplift of approximately 700 feet, which gave new life to all the streams by increasing their grades, and they immediately commenced to deepen their channels. This process was continued not only through the old

*R. G. McConnell, B.A., Geological Survey Report. (No. 979.)

gravel deposits but down into the bedrock to a depth of from 150 to 300 feet. The new valleys are sunk as a rule, through the bottom of the old ones, but in a few places, as at the mouth of Bonanza creek, they deviate from them and have carved out independent courses. The difference in character between the old and new valleys is striking. The old ones represent the product of long continued stable conditions, and are characterized by wide flats and gently sloping sides, from which all traces of angularity have been smoothed away. The flats of the old Hunker creek valley have a width in places of over a mile. The new valleys, on the other hand, while opening out into occasional basins, are generally narrow, steep-sided and angular. This applies only to the creeks, all of which are small, as the Klondike river has cut a huge trench through the district since the uplift. Only a portion of the deposits of the old valleys was destroyed during the excavation of the recent valleys, as the latter are much narrower and do not follow exactly the same course. The undestroyed portions constitute the White Channel gravels of the miners.'

13. Bedrock.*—'The greater part of the gold both in the hill and creek gravels occurs on or near bedrock, either in the lower four to six feet of gravel or sunk for some distance in the bedrock itself. The distribution depends largely on the character of the bedrock. Soft schists such as those underlying the rich portion of upper Dominion creek prevent the gold from descending, and it accumulates in a thin layer at the base of the gravels. In many of the rich claims between the two discoveries on Dominion creek a thin stratum of gravel resting immediately on bedrock proved extraordinarily rich, while the bedrock and the upper gravels were comparatively lean. On Bonanza creek the bedrock as a rule is harder and more flaggy, and the action of frost has parted the layers and allowed a por-

*R. G. McConnell, B.A., Geological Survey Report (No. 979).

tion of the gold to descend along them. From three to five feet of bedrock are usually mined at a profit, and gold has been found in some quantity at a depth of twelve feet and probably descends still deeper. On a couple of claims on Hunker creek, below the mouth of Seventy Pup, practically all the gold occurred in a shattered porphyry bedrock, the overlying gravels proving almost barren. The bedrock underlying the hill of White Channel gravels is more decomposed than that in the creek bottoms, does not open out in the same way and retains most of the gold at or near the surface. In a few places gold has been found in paying quantities in the schist partings under the decomposed layer, but as a rule only the upper few inches are mined.'

14. Representation.—When a claim has been staked and a grant issued, the owner has absolute right of renewal from year to year upon payment of a renewal fee and doing or causing to be done work on the claim to the value of $200. The intention of the provision dealing with representation is to stimulate development work, and if possible, to prevent claim owners from holding claims for speculative purposes. In some cases attempts are made to retain mining property by the performance of an amount of representation work which leaves some doubt as to whether or not the law has been complied with. In such cases the claims are often relocated and if the relocator can prove that the necessary amount of representation work has not been performed, the title to the claim becomes forfeited, and the relocator has the first right to locate the claim. No title shall be contested by any one who does not claim an adverse right except by leave of the commissioner of the territory. The cost allowed by the government for representation work, is defined as follows:—

SHAFT SINKING.

For first ten feet in depth, $2 per running foot of dirt removed.

For second ten feet in depth, $4 per running foot of dirt removed.

For third ten feet in depth, $6 per running foot of dirt removed.

For fourth ten feet in depth, $8 per running foot of dirt removed.

Below forty feet in depth, $10 per running foot of dirt removed.

TUNNELLING.

(*a*) In unfrozen ground, for first (25) twenty-five feet, $2 per running foot.

Beyond (25) twenty-five feet, $3 per running foot.

(*b*) In frozen ground, for first (25) twenty-five feet, $3 per running foot.

Beyond (25) twenty-five feet, $4 per running foot.

DRIFTING FROM SHAFT.

(*a*) In unfrozen ground, $2 per running foot.

(*b*) In frozen ground, $3 per running foot.

There shall be allowed, in addition, one dollar per running foot for every ten feet in depth of the shaft from which the drift is run. In measuring of the drift each running foot shall have a width of four feet, and where the drift is of a greater width, allowance shall be made for such additional work on a basis of each running foot having a width of four feet.

TIMBERING.

In shaft, $3 per running foot.

In drift or tunnel, $2 per running foot.

OPEN CUTTING.

(*a*) Ground sluicing, 50 cents per cubic yard of dirt removed.

(*b*) Stripping (by scraper), 75 cents per cubic yard of dirt removed.

(*c*) Hand-shovelling, $1.75 per cubic yard of dirt removed.

DRILLING.

In all cases, including both steam and hand-drilling, the actual cost of such work.

HYDRAULICKING, DREDGING AND STEAM SHOVELLING.

50 cents per cubic yard.

UNPROVIDED CASES.

Other miner-like work for which special provision is not made, shall be allowed at the actual cost, but for ordinary labour $7.50 per day per man employed shall be allowed.

All mining operations for the purpose of representing claims shall be done in a miner-like manner.

15. GROUPING.—The mining recorder may grant permission for a term not exceeding ten years, to any person or persons, not exceeding ten in number, owning adjoining claims, to perform on any one or more of such claims all the work required to entitle the owner or owners to a renewal grant for each claim so grouped, provided the applicants file with the recorder a deed of partnership creating a joint liability between the owners of the claims for the joint working thereof. Permission may also be given to group more than ten adjoining claims, if the commissioner of the territory is satisfied that the interests of the locality where the claims are situated would be materially benefitted by such grouping, and such claims may not all be contiguous. The grouping of claims enables the owners to

more thoroughly and economically prospect a locality by sinking shafts and tunnelling directly across a creek.

16. Stampedes.—When a rumour is current in a mining camp that gold has been discovered on some unknown creek, miners, as a general rule, rush off to the scene of the discovery. Distance and the most rigorous climatic conditions present no obstacles. In the early days stampedes in the Klondike could have been numbered by the hundred, and the territory suffered to some extent from such a panicky condition. Within recent years stampedes have been organized for the purpose of staking a creek or portion of a creek in order to promote a dredging enterprise. Rigs or a steamboat may be chartered, and the utmost secrecy prevails until the expedition returns. The actual cost of an organized stampede is computed as follows, namely:

Purchasing rights of 100 stakers, at $20	$2,000 00
Recording fees—100 claims, at $10	1,000 00
Fees recording transfers—100	101 00
Legal fees and sundries	399 00
	* $3,500 00

To entitle the promoter of such an enterprise to the absolute right to the renewal of 100 claims, it is necessary to expend $20,000 in representation work, and an additional $1,000 in renewal fees. Unless the ground has been carefully and systematically prospected, it is useless to undertake such an enterprise without available capital to prosecute development work.

17. Water Rights.—Under the Yukon Placer Mining Act a claim owner is entitled to the seepage water on his claim and to the use of a certain quantity of the lawfully unappropriated water flowing past his claim. Water rights are granted for a period not exceeding five years, and in special cases for

*These figures are the exact cost of an actual stampede, and were kindly furnished by one of the interested parties. Had it not been that the locality was convenient to the stakers, an additional amount would have been necessary for transportation.

a longer period. A grant of water on an occupied creek is subject to the rights of claim owners working on the stream above or below the ditch-head and of any other persons lawfully using the water. If, after a water right has been granted, claims are located and worked below the ditch-head on any diverted stream, the operators shall collectively be entitled to the continuous flow of the water passing their claims to the following extent:—

(*a*) If three hundred inches or less are diverted, they shall be entitled to forty inches and no more;

(*b*) If over three hundred inches are diverted, they shall be entitled to sixty inches, and no more;

Except, in either case, upon paying to the owner of the ditch, and all other persons interested therein, compensation equal to the amount of damage sustained by the continuous flow of such extra quantity of water as is desired. When the holder of a water grant has the privilege of selling water, the price charged for such water is subject to the control of the commissioner of the territory, and the water must be supplied to all claim owners who make application therefor in a fair proportion, and according to priority of application.

In measuring water in any ditch or sluice the following rules must be observed:—

(*a*) The water taken into a ditch or sluice shall be measured at the ditch or sluicehead;

(*b*) No water shall be taken into a ditch or sluice, except in a trough placed horizontally at the place at which the water enters it;

(*c*) One inch of water shall mean half the quantity that will pass through an orifice two inches high by one inch wide, with a constant head of seven inches above the upper side of the orifice;

(*d*) A sluicehead shall consist of fifty such inches of water.

Every grant of water appurtenant to a claim which is sold, shall be construed to have conveyed and transferred all recorded water privileges appurtenant to the claim assigned.

18. Reservoirs.—The commissioner may withdraw from mining entry any vacant ground required as a reservoir site or for any other purpose in connection with the storage of water, but only such ground as has been thoroughly prospected and has been found to be worthless for placer mining purposes.

RESERVOIRS CONSTRUCTED IN KLONDIKE DISTRICT.

Location.	Owner.	Catchment area.	Capacity, cu. ft.
Upper Bonanza	Yukon Gold Co	14·48 sq. miles	43,500,000
Ackland Farm	"	8·17 "	1,330,000
Adams Creek	Bonanza Creek Gold Mining Co	6·64 "	6,600,000

19. Surface Rights.—Large stretches of the river beds in the Yukon have been acquired under the regulations governing the issue of leases to dredge for minerals, but with one or two exceptions, the dredges in the territory at the present time, are operating on creek claims or flats adjoining river beds. All claims that have been staked or otherwise acquired for the purpose of dredging are held subject to the provisions of the Placer Mining Act. The surface rights of a claim are nat granted to any person other than the owner of the claim until the owner is given an opportunity to acquire such rights. This provision protects the dredge operator against litigation, which otherwise might be created by some other person acquiring the surface rights of mining property, the surface of which must necessarily be destroyed by dredging operations.

Yukon River at Selwyn.

20. Machinery.—Very crude devices were employed in the early days, *i.e.*, '98 and '99, to handle the pay dirt and recover the gold. The invention and introduction of modern mining machinery specially adapted to the frozen ground in the Yukon may be attributed to the experience and enterprise of resourceful miners and operators, the high price of labour, and the necessity of reducing the cost of operations in order to mine gravels carrying low grade pay. The steam points and equipment for thawing by hot water, the self-dumper and the mechanical elevators (which have recently been installed on Bonanza creek by the Yukon Gold Company), have all been specially designed to meet the conditions that exist in the Klondike.

21. Grade of Gold *—'Klondike gold varies greatly in grade, not only on different creeks but also along different portions of the same creek. The difference of grade is due to the gold being in all cases alloyed with silver in varying proportions**. In the lowest grade gold the silver almost equals the gold in volume, the ratio being 1 to 1·4. In the high grade gold the ratio is 1 to 5 and the general average is 1 to 2·3. In value the ratio of silver to gold is very small, the proportion calculated from a number of returns being approximately 1 to 150**. While the grade of the placer gold is supposed to conform in a general way with that of the original vein gold, some changes are evidently produced by the leaching out of a portion of the silver contents. Evidence of loss of silver is afforded by the fact that fine gold which would necessarily be affected more by leaching than the accompanying coarse gold invariably carries a smaller percentage of silver. Nuggets also assay higher as a rule on the surface than in the centre. Five assays of selected nuggets made by Mr. Connor in the laboratory of the survey gave the following results:—

*R. G McConnell, B. A. Report of Gold Values in the Klondike High Level Gravels. (No. 979).

	Centre of Nugget.	Surface.	
1. Silver	35·8	29·4	Trail hill, Bonanza creek.
Gold	64·2	70·6	
2. Silver	39·9	33·5	Chechaco hill, Bonanza creek.
Gold	60·1	66·5	
3. Silver	37·3	30·3	Bonanza creek, No. 12 below.
Gold	62·7	69·7	
4. Silver	46·1	41·0	Treasure hill, Last Chance creek.
Gold	53·9	59·0	
5. Silver	33·0	33·5	Bonanza creek, No. 3 below.
Gold	67·0	66·5	

'All the nuggets with the exception of No. 5 show losses in silver of from five to seven per cent on the surface, assuming that the composition was originally uniform. No. 5 was a large nugget filled with quartz and its exceptional character is probably due to its being much younger than the others.'

22. Transportation of Gold.*—The two main factors in the transportation of coarse gold by natural causes are grade and bedrock. With steep grades and smooth bedrock transportation is comparatively rapid, while little movement takes place when the grades are moderate and the valleys are floored with the tilted flaggy schists characteristic of the district. The Klondike slopes are everywhere mantled with a thick covering of broken and partially decomposed schist fragments easily moved when not frozen and ever tending downwards towards the creek and gulch levels. The downward movement is slow and intermittent at present on account of the perpetually frozen condition of the surface, except on sunny slopes. During the period of the White Channel gravels—the period of the great gold accumulations—climatic conditions were less severe and the movement must have been much more rapid. The slide material carries with it the gold and gold-bearing quartz released by the breaking up of the auriferous quartz veins, and when running water is reached the gold is sluiced out and re-

mains behind, while the rock fragments are ground up and carried away.

(*a*) *In gravels.*—The distance travelled by the gold after reaching the waterways, neglecting the time element, depends on the grades and bedrock. The upper portions of the creeks and the steep gulches, except where they cross the pay-streak of the White Channel gravels and are directly enriched from them, have not proved rich and are only occasionally productive. The gold washed down into them moves slowly on, and all the great accumulations occur on portions of the creeks with grades of 150 feet or less to the mile. Evidence of the tardy movement of coarse gold down streams of moderate grade, even where the latter are actively engaged in eroding their channels, is furnished at many points along Bonanza and Hunker creeks. The pay-streak of the elevated White Channel gravels has been destroyed in places along both these streams. Whenever this occurs the creek bottoms directly opposite the destroyed portions are immediately enriched, showing that the gold, or a large portion of it at least, has remained almost stationery during all the time the creeks were employed in deepening their channels from 150 to 300 feet. The complementary relationship existing between the creek and the hill pay gravels has been recognized by the miners, and whenever the creek gravels are lean, pay is confidently expected on the hills, and in the productive portions of the creeks is usually found.

(*b*) *On bedrock.*—The influence of bedrock in retarding or accelerating the progress of gold down stream is almost as important as that of grade. The common bedrock of the district is a light coloured flaggy sericite schist of unequal hardness and usually tilted at high angles. The sericite schist alternates in places with bands of dark graphitic schists and is broken through by numerous porphyritic dikes and stocks. The light coloured flaggy schists when had, form an excellent

bedrock from the miner's point of view, as they weather unequally into irregular rock ripples, which arrest the progress of the gold. The partings also open out under the influence of the alternate freezings and thawings to which the rocks are subjected and the gold descends along them, and continues to descend as the surface is gradually lowered by erosion. Its progress down stream when caught in this manner is indefiinitely delayed. The porphyritic rocks when shattered, as is often the case, also arrest most of the gold. The soft varieties of the sericite schists and the dark graphitic schists, on the other hand, offer small resistance to the passage of the gold. They weather to a smooth surface along which the gold moves easily, and the portions of the creeks underlaid by them are usually lean.'

23. Purchase of Gold.—The two banks* in Dawson purchase gold either in the form of dust or dry amalgam. When the gold is presented at the banks, all foreign matter, such as sand, is blown out of the dust by the gold buyer, who weighs it in the presence of the owner. The gold buyers have usually had considerable experience in handling gold, and by the appearance of the dust can invariably designate the creek from which it has been derived. The dust from the different claims is either purchased at a rate established by previous assays, or if the owner prefers, a receipt for the weight is given and a special assay is made. In making the assay the dust or amalgam is melted by the assayer, and the base metals (iron and copper) fluxed off. It is then poured into moulds and cleaned of any slag adhering to the gold. The bar is next weighed, and the difference in weight represents the loss in melting. Afterwards, sample chips are taken from the bar (along diagonal lines on top and bottom), and each chip is assayed. The results of the assay of each chip must check within one-tenth of a

*Branches of the Canadian Bank of Commerce, and the Bank of British North America.

Hydraulicking.

point of fineness. From the results of the assay a certificate of fineness is given, 1,000 fine representing pure gold at $20.67 per ounce. The royalty on all gold shipped from the Yukon is 2½ per cent. or 37½ cents per ounce, and the valuation of gold for royalty purposes is $15 per ounce. The following is a list of the assay values of dust from some of the principal creeks, namely:

VALUES OF GOLD DUST.

Name of Creek.	Assay Value of Dust.
All Gold	$17 00 – $17 25
Bonanza Creek—above Discovery	16 44 – 16 84
" below Discovery	15 54 – 16 39
Blackhills	14 75 – 15 63
Canyon	14 38 – 15 15
Dago Gulch and Hill	14 43 – 17 08
Dominion Creek—below Upper Discovery	16 46 – 16 85
" above Lower Discovery	16 60 – 16 80
" below Lower Discovery	16 55 – 17 65
Eldorado	14 25 – 15 65
Eureka	12 54 – 15 60
Gay Gulch	15 42 – 16 03
Glacier Creek	16 99 – 17 30
Gold Bottom	15 67 – 16 70
Gold Run	17 00 – 17 50
Highet	16 97 – 17 37
Hunker—above Discovery	16 20 – 17 05
" below Discovery	15 36 – 17 23
Last Chance	13 85 – 15 57
Little Blanche	12 99 – 14 02
Lovett Gulch	15 93 – 16 84
Miller Creek	16 32 – 16 87
Quartz Creek	14 95 – 15 89
Sulphur Creek—above Discovery	16 10 – 16 49
" below Discovery	16 10 – 16 73
Thistle	16 73 – 17 95
Victoria Gulch	16 46 – 16 68

24. MINER'S UNITS.—The following table shows the standard of weights and measures in placer mining in the Klondike:—

TABLE OF MINER'S UNITS.

*5½	pans make	1 cubic ft.
15	pans make	1 wheelbarrow.
4	wheelbarrows make	1 bucket.
10	wheelbarrows make	1 cubic yard.
†1	pan of gravel weighs	20 lbs.
1	cubic yard of gravel weighs	3,000 lbs.

*These measures are not to be construed as absolutely accurate, but are used by miners in making substantial or working estimates.

†Estimated weight average gravels.

25. Table showing precipitation in the Yukon for each month during a period of nine years, as compiled by the meteorological observer at Dawson, Y.T.

	Jan.		Feb.		March.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		Total precipitation.
	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	Precipitation.	Number of rainy days.	
1900.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1901.	....	....	....	....	....	....	....	....	0·70	....	0·94	2	1·32	3	0·54	5	1·17	5	2·25	7	1·10	6	1·55	6	....
1902.	1·70	9	0·20	1	....	0	0·55	2	0·40	2	0·86	3	3·32	8	2·30	14	1·17	9	0·92	8	1·10	4	1·00	5	13·52
1903.	0·550	2	1·35	6	0·70	5	0·60	3	0·43	3	0·46	9	1·38	6	1·23	10	2·41	8	1·25	7	0·45	4	0·65	2	11·41
1904.	0·70	9	0·31	6	0·11	2	0·78	6	0·76	6	1·71	8	2·14	11	1·80	10	1·26	7	0·56	3	0·60	6	1·45	6	12·20
1905.	0·50	3	1·21	6	0·40	3	0·94	5	0·97	4	0·25	2	1·51	9	2·51	10	3·52	15	1·84	14	0·24	5	1·69	10	15·58
1906.	1·23	11	0·52	11	0·22	7	0·46	6	2·00	9	0·92	9	1·20	15	1·44	11	1·06	9	0·56	12	1·58	11	0·92	8	12·11
1907.	1·61	11	0·35	4	0·88	6	0·23	9	1·02	10	0·85	12	1·75	11	1·28	9	2·29	12	4·08	17	2·60	14	0·62	6	17·56
1908.	0·71	10	1·00	8	0·71	7	1·22	10	1·43	14	1·23	14	2·91	17	1·08	9	1·33	12	0·69	9	1·59	....	2·00	....	15·90
1909.	0·26	8	0·48	6	1·24	15	0·67	7	0·81	10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Tombstone Mountain, Ogilvie Range.

PART III.

MINING METHODS.

1. Prospecting.—The first work the prospector does on a new creek is to pan wherever the bedrock is exposed by the action of water. (Bonanza creek was accidentally discovered by Carmack, who panned in this way, and staked without further prospecting.) If, after panning, favourable prospects are found, a small space of ground is cleared and a shaft, usually 3 feet by 5 feet, is sunk to bedrock. It is not necessary to thaw the frozen muck, which can be broken with a pick, but when the gravel is reached it is necessary to make a fire on the bottom of the shaft and thaw downwards until bedrock is reached. Another method of thawing the gravel is by boulders which have been heated in a fire. The warm boulders are dropped on the bottom of the shaft and covered with moss or brush. Either process thaws from one to two feet of gravel in about five or six hours. (Thawing with boulders in described under paragraph 4.) Dirt can be thrown out of the shaft to a depth of about ten feet, and then it is necessary to use a windlass to hoist. The gravel removed from the shaft is also panned at frequent intervals. The general rule is that if there is pay at all in the gravels, it is richest on or in bedrock. Paradise Hill, on Hunker creek, however, has furnished an exception to this rule. 'The main gold zone here in many places is found not in bedrock, but at elevations of from three to twelve feet or more above it.' To drift or tunnel, a fire is built against the side of the shaft, and the necessary amount of gravel is excavated. To prospect on creeks where a small boiler can be used, the procedure is somewhat different. A small Porcupine boiler of 3 h.p., which furnishes steam to three points is generally utilized. A half inch pipe can be driven through 10 feet of muck in about five hours. To sink a shaft of 20 feet in this

way requires about one cord of wood for thawing, and two men will remove the dirt from the shaft in two days.

2. Thawing.*—'The gold-bearing gravels in the Klondike are perpetually frozen and have to be thawed by one of the various methods employed in the district. Even if mechanical appliances were devised to excavate these gravels in a frozen condition, a process of thawing would be necessary before the gold could be recovered. The efficiency of any one method of thawing varies with the quantity of humidity in and the compactness of the gravels. Nearly all the gold-bearing streams of Post Tertiary age are frozen to bedrock and artificial thawing is absolutely necessary, while those of most recent age are only partially frozen and do not require artificial thawing.'

CLASSIFICATION OF THE METHODS OF THAWING.

Natural thawing	1. The Sun.
Artificial thawing	1. Rocks.
"	2. Wood.
"	3. Steam points.
"	4. Hot water.

3. Natural Thawing.*—'The method of exposing the gravels to the sun to thaw has not been universally adopted, partly because the overburden cannot be removed on account of the lack of water and grade and partly on account of the short seasons. It has not yet been demonstrated whether it is possible, either from a physical or economic point of view, to thaw a creek gravel deposit of 15 feet in depth. The surface of all creek bed deposits is covered with moss overlying a layer of frozen soil—known as "muck"—from a few feet to 14 feet in thickness. Before the rays of the sun can effectually penetrate the muck, the moss has to be removed by artificial means. If the grade is available the muck is removed by ground-sluicing. Where the body of gravel is exposed the sun will thaw from four to five feet in one season, but where this depth is

*A. J. Beaudette, Government Mining Engineer.

exceeded, it is necessary to thaw by artificial means where dredges are operating. In open-cut work, where the material is excavated with the pick and shovel, the sun's rays are sufficient to thaw for a number of shovellers according to the area of gravels exposed. In all hydraulic operations the heat of the sun is the only medium of thawing. The monitor is placed in such a position that it can be directed alternately on certain areas, the face of the gravels usually being worked in three sections, *i.e.*, while the water is directed on one section the other two sections are thawing. In this way the sun will supply sufficient material to keep the monitor operating.'

4. Thawing with Rocks.—'The method of thawing with rocks is not now practised. During the period of early mining in the Fortymile district, rocks were heated in a fire on the surface of the ground, and then dropped on the bottom of the shaft, where they were covered with tin or sheet iron to concentrate the heat. Rocks were also used to thaw the ground for drifting. Thawing with rocks concentrates the heat, and obviates the sloughing of the side of a shaft. In many localities the muck contains streaks of sand through which the heat is more rapidly conducted, and as a result a portion of the roof may fall down or "cave-in," as it is usually termed.'

5. Thawing with Wood.*—'The several species of wood available for thawing purposes are, spruce, cotton-wood and jack pine, the latter kind being scarce the former species are chiefly used.'

6. Thawing Bar Diggings.*—'The method employed in thawing bar diggings in the Fortymile district was as follows, namely:—

An area of about 50 feet square was stripped of ice, and a portion of this area, 20 feet in length by 6 feet in width was

*A. J. Beaudette, Government Mining Engineer.

thawed by one fire, this being the quantity one man could excavate before the thawed ground was again affected by the frost. A row of kindling, two feet in width was placed along the whole length of the twenty feet, and covered with dry spruce. A second and third row of wood was placed on top and sheet iron or tin was used as a complete cover, so that the wood could smoulder and the heat be retained or concentrated within the area to be thawed. The quantity of wood necessary to thaw an area of ground 20 feet long by 6 feet wide and 1½ feet deep, was estimated at 1½ cords.'

7. Wood Thawing in Drifts.—'The method of thawing with wood in drifting operations is practically the same as that employed in bar diggings, but more care is exercised in placing the fires. This method is employed only in small drifting operations, when the material is hoisted with a windlass. To expedite the work in the drifts it is customary to sink two shafts from 50 to 75 feet apart. While the drift from one shaft is being thawed, the dirt from the other drift is hoisted from the other shaft. The mode of placing the wood along the face of the drift is as follows: Kindlings about one foot in width are placed along the face of the drift, and then a layer of wood. Dry spruce is placed on top of the kindlings for a width of a foot on each side. On top of the dry spruce is placed a layer of green spruce, which in turn is covered by sheet iron. The spruce and sheet iron keeps the fire smouldering and concentrate the heat.' When bedrock is thawed the same method is applied, but the wood is placed lengthwise along the drift, the end of one stick resting on the end of the other. Fires of this kind burn for three or five hours.'

8. Thawing with Hot Water.*—'This method is employed to the best advantage when the gravels are compact and contain very little sediment. Where the gravels are thawed by

*A. J. Beaudette, Government Mining Engineer.

Ground Sluicing.

this method a much greater quantity of dirt can be handled by the shovellers than when the ground is thawed by either wood or steam. The method may be described as follows: A sump-hole is made at the bottom of the shaft, about five or six feet below the level of the drift, and a pulsometer or a duplex Worthington pump is installed on top of the sump-hole. The steam from the boilers is conducted through an iron pipe, down the shaft, to the pump or Pulsometer, as the case may be. At the bottom of the shaft there is a small pressure pump, to which is attached a fire hose with nozzle. The water from the sump-hole is pumped on the face of the drift, and returns to the sump-hole by means of a small ditch dug along the side of the drift. The same water is used several times, and when it accumulates, as a result of the humidity of the gravels, it is pumped out of the shaft. The water is kept warm either by the fresh steam from the boilers or the exhaust from the pump or both. The duty of a No. 7 Pulsometer is about 60 cubic yards in ten hours.'

9. Thawing with Steam Points.*—'Steam thawing is employed in three distinct kinds of operations, drifting, open-cutting and dredging.'

The Point.—'A "point" is made of extra hydraulic pipe, is 6 feet in length and has a bore of $1\frac{1}{2}$ inches to $\frac{3}{8}$ of an inch in diameter. They have solid standard heads, which stand the blow of a six or eight pound hammer.'

*Connections.**—'The points are connected with batteries of four each, having a separate steam hose—usually $\frac{1}{2}$ inch—and steam valve, and each battery is connected with the main steam line $\frac{3}{4}$-inch steam hose and valve.'

*Supply of steam.**—'To do efficient work each point requires steam equal to $1\frac{1}{2}$ h.p., boiler capacity, *i.e.*, a 30 h.p. boiler will furnish steam to 20 points. If a smaller boiler is

*A. J. Beaudette, Government Mining Engineer.

used for this number of points, much trouble will be experienced in firing and supplying the boiler with water.'

*Duty of a steam point.**—'The quantity of ground that can be thawed with a steam point varies from 3 to 6 and often 7 cubic yards in 10 hours. The efficiency of the point varies according to the compactness of the gravels, the quantity of humidity in the gravels and the area to be thawed and as to whether it is in a drift or ahead of a dredge. In drifting operations the average duty of the point is 3·75 cubic yards in 10 hours.'

*Point setting.**—'When points are set in the face of a drift they are first driven about two feet, and allowed to remain at this length for an hour or so. They are then driven other two feet, and finally driven the full length. The points are set about three feet apart in average gravels, but only about 2½ feet in compact gravels. Care has to be taken that only the pay material is thawed, otherwise waste material will have to be removed.'

10. Thawing Ahead of Dredge.*—'All the dredges operating in frozen ground have steam plants for the purpose of thawing the gravels ahead of the dredge. The size of the plant depends on the number and capacity of the dredges in operation. The boilers used in operations of this kind are from 100 to 150 h.p. The steam is transmitted from the main station across the area to be thawed, by means of a main steam pipe from which there are many laterals conducting steam to batteries of 4, 6 and 8 points. All the main steam pipes are inclosed in a wooden box to avoid the condensation of the steam. The points are set from 4 to 6 feet apart and are from 12 to 15 feet in length, and are left in place for eight hours. The duty of a point under these conditions is from 5 to 7 cubic yards in ten hours.'

*A. J. Beaudette, Government Mining Engineer.

The Y. C. G. F. Co., Pipe Line from Bear Creek. Photo by J. Doody, Dawson.

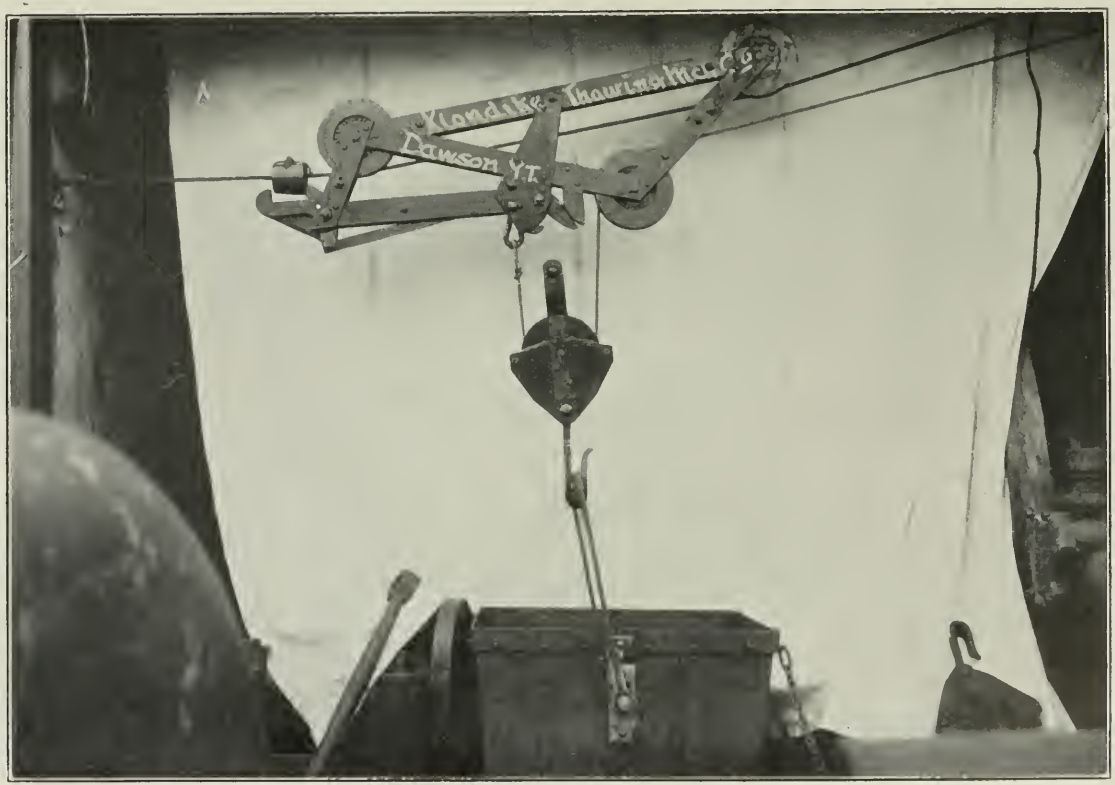
11. Ground Sluicing.*—'This method consists of concentrating the stream on the gravels, which are thus removed by water without pressure. To successfully operate by this method it is necessary (1) to have a plentiful supply of water, (2) to operate in shallow gravels, and (3) to have a stream of sufficient grade to move the material. When the whole material from surface to bedrock is removed in this manner the method is known as "ground-sluicing"; when only the over-burden is removed the method is known as "stripping." This work is easily done in the early spring by taking advantage of the spring floods and leading the water by several channels across the claim. The muck thaws easily and the streams soon cut down to the gravel, and then gradually widen their channels until they meet. In some cases the process is hastened by blasting out the walls of the muck channel with slow explosives. The upper portion, if barren, is removed and piled up where most convenient, and the underlying pay gravels are shovelled up or hoisted in buckets, and sluiced in the ordinary way.'

12. Sluicing.—An abundant supply of water is essential to successful placer mining. In the early days of the Klondike when the rich claims on Bonanza and Eldorado were being worked, the supply of water was inadequate, and it is reported that in many cases as much as $8 per hour per sluicehead was charged. The price paid at the present time, *e.g.*, from the Day ditch on lower Dominion, is $1.25 per sluicehead per hour. After a winter dump has been thawed by steam points the dirt is moved to the sluice-boxes in various ways. One method is to scrape the dirt into a dump box at the head of the line of sluice-boxes. This is usually done by a steam scrapper. Another method is to pump the water to a sufficient elevation, so as to give a pressure to hydraulic the dirt from the dump into the sluice-boxes. When the water is convenient, however, pro-

*A. J. Beaudette, Government Mining Engineer.

bably the most economical mode of sluicing a dump is to place two sluice-boxes parallel to each other, on the space of ground where the dirt is to be dumped. These boxes are covered by short wooden planks or some other sufficient covering to keep clear the space through which the water runs in the process of sluicing. In the spring the sluice-boxes are gradually uncovered from one end, and the work of shovelling in, *i.e.*, depositing the dirt in the sluice-boxes, can be accomplished by two or three men. This method obviates the necessity of employing a large number of shovellers. In order to confine the dirt within a limited area, cribbing is constructed around the dump so that the dirt is retained within easy access of the sluice-boxes. On many of the claims, however, the water for sluicing purposes, instead of being conveyed by flume from a point at a sufficient distance up the creek to give the required grade, is pumped up, and the sluice-boxes are placed high enough to carry the tailings where required, thus obviating the expense of handling or scraping tailings. During the summer the dirt or pay gravel is carried directly from the shaft and dumped into the sluice-boxes from the bucket attached to the self-dumper. By the open-cut method in shallow ground, however, the pay gravel is sometimes conveyed to the sluice-boxes by the ordinary wheelbarrow.

13. Self-Dumper.—The self-dumper or carrier was designed specially for the Yukon, and to meet the requirements of the miners for some light and simple machine that would hoist and convey the dirt from the bottom of the shaft or from an open-cut, to the dump or sluice-box. The carrier is operated on a single three-quarter inch cable stretched between two posts, and usually at an angle of about 40°, but if necessary at a much less grade. One post, about five feet high, is situated in rear of the shaft, and the other post, which is called the 'gin-pole,' is erected at whatever point the dirt is to be dumped.



Self-Dumper.

The carrier itself is worked by a single $\frac{3}{8}$ inch or $\frac{1}{2}$ inch cable. The hoisting cable extends from the drum of the engine to the top of the gin-pole where it passes through a block and extends to the carrier, which, for example, is at the top of the shaft. The cable passes through a sheave in the carrier and extends down the shaft, passing through a block attached to the bale or handle of the bucket and then returning to the carrier, where it is fastened. When the signal to hoist is given the cable winds around the drum of the hoisting engine, quickly lifting the bucket from the bottom of the shaft to the carrier, where the handle of the block, which is attached to the bucket bale, lifts the hook in the centre of the carrier, thereby releasing the sliding latch and automatically locking the hook and holding the bucket securely in the centre of the carrier. This occupies only the fraction of a second, and the travel of the carrier is not impeded. The dumper is then pulled along the carrying cable to the point where the dirt is to be dumped. A chain is attached to the front side of the bucket, and at the end of the chain is a ring, which passes along a cable fastened at both ends and lying upon the ground directly under the carrying cable. When this ring comes in contact with a clamp, which is fastened to the cable, the bucket is prevented from going any farther and the strain on the chain overturns the bucket and the contents are emptied on the dump. After dumping, the hoisting cable is slackened and the dumper or carrier rapidly travels down the cable until it reaches the top of the shaft. An eccentric hook attached to the sliding latch in the carrier strikes a ball fastened on the carrying cable. This action releases the sliding latch, unlocks the hook, and disconnects the handle of the bucket from the carrier. The bucket then travels down the shaft to be re-filled.

Cost of complete pumping, thawing and self-dumping outfit suitable for working ten shovels (or 16 shovels if power is not required to pump).

TABLE I.

40 h.p. Scotch Marine Water Back Boiler, return flue..	$1,300 00
15 h.p. Horizontal engine	375 00
6 h.p., Gould centrifugal pump (with foot valve attached)	300 00
10 h.p., hoisting engine	450 00
Self-dumping carrier and turnbuckle	100 00
200 ft. $\frac{3}{4}$" cable	38 00
500 ft. $\frac{3}{8}$" cable	50 00
*20 $\frac{1}{2}$" thawing points, 8 ft. long	200 00
4 wheel-barrow bucket	60 00
10 Pan-American wheel-barrows	100 00
100 ft. $\frac{5}{8}$" steam hose	65 00
1 dozen Silver Dollar shovels	18 00
200 ft. $\frac{3}{4}$" pipe	24 00
Miscellaneous tools and fittings	125 00
(1)	$3,205 00

The self-dumping carrier can be used with a much smaller plant, and is in general use where only five or six shovellers are employed. In a smaller plant the cost of boiler, engine and hoist is much less than the figures quoted.

The following two tables, showing the cost of sinking shafts, were furnished by two different operators on the watershed of Indian river, namely:—

TABLE II.

SINKING BY SELF-DUMPER.

(30 ft. deep, and 8 by 8 ft.)

1	boilerman*	$6 50	One shift.
1	pointman*	7 00	
1	hoistman*	7 00	One shift.
2	shovellers* at $6.50	13 00	
$\frac{1}{2}$	cord wood (fuel)	4 00	
$3\frac{1}{3}$	cords (timbering) at $8	26 66	
		$64 16	

7 ft. thawed and hoisted in 12 hours.

Cost of 7 ft. (including timbering)	$64 16
Cost per ft	9 16

*These figures include an allowance of $2.00 per day per man for board, *i.e.*, 1 boilerman at $4.50 plus $2.00..

*To thaw by hot water instead of steam the points would be substituted by a pump at an approximately similar cost.

(1) This list was kindly furnished by Mr. Geo. H. Johnson of the Klondike Thawing Machine Co

TABLE III.

In this case the shaft was 55 feet deep and 8 by 8 feet, and the dirt was hoisted by hand windlass.

Labour	$400 00
Timbering, 6 cords at $8	48 00
Dressing timber	50 00
Steam for thawing, at $1 an hour, 50 hours	50 00
Cost of 55 ft	$548 00†
Cost per ft	$9 96

†The cost of sinking this shaft was furnished by one of the most successful operators on the watershed of Indian river, and is based on the prices of the present day, the shaft having been sunk in June, 1909.

TABLE IV.

TUNNELLING BY SELF-DUMPER.

(6 ft. by 6 ft.)

7 to 12 p.m.—	1 pumpman	$ 7 00	Thaws 5 hours.
	1 helper	6 00	
	1 fireman	6 50	
1 to 6 a.m.—	1 engineer	7 50	
	6 shovellers at $6.50	39 00	
	Wood consumed, ¾ cords	6 00	
	Timbering 12 ft. of tunnel, ⅔ cords	5 33	
		*$77 33	

6 feet of dirt excavated on each side of shaft in 12 hours.

Cost of 12 ft	$77 33
Cost per ft	6 44

*These figures include an allowance at the rate of $2.00 per day per man for board.

The six shovellers take out the dirt and timber the portion of the tunnel that has been excavated. If the roof is muck, it is not necessary to timber. When the roof is gravel, the tunnel is timbered to obviate the sloughing of rocks and dirt, which would impede the progress of the work along the tunnel. It is claimed that the best method is to thaw five hours for the reason that the water becomes warm when thawing for ten hours, and as a result the roof is more liable to slough, the dirt piles up and blocks the operations of the nozzleman and the shovellers work at a disadvantage.

The following table, which was furnished by one of the most successful operators on the Indian River watershed, is taken from a 42 days' run, and shows the working cost per sq. ft. of bedrock, *i.e.*, the actual cost of thawing, hoisting and sluicing, the dirt being dumped from the bucket into the sluice-boxes:—

TABLE V.

Thawing Crew—	
2 pumpmen at $6.00	$ 12 00
2 helpers at $5.00	10 00
1 fireman at $5.00	5 00
3 cords wood at $8.00 per cord	24 00
Hoisting Crew—	
1 foreman at $6.00	6 00
1 engineer at $6.00	6 00
1 dumpman at $5.00	5 00
1 bucketman at $5.00	5 00
12 shovellers at $5.00	60 00
Wheeling planks at $75.00 per M	10 00
21 days' board* at $1.75	36 75
	†$179 75

*In this case the board of 21 men is reckoned at $1.75 each.

†It will be noted that the wages paid by this operator is above the average, and it necessarily follows that only the best men are employed.

The quantity of material handled per day of 10 hours was 590 sq. ft. of bedrock, the dirt hoisted being approximately three feet deep.

Cost of handling 590 sq. ft. of bedrock	$179 75
Cost per sq. ft. of bedrock	0 30

The following table, which was furnished by a skilful operator, shows the working cost of a self-dumping plant, namely:—

TABLE VI.

Working Cost of Self-Dumper.

Thawing Crew—	
*2 pumpmen at $7.00 per day	$ 14 00
*1 helper at $6.00 per day	6 00
*1 fireman at $6.50 per day	6 50
Hoisting Crew—	
*1 foreman at $8.00 per day	8 00
*1 engineer at $7.50 per day	7 50
*1 Dumpman at $6.50 per day	6 50
*1 Bucketman at $6.50 per day	6 50
*16 shovellers at $6.50 per day	104 00
3 cords of wood at $8.00	24 00
Box candles	3 50
Coal, 25c.; oil, 25c	0 50
Picks (Life one month) 16 at $2.50 } Per	
Shovels (Life one month) 16 at $18.00 per doz. } day	2 13
Wheeling planks (Life 3 months) at $75 per M. per day.	0 25
	$ 189 38

*These figures include an allowance of $2.00 per day per man for board.

The capacity of the above plant, equipped with two No. 6 Pulsometers, would be approximately 600 sq. ft. of bedrock, the dirt hoisted being between 3 and 4 ft. deep.

600 sq. ft. of bedrock	$189 38
Cost per sq. ft. of bedrock	0 31**

**The above table includes the cost of thawing, hoisting and sluicing.

Hoisting by Windlass.—The following information, which was furnished by a miner on Lower Dominion, will give an idea of the cost of hoisting the dirt by hand windlass: (On many claims on the lower portion of Dominion the pay gravel is thawed by fires of kindling wood, and described under paragraph 7 of this Part, and the dirt is hoisted by hand windlass.)

TABLE VII.

PLANT.

1, 5 h.p. boiler.
40 ft. ½-inch steam pipe.
2 steam points with hose.
1 lead hose, 10 ft. (to connect point battery with steam pipe).
1 windlass with 40 ft., ¾-inch rope or ¼-inch cable.
2 windlass buckets.
Picks and shovels.

TABLE VIII.

WORKING COSTS.

(Sinking shaft 3 by 5 ft.)

The ground is thawed for five hours in the afternoon and allowed to cool over night. The thawed dirt is then hoisted in five hours next morning. Two men thaw and take out six feet of dirt in one shift, *i.e.*, ten hours. Approximately one cord of wood is sufficient fuel to thaw a shaft 30 feet deep.

2 men at $6.50	$ 13 00
Wood, for thawing	2 00
	$ 15 00

Cost of sinking 6 ft	$ 15 00
Cost per ft	$ 2 50

Tunnelling.

From the bottom of the shaft two men will drive a tunnel 6 feet by 4 feet by 3½ feet, in one shift, *i.e.*, thaw the ground

and hoist the dirt in ten hours. (It is seldom necessary to timber shafts or tunnels for windlass work.) The cost of tunnelling by this method is estimated as follows:—

TABLE IX.

2 men at $6.50	$ 13 00
Wood for thawing	2 00
	$ 15 00
Cost of tunnelling 6 ft	$ 15 00
Cost per foot	2 50*

*The shaft in this case was 30 feet in depth. The cost per foot would necessarily increase according to the distance from the bottom of the shaft.

On lower Dominion, during the past winter, six men took out 25,000 square feet of bedrock and sank four shafts, each 36 feet deep, in six months, the ground being thawed by fires of kindling wood. The cost of this work is estimated as follows:—

TABLE X.

6 men at $6.50, 180 days	$7,020 00
100 cords wood at $7.50	750 00
5 men at $7.00, sluicing 20 days	700 00
Water $1.00 an hour for 200 hours	200 00
	$8,670 00

DREDGING.

14. It is now nearly half a century ago since ground was first dredged in California and New Zealand, but it is only within the last few years that the frozen placers of the Yukon were found to present a vast field for the dredging industry. While it is undoubtedly true that the early failures in the operation and construction of dredges in California and New Zealand, were disastrous to the shareholders, yet the costly experience in these unsuccessful ventures has securly laid the foundation of dredging as a highly profitable industry, and has conferred incalculable benefit to the miner and the engineer in the construction of the modern dredge. The peculiar conditions which exist in the Yukon have been studied by engineers, who have

Dredge operating on Klondike River.

designed improvements to overcome the difficulties that were found to exist in the north.

It is the general impression that there is a large element of speculation in all classes of mining, but it can safely be asserted that mining by the dredging process can be conducted from its initial stages on a practically sound business basis, provided proper judgment is exercised in the selection of property and in the general management of such an enterprise. In the Yukon, groups of claims have been staked in the different mining districts, and there are many dredging enterprises available for investigation. Before seeking capital for the installation of a dredge, the promoter or owner of the property should be in a position to demonstrate the average values contained in the gravels. Under these conditions speculation, in so far as the capitalist is concerned, can be almost eliminated. If, however, as is often the case, the promoter or owner of the property gives an option to purchase and the intending investor undertakes to prospect the ground, such expenditure must of necessity be speculative.

15. The beds of almost all the rivers* in the Yukon are unfrozen, and when dredging is confined to the bars and beds of rivers the most essential questions to be determined before the installation of a dredge are:

1. The average value of the gravels;
2. The quantity of gold-bearing gravels in the property;
3. The cost of installation; and
4. The cost of power, operating expenses and maintenance.

16. Dredging in frozen ground necessitates a much greater expenditure, and it is, therefore, necessary that the gravels in this condition should carry higher values, or at all events sufficient values to confer a profit on a more expensive enterprise.

*The Dredging Regulations define a river as "a stream of water the bed of which is of an average width of one hundred and fifty feet throughout the portion thereof sought to be leased."

To those who contemplate the operation of a dredge in frozen ground, the following features have to be considered, namely:—

1. The average value of the gravels;
2. The quantity of gold-bearing gravels in the property;
3. The quantity, nature and cost of removing overburden;
4. The cost of thawing gravels;
5. The cost of installation;
6. The cost of power, operating expenses and maintenance.

When these conditions have been carefuly and thoroughly investigated under the light of experience and sound judgment, an approximate estimate may be made of the ultimate profits of the enterprise.

17. Value of Gravels.—The usual mode of determining the values contained in the gravels where dredging operations have, so far, been carried on in the Yukon, is by the operation of one or several of the different kinds of drills. Owing to the ground being continually frozen, shafts can be sunk to advantage in shallow ground, but where the depth is from 20 to 30 feet, the drill is in general use.

18. Quantity of Gravels.—Besides ascertaining the values contained in the gravels, the drills define the pay-streak or quantity of gold-bearing gravels available. The pay gravels, which are ascertained in this manner, are accurately defined by the aid of the drill.

19. Overburden.—Where dredges are operating on creek claims, the gravels are overlaid by muck to a depth of from 6 to 10 feet. The method, which is generally employed at the present time of disposing of this overburden, is to thaw the ground by steam in front of the dredge, steam points being used in the manner described in paragraph 10.

Thawing by steam.—The following tables, which were furnished by a company operating in frozen ground, shows (1)

thawing equipment, and (2) crew for thawing equipment, wages, &c.:—

TABLE I.

Estimated plant, one 150 h.p. boiler	$5,000 00
Steam pipe line, hose, points and fittings	5,000 00

TABLE II.

Crew for Thawing Equipment, Wages, &c.

2 engineers at $9 20* per day	$ 18 40
2 wood-bucks at $6.00* per day	12 00
20 pointmen at $7.00* per day	140 00
2 foreman at $8.00* per day	16 00
Repairs, say	10 00
12 cords wood at $14.00	168 00
	"$364 40

*The wages include board, which is generally reckoned at $2.00 per day, i.e., 2 engineers at $7.20 plus $2.00 for board.
"This expenditure is for 24 hours.

The plant described in Table I. will furnish steam to 125 points.

The duty of a point thawing ahead of a dredge is estimated by Mr. A. J. Beaudette, the government mining engineer, at 5 to 7 cubic yards in ten hours.

Stripping by water.—One company is removing the overburden by water under pressure. The gravels then thaw by natural process. This method is being carried on under favourable conditions, and has, so far, proved successful. With 250 inches of water and a force of seven men, the approximate quantity of overburden removed per day is 350 cubic yards. The cost of this work is estimated at 13 cents per cubic yard, but the superintendent in charge of the work states that with 500 inches of water the cost could be reduced to 6 or 7 cents per cubic yard.

20. Thawing Gravels.—Where dredging operations are in progress on creek claims, the gravels are thawed at the same time as the overburden. In the case, however, where the overburden is stripped by water under pressure, the gravels are

being permitted to thaw by natural process. * 'The rate of thawing depends upon the humidity and drainage of the gravels. The depth of gravel that can be thawed by natural process during the first season (between the 20th of April and the 1st of October) under favourable conditions, is approximately eight feet. Each succeeding year will thaw approximately fifty per cent of the preceding year.'

21. Installation.—After the actual cost of the dredge has been ascertained, an approximate estimate of the cost of installation may be obtained by reference to the schedule of rates of the White Pass and Yukon Route. This schedule shows the rates of transportation from ports on the Pacific coast to Dawson. The freight rates from Dawson to the different points throughout the territory are also given in schedule form. Both these schedules will be found under the chapter dealing with transportation. The tariff items dealing with the importation of machinery will be found in appendix I.

22. Power.—The dredges in the Klondike district (with one exception) are driven by electric power. Information as to the cost of electric power could not be obtained from the companies operating their own power plants, but the rate charged by the Dawson Electric Light and Power Company is from 4 to 5 cents per kilo watt.

23. Labour.—The price of labour is shown in the different tables dealing with dredging and ordinary placer mining.

24. Companies Operating.—*The Yukon Gold Company.*—The holdings of this company consist of a large number of creek, hill and bench claims on Bonanza, Hunker and Bear creeks. Seven dredges have been installed, namely, three Bucyrus dredges of a capacity of 2,500 cubic yards each, two Bucyrus dredges, each having a capacity of 3,500 cubic yards, and two Marion dredges, each having a capacity of 3,500 cubic

*A. J. Beaudette, Government Mining Engineer.

The Str. "Victorian" near the Five Finger Rapids. Photo by J. Doody.

yards. On the claims where five of the dredges are working the average depth of muck is 6 feet, and where the other two are working the depth of muck is 10 feet. Where three of the dredges are working the average depth of gravel is 15 feet, and the other four are operating respectively in ground having an average depth of 12, 20, 21 and 22 feet of gravel. The bed-rock generally consists of soft decomposed schist and porphyry. The gravel consists of small water worn boulders. In this connection it may be said that revolving screens are used on all the company's dredges. This company operates its own power plant, which is situated on the Little Twelvemile river. *'Electric transmission is effected over 36 miles of main line and 18 miles of branch high-tension line, with 8 miles or secondary lines from four sub-stations.'

The Canadian Klondike Company.—This company is operating a Marion dredge (7 cubic feet bucket), which, it is claimed, has an actual average capacity of over 3,000 cubic yards per twenty-four hours. The dredge is driven by electric power, and has been operating in the Klondike valley for about four years. The power plant consists of a Westinghouse-Parsons steam turbine and three McNull water tube boilers. Each boiler is capable of developing 150 h.p., working at a pressure of 150 pounds per square inch, the fuel being wood. The steam is exhausted into an Alberger surface condenser in which 28-inch vacuum is maintained by means of a dry vacuum pump. The condensed steam is pumped by a hot-well pump, from the condenser into closed feed-water heaters where the feed water is heated by exhaust steam from the auxiliary machinery, to a temperature of 200°F. The steam turbine is rated at 500 h.p., running at 3,600 revolutions per minute, and is connected directly with a Westinghouse 3-phase generator of 400 kilo watt capacity. This generator delivers a current of 100·5

*T. A. Rickard, Ed. Mining and Sc. Press (Yukon Ditch) Jan., 1909.

amps. per phase at a pressure of 2,300 volts between terminals, the current frequency being 7,200 alternations per minute. The field coils of the generator are excited by a D. C. dynamo of 17 kilo watt capacity, working at a pressure of 125 volts. During the season of 1908 it is estimated that this dredge handled over 450,000 cubic yards.

The Bonanza Basin Gold Dredging Company.—This dredge is operating on a group of river claims on the right limit of the Klondike river, about one mile above its confluence with the Yukon. The company began operations during the summer of 1905, and are operating an Allis Chalmers 6½ cubic feet (open-connected) bucket dredge. The dredge is driven by electric power which is furnished by the Dawson Electric Light and Power Company.

The Lewes River Gold Dredging Company.—A dredge belonging to this company is operating on Bonanza.

The Consolidated Gold Dredging Company of Alaska.—The holdings of this company on the Fortymile river, in Canadian territory, consist of five dredging leases covering a distance of 23 miles. The five leases commence at a point at the junction of the Yukon and Fortymile rivers and extend up stream to the international boundary line. In a prospectus issued by this company it is stated that the gravel on the Fortymile river varies from 5 to 25 feet in depth, and that the bedrock consists of a mica schist more or less irregular and broken but easy to mine. This company is operating an Allis-Chalmers (6½ cubic foot bucket) dredge in the submerged bed of the Forty-mile river.

The Yukon Basin Gold Dredging Company.—The holdings of this company consist of 105 miles of the Stewart river. During the season of 1908 a Risdon (4 cubic feet bucket) dredge was installed on Nelson's bar on the left limit of the

Stewart river, about five miles below McQuesten. This dredge is at present being operated by steam power, but the company is contemplating the installation of an electric power plant. The quantity of fuel consumed in twenty-four hours is about 5½ cords of wood. The character of the gravel is free river wash, unfrozen, and is estimated to be about 45 feet in depth, with soft bedrock. The capacity of this dredge is 2,500 cubic yards per day.

The Stewart River Gold Dredging Company, Limited.—The holdings of this company consist of 30 miles of the Stewart river, 30 miles on the McQuesten and 70 hillside and bench claims adjoining the tract of river leased on the McQuesten. No dredges have yet been installed, but two Traction No. 3 Keystone drills will be used to prospect the property during the present summer. The manager of the company states that a survey will be made during the present season, with the view of installing an electric power plant, applications having already been made for water power from Fraser falls, Mayo and Janet lakes. This company has a gasoline launch which will be used, in connection with its operations, on the Stewart and McQuesten rivers.

The Indian River Gold Mining and Development Company, Limited.—This company installed a Risdon dredge on Indian river in the fall of 1907. The dredge has been working in the river bed, which consists of shallow, loose gravel, the bars and banks of the rivers being frozen.

The North American Transportation and Trading Company.—No dredges have yet been installed by this company, but the work done last year on Miller creek was for the purpose of preparing the creek bed for dredging. This work consists of washing away the overburden by water under pressure, the water being furnished by ditches extending from the head of Miller and Bedrock creeks. The removal of the overburden

or muck permits the gravel to thaw by the action of the atmosphere alone, thus avoiding the necessity of thawing with steam. A force of seven or eight men is necessary to carry on this work satisfactorily, as the brush and moss have to be removed by hand, burned or otherwise disposed of. The frozen soil is then washed away by the water, and powder is used to break up the heavy deposits, which are frequently ten feet in depth. Approximately 20,000 cubic yards of muck were washed away last year. This work uncovered some 200,000 cubic yards of gravel, which at once commenced to thaw. A much greater area of gravel will be uncovered during the present year. The gravel uncovered during the summer of 1908 will be in good condition for dredging in the spring of 1911.

OPERATING EXPENSES.

The following table, which was furnished by a company operating in the Klondike district, shows the crew of an electric driven dredge, together with the rate of wages paid, namely:—

Crew for one electric driven dredge.

TABLE III.

1 dredgemaster at $350.00* per month	$ 350 00
3 winchmen at $240.00* per month	720 00
3 oilers at $195.00* per month	585 00
1 blacksmith at $240.00* per month	240 00
	*$1,895 00

Another company has furnished the following table showing the crew of a steam driven dredge, together with the rate of wages paid, namely:—

Crew for one steam driven dredge.

TABLE IV.

1 dredgemaster at $8.00* per day	$ 8 00
3 winchmen at $8.00* per day	24 00
1 engineer at $8.00* per day	8 00
2 firemen at $6.00* per day	12 00
3 deckhands at $6.00* per day	18 00
Per day	$70 00

*The wages given include board, which is reckoned at $2.00 per day.

The following table shows the working cost of another steam driven dredge ($5\frac{1}{2}$ cubic foot bucket). This dredge is operating in a river bed:—

TABLE V.

1 dredgemaster	at	$11 50*	$11 50
2 winchmen	at	8 00*	16 00
1 engineer	at	9 50*	
1 engineer's assistant	at	8 50*	18 00
2 firemen	at	7 50*	15 00
2 deckhands	at	7 00	14 00
2 woodmen	at	6 50*	13 00
Fuel, 11 cords	at	9 00	99 00
1 carpenter	at	8 00*	8 00
Oil, &c			4 00
Total			$198 50

*These figures include board, which the manager of the Company states is reckoned at $1.50 per day.

DRILLING.

The following table was furnished by a company operating in the Klondike district, and shows the working expenses of a Keystone drill per day of 10 hours:—

TABLE VI.

*1 driller	$8 00
*1 fireman	7 00
*1 sampler	10 00
*1 helper	6 00
Wood, 1 cord	14 00†
Repairs, say	8 00
1 team and driver	20 00
Total	$73 00

15 to 30 ft. drilled in 10 hours.

Another company furnished the following statement in connection with the working expenses of a Keystone drill, per shift of ten hours, in the Klondike district, namely:—

TABLE VII.

*1 driller	$8 00
*1 helper	6 50
*1 fireman (12 hours)	6 80
$\frac{1}{2}$ cord wood	3 00†
Total	$24 30†

*Wages include board, which is reckoned at $2.00 per day.

†The price of wood varies in different localities. The disparity in price is due to the distance the wood is hauled and to handling.

†The manager of the Company states that "This constitutes the expense of operating the drill with the exception of what might be considered a legitimate charge for wear and tear."

The manager of this company states that the sampling is usually done by the man in charge of the clean-ups on the dredge, and that the time occupied in sampling would not exceed two hours, or $1.50 for each hole drilled.

The following is a recapitulation of the shift sheets for two Keystone drills operating in the Yukon, namely:—

TABLE VIII.

Lost time.	Running time.	Operating time.	Number of feet drilled.	Cost.	
				Total.	Per foot.
998·45	1623·15	2622.	3027′	$11,794 45	$3 89
668·45	1213·15	1882.	2525′ 6″	5,655 54	2.23

The following table shows the working expenses of an Empire drill, per day of 10 hours, as furnished by one of the dredging companies operating in the Yukon, namely:—

TABLE IX.

1 driller (who also pans)	$10 00*
3 helpers, at $6.00	18 00
1 horse (including feed)	8 00
Total	$36 00

7 to 15 feet drilled in ten hours.

* These figures include board reckoned at $2.00 per day, *i.e.*, "1 driller, $8.00, plus $2.00 for board."

The same company also furnishes the working expenses of a Keystone drill, as follows:—

TABLE X.

1 driller	$9 00*
1 sampler	7 50*
1 fireman	6 00*
2 helpers, at $6.00	12 00*
Wood, 1⅓ cord, at $10.00	13 33
Repairs, &c.	10 00
1 team and driver, ½ day	10 00
	$67 83

10 to 20 feet drilled in 10 hours.

An Electric Hoist on 30 below on Bonanza (Y.C.G.F. Co.) Photo by J. Doody.

The following table is a recapitulation of the shift sheets for two Keystone drills operating in the Klondike district, namely:—

TABLE XI.

Lost time.	Running time.	Operating time.	Number of feet drilled.	Cost.	
				Total.	per foot.
591·15	1118·45	1710.	2589′ 6″	$5,360 43	$2.07
1438·50	3079·10	4518.	4750′	15,840 76	3 33

The following table shows the percentage of lost time of a dredge operating in the Klondike district, namely:—

Cause of Stoppage.	Time Lost.		Per cent.
	Hrs.	Mins.	
Bucket line	73	21	19.55
Chutes	1	15	.33
Clean-ups	17	2	4.54
Ladder	3	20	.88
Ladder hoist	2	40	.71
Lines	11	18	3.01
Main drive	5	43	1.52
Motors	9	20	2.49
Moving	2	55	.78
Oiling	57	16	15.29
Other causes	48	..	12.8
Power	12	..	3.2
Pumps	..	15	.07
Screen	2	2	.54
Stacker	32	30	8.67
Stepping ahead	80	45	21.53
Spud	..	32	.14
Tumblers	14	45	3.93
Winch	..	5	.02
	375	4	100.00

Summary of Season's Operations.

	Hrs.	Mins.	Per cent.
Lost time	375	4	9.11
Running time	3,745	26	90.89
	4,120	30	100.00

*These figures include board reckoned at $2.00 per day, *i.e.*, 1 driller $7.00 plus $2.00 for board.

MECHANICAL ELEVATORS.

25. On Bonanza creek two mechanical elevators have been installed by the Yukon Gold Company, and another is in course of construction. The type is a continuous bucket line electrically driven.* 'The mechanical elevator was specially designed by the engineers of the company to meet the conditions found in certain portions of the Klondike creek deposits where the gravel is shallow and largely frozen, and where the gold itself is found for some distance within the bedrock. The method of working is a combination of hydraulicking and elevating; therefore, it involves the use of electric power as well as water under pressure. The obstacle to straight hydraulic mining as applied to shallow creek gravels is the absence of sufficient grade on the bedrock to sluice the gravel and dispose of the tailings. While such gravel can be dredged, and, in fact, has been dredged successfully, the chief objection to the dredging method is that the gold is distributed at varying depths in the bedrock. The inability of the operator to see the bedrock, and, in some cases, the hardness of the material encountered, render complete extraction unattainable by this method. It was to overcome the difficulties attendant upon either the hydraulic or dredging methods that the mechanical elevator was designed. The fundamental features of the device are: (1) the creation of artificial grade; and (2) obtaining room for the disposal of tailings by the erection of a steel tower supporting the series of buckets that elevate the gravel. Thus grade is obtained at both ends of the operation. . . .'

*'The mining operation itself consists in stripping the ground in front of the elevator by the use of monitors placed advantageously, so as to make the most of the driving power of the water issuing from the nozzle. After the ground has been stripped, the rich gravel is reached and is driven into the pit at the lower end of the excavation, where it is lifted by the chain

*Mining and Scientific Press, Vol. XCVIII, No. 12 March 20th, 1909.

of buckets. Then the bedrock is swept clean and as much of the soft superficially weathered rock is piped into the pit at a pressure of 140 pounds per square inch (or 350 foot head with a 3-inch nozzle) will permit. The delivery of material into the elevator pit is regulated by the piper or nozzle-man acting in harmony with the man in charge of the sluice-boxes. They signal to each other whenever necessary. Finally, the bedrock is dug by pick and shovel, for about a foot deep, the fragments being swept with wire brushes and whisk brooms into the ground sluice, as in ordinary hydraulic mining. The object is to clean the bedrock thoroughly. One man will clean 15 to 20 feet square per shift. The nominal capacity of the No. 3 elevator was rated at 4,000 cubic yards per day; the actual work done was equivalent to 1,500 yards. The buckets were about half full; if filled, the material lifted would exceed the capacity of the sluice-boxes, which were set on inadequate grade because of lack of room for disposal of the tailings. This will be remedied when the elevator is moved up stream. It is expected to move the plant twice, if not three times, each season. The last move would be made at the end of the season, so as to have the elevator in position ready for work at the commencement of the next season. When moving, the chain of buckets is disconnected and dragged ahead by means of a cable; the lower tumbler and the ladder structure below the level of the bedrock are also detached and shifted in the same manner. The remainder of the machine will be drawn forward bodily on wheels running over 50-lb. rails. The frame will be made rigid by stiff legs on each side, so as to prevent tipping while removal is in progress. The power consumed in the operation of the mechanical elevator is estimated at 200 h.p.; the bucket line requires 35 h.p., and the pumps 165 to 175 h.p. From this it is evident that the pumping constitutes a large part of the work performed. Power costs $8 per h.p. per month.'

* 'The elevator requires the labour of ten men per shift.'

1 foreman.
1 piper.
2 oilers.
2 sluice-tenders.
4 labourers.

Messrs. Burke and Company are also operating a steam elevator on Hunker creek.

HYDRAULICKING.

26. Owing to the hitherto inadequate and intermittent water supply available in the Klondike district, considerable difficulty has been experienced in undertaking hydraulic operations on a large scale. It is claimed, however, that the Twelve-mile ditch, which is being constructed by the Yukon Gold Company and will probably be completed during the present season, will furnish a constant supply of water.* It was estimated that a ditch to the mines near Dawson, with a capacity of 125 cubic feet per second, under a head ranging from 850 to 350 feet would be 70 miles long and would cost $3,000,000. It has cost over this amount to date and will require a further expenditure to complete. The total distance between the head of the ditch and Gold Hill, the point of distribution, is 70·2 miles, the difference in elevation between these points being 1,112·8 feet. The effective head along Bonanza creek, in the vicinity of Gold Hill, is 375 feet. The construction includes 19·6 miles of flume, 38 miles of ditch and 12·6* miles of pipe. Owing to the nature of the ground traversed, it has been necessary to modify the size and gradient of the ditch according to the local conditions, but the standard is a 9 -foot bottom, with 3½ feet depth of water, and a gradient of 6 feet per mile, rang-

*The Mining and Scientific Press, Vol. XCVIII No. 12.
*T. A. Rickard, Editor Mining and Scientific Press, Jan., 1909.


#9
Elevator No 3 On 29 Below On Bonanza. Yukon Gold Co. Foto By J. Deady.
Dawson. June 1909.

ing from a minimum of 4 feet to a maximum of 7 feet per mile. In places the ditch is fully 20 feet wide. The standard flume is 6 feet wide and 4 feet deep, with a gradient of 0·2841 per cent or 14 feet per mile. The pipe varies according to the engineering requirements and is variously built of steel and wooden staves, so as to have a diameter ranging from 42 to 54 inches. . . . * The largest single task on the whole line of construction was the installation of the inverted siphon crossing the valley of the Klondike river. The details of this line are as follows:—

Intake.....at 2,440 ft.
Discharge.....at 2,240 ft.
Lowest depression.....at 1,282 ft.

Details of Pipe.

Length.	Material.	Diameter.	Thickness.
Ft.		In.	In.
760	Wood	49	$1\frac{5}{8}$
7,520	Steel	43	$\frac{5}{8}$ and $\frac{11}{16}$
6,850	Steel	49	$\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$
1,629	Wood	49	$1\frac{5}{8}$

*T. A. Rickard, Ed. Mng. & Sc. Press, Jan. 1909.

The following table showing hydraulic mining operations in the Yukon, was compiled by Mr. A. J. Beaudette, government mining engineer:—

*HYDRAULIC OPERATIONS.

Name of Operator.	Locality.	Length of Ditch.	Capacity of Ditch.	Pressure of Water.
		Miles.	Inches.	Feet.
Yukon Gold Company	Acklen Farm, R. L. Klondike River	7½	1,000	360
Yukon Gold Company	Paradise Hill, L. L. Hunker Creek	4	300	75
Yukon Gold Company	American Hill, L. L. Bonanza Creek	8	1,000	250
Bonanza Creek Mining Company	Adams Hill, L. L. Bonanza Creek	3½	800	175
O. R. Brener	French Hill, Eldorado Creek	(2) 3 & 4	500 in all	150
Canadian D. H. Company	Hill, R. L. Bonanza Creek	2½	150	150
Grotschier *et al*	Leasehold, L. L. Klondike River	1½	150	75
Younkins, J	Hill, L. L. Last Chance Creek	3	300	75
Eilbeck and Collins	Hill, L. L. Last Chance Creek	3½	200	100
Dolan *et al*	Hill, L. L. Last Chance Creek	3½	200	100
Cook *et al*	Boulder Hill, L. L. Bonanza Creek	2¼	250	80
Elliott *et al*	Paradise Hill, L. L. Hunker Creek	4	300	75
Murphy and Gould	Nugget Hill, L. L. Hunker Creek	2¼	150	75
Larson, A	Temperance Hill, Gold Bottom Creek	1½	150	75
De Blegier & Company	Temperance Hill, Gold Bottom Creek	4	200	100
Burke *et al*	Whisky Hill, R. L. Hunker Creek	1½	150	75
Williams Concession	Hills, R. L. Hunker Creek	9	300	150
Delhie *et al*	Hills, R. L. Hunker Creek	4½	300	100
Geisler Brothers	Hill, L. L. Dominion Creek	1	75	75
Kelner & Steffens	Hill, R. L. Quartz Creek	2	100	50
Canadian D. H. Company	Hill, L. L. Bonanza Creek	3	200	100
Finlayson, E. O	Hill, L. L. Klondike River	6	300	150
J. W. Park	Hill, L. L. Klondike River	5½	75	75
Ballarat Creek Mining Company	Leasehold, Ballarat Creek	5	300	175
Yukon Gold Company	Hill, L. L. Bonanza Creek	4	500	150
Dublin Gulch H. Co	Dublin Gulch, Stewart District	Being constructed.	1,000	300

PART IV.

QUARTZ MINING.

During the past few years very little progress has been made in quartz mining in the Dawson district. This is not due to the absence of quartz veins, but to the difficulty in securing capital to investigate. A certain amount of work is necessary to hold a quartz claim, but the preformance of representation work—the sinking of a few shallow shafts or the driving of a few short tunnels—does not aid very materially in prosecuting the development of the quartz industry. One of the best authorities on the origin of placer gold in the Yukon, states that there is little doubt that the Klondike gold, or the greater part of it at least, is detrital in origin and has been largely derived from the auriferous quartz veins cutting the older schists and especially the igneous schists of the Klondike series. The same authority,* in a report on the Klondike Gold Fields, states that 'quartz veins are exceedingly abundant in the schists of the Klondike series, and also occur, but more sparingly, in the clastic Nasina schists, and in the Moosehide diabase. The veins, as a rule, are small and non-persistent, varying in size from mere threads up to masses of quartz one to two hundred feet in length and from four to six feet in width. Large veins occur occasionally, on the Yukon river, below the mouth of Caribou creek, measuring over thirty feet in width. The common vein of the district is generally lenticular in outline, the lenticles, in the majority of cases, measuring only a few inches in width, and a few feet in length. The larger veins swell out in places to a width of from four to six feet, but are seldom traceable for any considerable distance. They follow the planes of schistosity as a rule, or cut them at a small angle. In some instances while the strikes of the vein and the enclosing schist nearly coincided, the dips proved to be in opposite

*R. G. McConnell, B.A., Geological Survey Officer, 14-B No. 884, p. 62.

directions. Branching veins are not uncommon, the branches often cutting directly across the schists. Besides the common lenticular variety, what might be called sheeted veins occur conspicuously in some of the sections, interleaved with the foliae of the shists. These veins are seldom more than three or four inches, and are usually less than half an inch in thickness. They differ from the lenticular veins in their more uniform thickness, and in their strict conformity to the inclosing schists, even when the latter are sharply bent. The lenticular quartz veins are much younger than the schists, and are older than the massive andesites and quartz porphyries. They were probably formed during, or, as a consequence of, the intrusion of the granite mass south of Indian River."

Some years ago considerable interest was taken in the development of three groups of quartz claims within a comparatively short distance of Dawson. These properties were known as 'The Lone Star,' 'The Lepine' and 'The Violet Ledge' groups. Development work was carried on for some time but either to the lack of capital or failure in the particular mode of operations, practically no progress was made towards demonstrating the value of these properties.

Lone Star.

Within the past year renewed interest has been taken in the Lone Star group. A company has been formed, and a stamp mill will be placed on the property early in the summer. The quartz veins in this group occur near the head of Victoria Gulch, a tributary on the left limit of Bonanza creek. It may also be here noted that above the mouth of Victoria Gulch the gravels of Bonanza creek are quite barren. Some years ago an effort was made to investigate the Lone Star group, and on what is known as the New Bonanza claim, a short rich kidney of quartz nearly six feet in width was uncovered.* A second

*R. G. McConnell, B.A., Geological Survey Officer, 14-B, No. 884, p. 62.

opening two hundred feet to the southeast was sunk, following a smaller vein, in which no free gold could be detected either with the naked eye or an ordinary magnifying glass. A sample was assayed in the laboratory office at Ottawa, and gave 2·625 ozs. of gold and 3·267 ozs. of silver to the ton.*

The more recent development work on the property consists of an open cut, which uncovers the junction of two veins. One

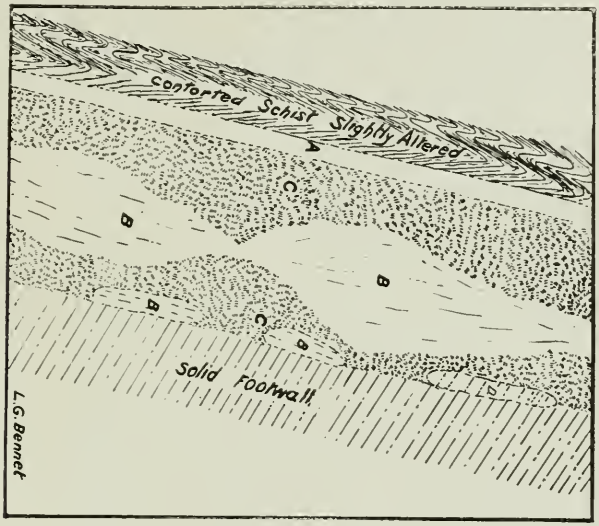


FIG. I.

vein, of which Figure 1 is a vertical cross-section, has an ore body of 3½ to 4 feet. This vein, it is claimed, passes the junction without a break, and is consequently the younger of the two. During the earlier operations on the property a shaft was sunk on this vein to a depth of 40 feet, and a tunnel driven both ways in the ore at the bottom of the shaft. At that time a considerable quantity of ore was mined, and twenty tons were taken from the dump and treated in a small stamp mill near Dawson. As a result of the treatment of this ore, it is claimed that gold amounting to $407 was recovered. One of the owners

* R. G. McConnell, B.A., Geological Survey Officer, 14-B, No. 884, p. 62.

states that the footwall of the vein is smooth and consists of solid sericite schist, while the hanging wall is a mass of contorted rock.

The other vein, which has been uncovered by the open cut consists, as far as has been ascertained, of a linear series of lenticular bodies of quartz overlapping each other. It is claimed by the company that this is what is known as a segregated vein, and that such veins lying interfoliated in slates and schistose rocks, are practically all mere varieties of fissure veins, which have been pinched into separate lenses by pressure. It is also claimed that the contorted condition of the hanging wall of the younger vein, as well as the arrangement of the adjacent lenticular bodies and an abundance of water along the fractured line, indicate that the overlapping lenticles form an older vein, which was faulted by the more recent formation of the younger fissure. A shallow shaft has been sunk on the lenticular vein, about four hundred feet from the junction, and it is reported that from this shaft very high assays have been obtained. In portions of this shaft coarse gold is visible to the naked eye, and a crystal of gold was found in the white quartz.

The company has made arrangements to install a stamp mill which will be in operation by the middle of August. It is also proposed to drive a tunnel through the footwall of the younger vein, and tap the two at the junction at a depth of 75 feet. This will give a first working level.

Dome Lode Development Company, Limited.

Situated on the right and left limits of Upper Dominion creek is a group of quartz claims, upon which extensive and systematic prospecting work is being carried on. This property, which was discovered by Mr. Aaron Knorr, consists of twenty-three claims. Of this number three belong to the Dome Lode Development Company, which holds an option from Mr.

A View of Adam's Hill and 6 and 7 below on Bonanza, from Klondike Mines Railway. Photo by J. Doody, June, 1909.

Knorr for the twenty claims adjoining. On the portion of the property between Upper Dominion and Lombard creeks, four promising veins have been located. Three of these veins strike northwest and southeast and have a northeast dip of 70° to 80°, while one runs due north and south. On the latter vein a shaft has been sunk to a depth of 80 feet, showing quartz from two to four feet in width. In the rock that has been taken from this shaft coarse gold can easily be detected by the naked eye. Figure II shows a cross-section of the hill upon which these veins occur. This section was prepared by Mr. Knorr (the discoverer) from data which he has acquired during a period of several years prospecting in the vicinity. The illustration shows the hanging wall of the vein, upon which shaft D has been sunk, to consist of altered schist for a width of about 200 feet and then a dike of quartz porphyry. The foot wall is shown as consisting of crystalline mica schist and forming a gneissic character in depth. Three hundred feet in a northerly direction from shaft D another shaft has been sunk on the same vein to a depth of 22 feet, showing quartz from eighteen inches to two and a half feet. Mr. Knorr states that this vein has been traced for a distance of $2\frac{1}{2}$ miles in a northerly direction, that it has been clearly uncovered well up on the divide between Lombard and Hunker, and has been distinctly traced for over a mile in a southerly direction, striking towards Sulphur creek. From both these shafts very high assays have been obtained.

Four hundred feet to the east is one of the veins which run northwest and southeast. On this vein shaft C has been sunk to a depth of 20 feet, showing three feet of quartz between the walls. This vein, it is claimed, has also been traced on the surface for nearly a mile. Both walls consist of crystalline mica schist.

Two hundred feet farther east, *i.e.*, nearer Dominion creek, is another vein, in which shaft B has been sunk to a depth of fourteen feet. This vein it is claimed, shows distinct evidence

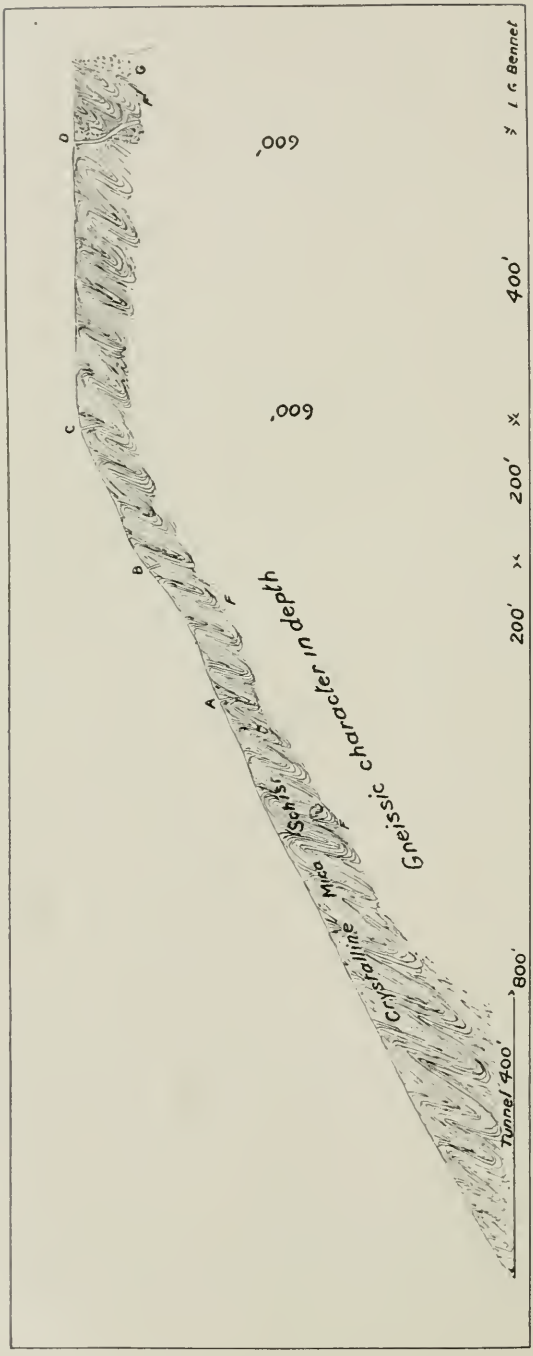

Tunnel 400'
800'
Crystalline Mica Schists
Gneissic character in depth
200'
200'
400'
600'
600'
Bennet

Fig. II.

of faulting, the portion of both walls along the line of the fissure being crumbled and twisted. The vein cuts across the formation and is entirely independent of stratification or foliage of the enclosing rock. Mr. Knorr states that this vein has been traced for several miles.

Two hundred feet farther down the hill, towards Dominion creek, still occurs another vein, upon which a shaft 22 feet deep has been sunk, showing four feet of quartz between the walls. It is claimed that this vein has also been traced for a distance of over 8,000 feet.

On the right limit of Dominion creek, and on the same group of claims, is another vein, which runs northwest and southeast. A shaft has been sunk in this vein to a depth of 22 feet, on what is known as the 'Independence' claim. In a summary report issued by the company it is stated that all the ore encountered so far, with the exception of that in the Independence claim, has been 98 per cent free milling.

The development work consists of a tunnel, which is being driven in the footwall of the veins between Dominion and Lombard, four feet six inches by six feet two inches in the timber, and a number of shafts and open cuts along the surface of the different veins. It is expected that the tunnel will cross-cut the first vein at a distance of between seven and eight hundred feet from the mouth, and at an approximate depth of four hundred feet from the surface. It is also estimated that the large or what is believed to be the contact vein, will be cross-cut at a distance of approximately 1,600 feet from the mouth of the tunnel, and at a depth of some 600 feet from the surface.

The plant consists of a 12 by 14 straight line two stage air compressor complete, with four No. 6 drills, operated by a 60 horse power locomotive boiler. There is also connected with the plant a small dynamo, which furnishes electric light along the tunnel. The crew consists of ten men, and by two shifts

between eight and ten feet are driven every twenty-four hours. The mouth of the tunnel is situated within a comparatively short distance of Sulphur Springs, the terminus of the Klondike Mines Railway. The quantity of wood available in the vicinity for fuel is limited, but the railway could be extended along the face of the Dome and the left limit of Dominion, and the transportation thus afforded would solve the fuel problem, as either coal or wood could then be obtained at a moderate cost.

In a summary report which has been issued by the Dome Lode Development Company, it is claimed that the company can operate at a cost of $4 per ton, and that there is a large body of ore averaging over $40 to the ton. As soon as the tunnel has been completed, it will be decided whether to install a stamp mill and treat the ores or dispose of the property to an operating company as the values are demonstrated.

Lepine Creek.

During the past year there has been very little development work on the group of mineral claims on Lepine creek. These claims are situated in a rectangular block commencing near the mouth of Fish creek and extending along Lepine to the mouth of Bradly creek. 'The claims are staked on a wide band of sericite schist, the ordinary country rock of the district. The schist is often somewhat silicified and, in places, is impregnated with iron. * * * The schists here are traversed by a wide dike belonging to the recent quartz porphyry group, and both schists and dike rock are completely decomposed to a depth of at least fifteen feet.'*

Violet Group.

The Violet group of quartz claims is situated on the summit of the ridge between Ophir and Eldorado creeks. *'The

*R. G. McConnell, B.A., Geological Survey Officer (14–B, No. 884, p. 65)


VAULT AND MOHAWK MINES, CANYON MINES (PADLEY CANYON)
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vein is broken by several small faults, and follows, at one point, for a few feet, a cross-fracture plane, running at right angles to the general course. It strikes with the inclosing schists in a S.E. direction, but dips across them. * * * The quartz is crystalline and, like many of the veins in the district, is dotted in places with reddish feldspars giving it a pegmatic character. It holds a considerable amount of iron, and, near the surface weathers to a rusty colour. Some galena is also present. The gold values are variable, but are stated to average $10.50 to $11 per ton.

QUARTZ CLAIMS IN WHITEHORSE DISTRICT.

——	Ore Shipped.	Ore on Dump.	Machinery.	Work completed prior to and during 1908-9.	Work contemplated 1909-1910.
Anaconda and Rabbits Foot.	20	350	.....	Tunnel 400 ft. Shafts 60 ft. Stripping 750 ft. Drift 25 ft.	
War Eagle and LeRoi.....	250	250		Open cut 100 ft. Shafts 35 and 86 ft. Tunnel 155 ft.	6 men developing.
Pueblo.....	1,400	3,000	.....	Tunnel 250 ft. Shaft 100 ft. Drift 60 ft.	
Copper King.....	1,000	100	$15,000. A 60 h.p. boiler, 3 drill comp. 15 h.p., Eng.	500 ft. tunnels and drifts. Shafts 100 ft. and 153 ft. Drifts 800 ft.	15 men sinking and developing.
Carlisle.....	100	50	.....	Two shafts 50 ft. each and 50 ft. drift.	
Spring Creek.....	10	100	.....	Shaft 40 ft., drift 20 ft.....	
Empress of India.....	6	.....	.....	Drift 150 ft.....	
Best Chance.....	14	100	.....	Shaft 26 ft. Drift 50 ft. Shallow shafts and open cuts.	
Grafter.....	2,200	.....	$1,000. A 5 h.p. hoist, 25 h.p. boiler.	Two shafts 50 ft. each and 100 ft. drift. Stoped 2,000 tons ore.	
Arctic Chief.....	650	600	.....	Tunnels 300 ft. and 700 ft. Winze 50 ft. Upraise 60 ft. Stoped 500 tons.	
Corvette.....	.....	100	.....	Tunnel 30 ft. Shaft 60 ft. Drift 100 ft.	
Valerie.....	20	300	$1,000. A 10 h.p. hoist. 15 h.p. boiler.	Three shafts, 50 ft., 50 ft., 22 ft., drifts 200 ft.	
Gold Hill.....	1	50	.....	Two tunnels, 50 and 100 ft.....	
Legal Tender.....	.....	200	.....	Surface work and tunnel 87 ft.....	
Golden Slipper.....	.....	25	.....	Tunnel and drift 80 ft.....	
Silver King.....	.....	50	.....	Shaft 50 ft.....	
Tally Ho.....	50	100	.....	Tunnel 300 ft.....	
Venus-Mars, Venus No. 2, Vault.	800	2,000	2 gas engines. 3 hoists. 1 air compressor with 10 drills. Aerial tram and concentrating mill. Total value $80,000.00.	Shafts and upraises 1,145 ft. Tunnels, drifts and crosscuts 1,760 ft.	None, unless better transportation rates are secured. 180,000 tons ore in sight, worth $22 per ton.

Vault	20			Tunnels and drifts 590 ft.	None under present cost of transportation. $35,000 tram if rates improved.
M. & N. Ibex	3	50		Tunnels 134. Upraise 40 ft.	
Dalton Annex & Black Fox				Tunnel 50 ft.	
Uranus, Capella, Uranus No. 2.	3			Drift 300 ft. Crosscut 250 ft.	To connect mine with mill at Venus by tram.
Caribou Group	100		Gas hoist, value $600.	Shafts 98 ft. and 137, drifts 190 and 122 ft.	5 mile tram, $100,000. Mill, $75,000.
Montana Group	2		1 aerial tram, 1 gas hoist, 1 engine and air drills. $102,000.	Shafts 53, 24, and 312 ft. Winzes 78 ft. Upraise 112 ft. Drifts 40, 90, 80, 427 and 42.	Will be mined by large force if rates to smelter are satisfactory.
Thistle Group				Shaft 52 ft.	

The information contained in the above Table was obtained from the Ann. Rep. of the Assistant Gold Commissioner, Whitehorse, Y T.

TABLE CONCERNING ORE BODIES (WHITEHORSE, Y. T.)

Claim.	Width of ore body.	Strike.	Dip.	Ore in sight.	Estimated value per ton.	Principal metal.	Added values for
	Ft.	°	°	Tons.	$		
Whitehorse belt	1 to 200	N. 20 E. to N. 50 E.	50 N.W. to 70 N.W.	1,200,000	11 00 (Copper at 12½).	Copper	Gold
Watson & Wheaton		N. 45 W.			25 00	Silver	"
Venus	3 to 20	N. & S.	45 S.	180,000	22 00	"	"
Vault	1 to 6	N. & S.	30 W.		22 00	"	"
M. & N.	2	N. 45 E.	22 N.W.		150 00	"	"
Uranus	3 to 20	N. & S.	14 W.		50 00	"	"
Caribou	16	E. & W.	12 N. to 40 N.		50 00	"	"
Montana	3 to 7	N. & S.	25 W.		20 00 (?)	"	"
Thistle	2 to 3½	N. & S.	25 W.		100 00	"	"

*Ann. Rep. of Assistant Gold Commissioner, Whitehorse, Y.T., 1909.


THE PUEBLA MINE, SHOWING LEDGE AND SOME STOCK ORE NORTH OF SHAFT
PHOTO BY J. O. A.
WHITE HORSE MINING DISTRICT

TABLE SHOWING MINERAL LOCATIONS.

District.	Mineral locations, 1908–9.	Mineral claims renewals, 1908-9.	Mineral claims Crown granted.	Total number of mineral claims in good standing.
Whitehorse....	97	178	42	275
Conrad.....	70	201	14	285
Kluane.....	31	13	0	44
Dawson.....	298	373	89	760
	496	765	145	1,364

Some analysis of samples of ores taken from various sections of the Whitehorse Copper Belt, made from average of fifty samples from the different properties.

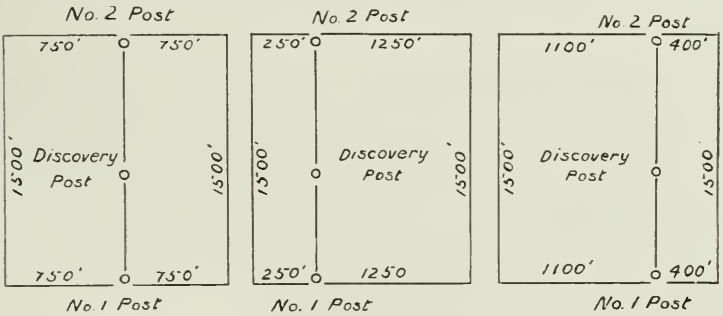
Name of Mine.	Au. per ton.	Ag. per ton.	Cu.	Fe.	Al.	CaO.	Mn.	SiO.	Mg.	S.
	Ozs.	Ozs.	%	%	%	%	%	%	%	%
Arctic Chief	0·21	1·2	3·21	45·5	12·8	0·2	6·71	9·67	.....	2·53
Grafter	0·05	1·55	7·90	7·12	3·88	21·84	.....	56·01	.....	2·78
Copper King	Trace.	1·00	6·21	4·55	.....	25·45	.....	35·76	.....	.....
War Eagle	0·05	3·8	8·8	4·4	.....	23·5	.....	55·8	3·0	6·6
Valerie	0·075	1·05	12·90	6·39	1·95	44·36	.....	23·91	5·65	4·21

ROBERT SMART,
Territorial Assayer.

STAKING.—Any person eighteen years of age or over, who has discovered mineral in place, may locate a claim not exceeding fifteen hundred feet in length by fifteen hundred feet in width, by marking it with two legal posts, along the line of the lode or vein, and marking out the line between such posts. Upon each post should be marked the name of the claim, the name of the person locating and the date, also the number of feet lying to the right and to the left of the location line.

The locator shall also place a legal post at the point where he has discovered mineral in place, on which shall be marked 'Discovery post.'

Examples of various mode of laying out claims:—



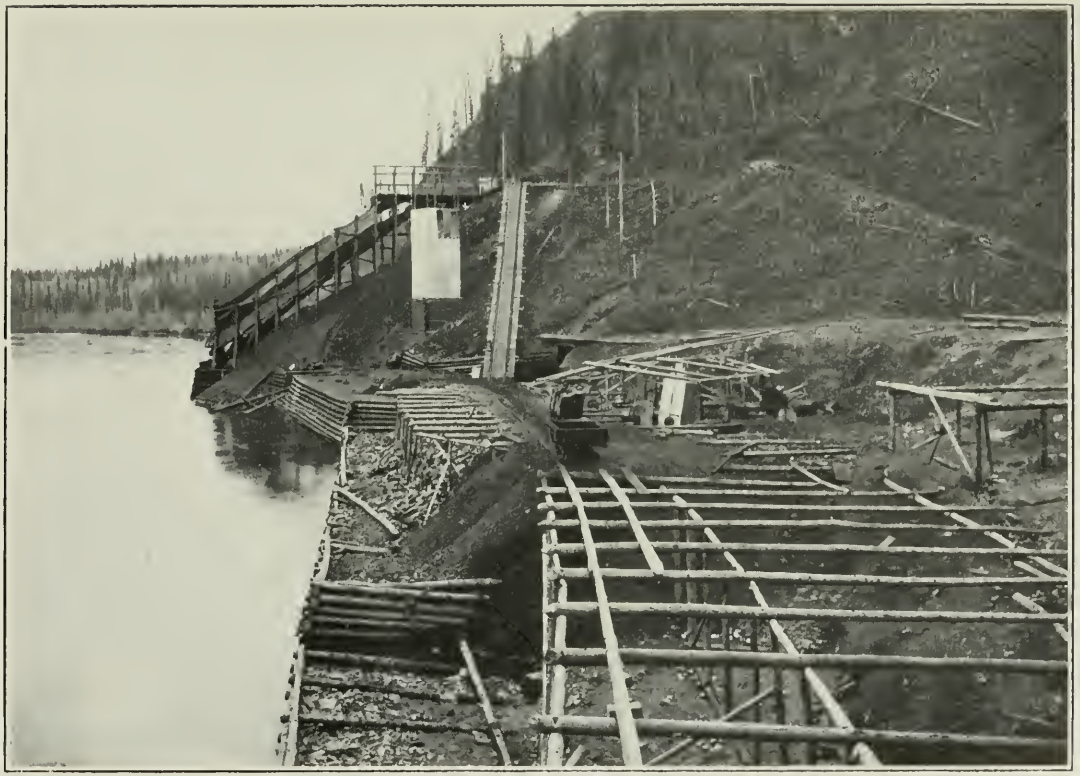
PART V.

COAL.

There are two coal-bearing horizons of economic interest in this portion of the Yukon Teritory. An upper horizon occurs near the top of the thick assemblage of conglomerate beds forming the upper half of the group of Cretaceous sediments, and to this higher zone belong the seams at the Tantalus mine and on Tantalus bluff. A second, lower coal-bearing horizon lies towards the base of the Cretaceous column as seen at the Five Fingers mine, also at a point west of the 69 mile post from Whitehorse on the Whitehorse-Dawson road and elsewhere.

The seams of the Tantalus bluff and the Tantalus mine doubtless extend a number of miles to the north and south of these places, but prospecting for coal is rendered particularly difficult there by the thick mantle of glacial and recent alluvial material which covers the greater part of the district. Beginning within a distance of two or three miles south of Tantalus, the Cretaceous sedimentary rocks are, for the greater part, covered with more recent Tertiary basalts, basalt tuffs, etc., so that although in the 20 miles immediately south of the Tantalus mine there is believed to be a great amount of coal, it will, in most places, require very careful prospecting to find it suitably located for mining purposes.

South of this district in which the strata have been so largely covered by later volcanics, the coal-bearing formations have been removed by erosion for a distance of over 30 miles to where a belt of the conglomerate of the upper coal horizon was found, traversing the district in a direction somewhat north of east. About 4 miles east of the wagon road the formation passes beneath a great thickness of volcanics, but to the northwest the formation is believed to extend a number of miles, and may exist as a continuation of the outcrops seen crossing the Hutchi River valley about 30 miles from the mouth of the river. The formations near the road are in the form of a double synclinal fold, the upper portion of the formation, and consequently the upper coal horizon, being here eroded away. The seams of the lower horizon, however, were seen in several places, being particularly well exposed along a small creek about 4 miles west of the 69 mile post from Whitehorse. At this point a number of seams were uncovered and others probably exist, as very little prospecting has been done here. Of the seams seen, one was 7 feet wide, one about 4 feet wide, and several between 6 and 8 inches in width. The following are approximate analyses by fast coking of these coals, furnished by Mr. F. G. Wait, of the Mines



Coal Mine, Tantalus.

Branch. No. 1 represents an average of an 18″ seam, and No. 2 of a 7′-6″ seam:—

	I.	II.
Water	8·98	12·02
Volatile combustible matter	29·62	34·28
Fixed carbon	48·30	42·56
Ash	13·10	11·14
	100·00	100·00
coke, non-coherent	61·40	53·70
Ratio of volatile combustibles to fixed carbon	1:1·63	1:1·24

The ash in No. 1 is white; in No. 2, pale reddish brown.

Coal was seen also along the side hills to the east of the wagon road between the 117 and 118 mile posts, but the very thick covering of glacial material made the measuring of the seams very difficult. One seam, less than 2 feet wide, was seen on a small creek which crosses the road between the 113 and 114 mile posts. The following is an approximate analysis by fast coking of a sample from this seam by F. G. Wait, of the Mines Branch, who states that the coal 'is probably a lignite which has been altered by intrusives.'

Water	4·68
Volatile combustible matter	15·59
Fixed carbon	72·26
Ash, reddish brown	7·47
	100·00
Coke, non-coherent	79·73
Ratio of volatile combustible to fixed carbon	1:4·64

All information that can be gathered concerning the Tantalus, Tantalus Butte and Five Fingers mines has already been published.[5] The areas described in this report, and two other areas previously mentioned[6]—one along the Lewes river between Hootalinqua and the Big Salmon river, and the second at a point a short distance from the Tantalus mines—include all the places north of Whitehorse and south of Tantalus at which the upper coal horizon is known to occur.

* Summary Report of the Geological Survey Branch of the Department of Mines, 1908.

5. Op. cit.

6 Cairns, D. D.—Report on portions of the Yukon Territory, chiefly between Whitehorse and Tantalus, Summary Report for 1907, Geological Survey Branch.

MACK'S COPPER.

A few miles to the southwest of Montagne, and only a short distance west of the western edge of the Tantalus map, are a number of mineral claims, locally known as Mack's Copper, because originally they were mostly owned by Mack brothers. The property is reached, usually, by a branch road leaving the Whitehorse-Dawson road about 6 miles above Montagne, and following approximately the old Dalton trail southwesterly up the Hutchi river. From a point about eight miles in on this road, a trail ascends the hills to the north of the claims which virtually are on the summits about 4 miles distant from and 1,900 feet above the valley. Practically all the ore in the vicinity appears to be on one claim.

The ore, which occurs in a fine-grained, greenish, porphyrite at or near its contact with limestone, consists chiefly of magnetite, with hematite in minor quantities, both being more or less impregnated with copper minerals, chiefly chalcopyrite, malachite and azurite. The main mass of mineral is in the form a small knoll of almost solid iron ore, about 200 feet wide, by, perhaps 300 or 400 feet long. On the south side of the hill the iron carried considerable copper while the ore on the top of the knoll shows no copper, possibly because of leaching. A cross-cut tunnel has been started in one of the most prominent places on the hillside, and when visited was in about 35 feet.******

The following samples were taken by the writer and have been assayed by Robt. Smart, Government Assayer at Whitehorse. No. 1 is an average of the end of the tunnel, No. 2 is an average of the best 4 feet of the open cut.

	I.	II.
Gold, ounces per ton	Trace.	0·025
Silver, ounces per ton	Trace.	3·400
Copper percentage	1·80	5·55

The Str. "Dawson" Leaving Dawson for White Horse.

Chapter 5.

TRANSPORTATION.

The Yukon river is navigable from Behring sea to Whitehorse, a distance of over 2,000 miles; and during the summer this river is the great channel of transportation from the coast to the interior. On the south side steamers ply along the Pacific coast between Vancouver, Victoria, Seattle and Skagway, connecting at the latter point with the White Pass Railroad, which extends from Skagway to Whitehorse. Between the middle of June and the latter part of October a fleet of steamers belonging to the British Yukon Navigation Company ply between Whitehorse and Dawson. The trip between Whitehorse and Dawson is made in less than two days, and between Dawson and Whitehorse in about three and a half days. In past years large quantities of merchandise were shipped on scows from Whitehorse to Dawson and sold on the water front to merchants and citizens. The city council of Dawson, however, in 1903, imposed a license of $500, which

was subsequently reduced to $300, on all transient traders. With the imposition of this tax, and a special through rate offered by the White Pass and Yukon Route and the British Yukon Navigation Company, to merchants shipping goods, the transient business practically ceased, and the transportation business between Whitehorse and Dawson is now almost entirely handled by the British Yukon Navigation Company. There is also one steamer belonging to an independent company, operating on this stretch of the river.

The ice on the Yukon breaks up about the middle of May, and shortly after that time the river is navigable north of Lake Laberge, the ice in the lake breaking up early in June. During this period lines of goods which may be in urgent demand are carried around the lake and shipped to Dawson on scows and whatever boats may be available.

The following are the official figures as to the opening and closing of the Yukon since any records have been kept:—

Freeze-up.	Year.	Break-up.
.....	1896	May 19, 2.35 p. m.
.....	1897	" 17, 4.30 p. m.
Nov. 4.....	1898	" 8, 8.15 a. m.
Oct. 23.....	1899	" 17, 4.10 p. m.
Nov. 2, 5.00 a. m.....	1900	" 8, 6.00 a. m.
Nov. 12, 11.40 a. m.....	1901	" 14, 4.13 p. m.
" 5, 1.15 a. m.....	1902	" 11, 8.45 p. m.
" 10, 1.45 a. m.....	1903	" 13, 11.38 a. m.
" 8, 8.50 a. m.....	1904	" 7, 9.44 a. m.
" 10, 12.50 p. m.....	1905	" 10, 5.21 p. m.
" 7, 5.15 a. m.....	1906	" 11, 7.45 a. m.
" 2, 1.15 p. m.....	1907	" 5, 6.52 p. m.
Oct. 26, 3.00 a. m.....	1908	" 7, 5.27 p. m.
.....	1909	" 11, 9.47 p. m.

In 1904 there was issued by the White Pass and Yukon Route, in connection with the ocean lines between Puget Sound and British Columbia ports and Dawson, a pamphlet known as 'Northern Freight Classification No. 4,' showing in alphabetical order a list of articles with the name of the class in

which the rate is quoted on the annual tariff issued by the company. Occasionally as the annual tariff is issued, supplements have also been issued amending the classification list. In this classification list are also special rules and conditions governing the transportation of the different articles.

The following is an extract from the tariff for 1907, issued by the White Pass and Yukon Route:—

Governed by Northern Freight Classification No. 4, amendments thereto, or subsequent issues thereof. Rates in dollars and cents per ton of 2,000 pounds. Between British Columbia and Puget Sound Ports and Dawson.

Class Rates (See Rule No. 20.)

Item No.	Note.—C.L. means carload 20,000 lbs. or over, unless a lower minimum is provided. L.C.L. means less than carload.	White Pass and Yukon Route Points.		
		Quantity.	Dawson, Y.T.	
	Minimum Charge.		$3 75	
1	Class A.....	L.C.L.	$65 00	
		C.L.	60 00	
2	" B.....	L.C.L.	80 00	
		C.L.	70 00	
3	" C.....	L.C.L.	95 00	
		C.L.	85 00	

Special (Group) Commodity Rates.

4	Group 1—See Rule No. 14.	C.L.	$55 00	Effective July 1st to Aug. 15th inclusive.
5	" 2 " 14.	"	62 50	
6	" 3 " 15.	"	55 00	

See Clauses numbered 9, 10, 11, and 12 for Group Articles.

SPECIAL (Straight Carload) COMMODITY RATES.

7 Hay (compressed to at least 22 lbs. per cubic foot). Min C.L. 14,000 pounds	C.L.	$55 00	Effective June 16th to July 31st inclusive.
8 Oats and feed (straight or mixed carloads)	"	50 00	
9 Blacksmith's coal	C.L.	45 00	
10 Flour	"	50 00	
11 Sugar	"	50 00	
12 Canned cream or milk, hermetically sealed (straight or mixed)	"	50 00	Effective June 16th to Aug. 15th inclusive
13 Coal oil	"	55 00	
14 Beer	"	65 00	
15 Beer kegs, empty returned (any quantity), south bound only		15 00	
16 Oats and feed (straight or mixed carloads).	C.L.	55 00	Effective April 16th to June 14th inclusive; and from Aug. 1st to Sept. 15th, after which dates the rates will be increased 10 per cent.

SPECIAL LUMBER RATES, EFFECTIVE SAME AS CLASS RATES (See Rule No. 20).

17 *Lumber, rough or dressed one side only	C.L.	$40 00	
18 Lumber, dressed or T. & G. securely fastened in bundles	"	50 00	
19 Lath and shingles	"	50 00	

NOTE.—Through rates on lumber named herein apply to Dawson only. Mixed carloads of lumber may be taken at the carload rate for each kind.

* PENALTIES.—When timbers or single pieces of lumber are—
Over 30 feet and not more than 40 feet long increase the rate 20 per cent.
Over 40 feet and not more than 60 feet long increase the rate 50 per cent.
Over 60 feet and not more than 80 feet long increase the rate 100 per cent.

Rates in dollars and cents per ton of 2,000 lbs.

Rates named in this tariff do not include custom house charges or dues.

Subject to change without notice.

In view of the large number of dredges and hydraulic plants being imported into the Yukon Territory, the following extracts from the supplement (1907) to the Northern Freight Classification will be of interest to those contemplating the importation of such machinery.

Steamboat Towing Barge up stream. View taken at Dawson.

When not otherwise specified in the Northern Freight Classification, an additional charge is made for handling heavy packages, including boilers and mining machinery, as follows:

Over 4,000 lbs. and not more than 6,000 lbs., add 10% to rate.
Over 6,000 lbs. and not more than 8,000 lbs., add 15% to rate.
Over 8,000 lbs. and not more than 10,000 lbs., add 20% to rate.
Over 10,000 lbs. and not more than 12,000 lbs., add 25% to rate.
Over 12,000 lbs. and not more than 14,000 lbs., add 30% to rate.
Over 14,000 lbs. and not more than 16,000 lbs., add 35% to rate.
Over 16,000 lbs. and not more than 18,000 lbs., add 40% to rate.
Over 18,000 lbs. and not more than 20,000 lbs., add 45% to rate.
Over 20,000 lbs., special contract.

HYDRAULIC PIPE.

Steel, wood or iron, when nested so that measurement will not exceed 60 cubic feet per ton of 2,000 pounds.....Class A

When measurement exceeds 60 cubic feet per ton of 2,000 pounds, an additional charge will be assessed for such excess measurement as follows, cubic measurement to be determined by multiplying the square of the outside diameter by the length:

EXCESS MEASUREMENT.

Over 60 to 70 cubic feet per ton of 2,000 lbs., add to rate 2½%
Over 70 to 80 cubic feet per ton of 2,000 lbs., add to rate 5%
Over 80 to 90 cubic feet per ton of 2,000 lbs., add to rate 10%
Over 90 to 100 cubic feet per ton of 2,000 lbs., add to rate 15%
Over 100 to 115 cubic feet per ton of 2,000 lbs., add to rate 20%
Over 115 to 130 cubic feet per ton of 2,000 lbs., add to rate 25%
Over 130 to 145 cubic feet per ton of 2,000 lbs., add to rate 30%
Over 145 to 160 cubic feet per ton of 2,000 lbs., add to rate 35%
Over 160 to 175 cubic feet per ton of 2,000 lbs., add to rate 40%
Over 175 to 200 cubic feet per ton of 2,000 lbs., add to rate 50%
Over 200 to 225 cubic feet per ton of 2,000 lbs., add to rate 60%
Over 225 to 260 cubic feet per ton of 2,000 lbs., add to rate 70%

San Francisco Rates.

The rates to and from San Francisco will be made by adding to the rates to and from Seattle, the following arbitraries applying only via Pacific Coast Steam Ship Co., in connection with Alaska Steamship Company.

Minimum charge, 50 cents for any single shipment.

Class A—$3.50 per ton of 2,000 lbs.
Class B— 4.50 " "
Class C— 5.50 " "

Hydraulic pipe and smoke stacks (exceptions to classification), $6 per ton of 2,000 pounds, but not less than $2 per 40 cubic feet.

On pieces or packages weighing over 4,000 pounds each, the following charge will be made in addition to the rates shown above:—

4,000 to 6,000 lbs.,	$2.00	per ton of	2,000	lbs.
6,000 to 8,000 lbs.,	3.00	"	"	"
8,000 to 10,000 lbs.,	4.00	"	"	"
10,000 to 12,000 lbs.,	5.00	"	"	"
12,000 to 14,000 lbs.,	6.00	"	"	"
14,000 to 16,000 lbs.,	7.00	"	"	"
16,000 to 18,000 lbs.,	8.00	"	"	"
18,000 to 20,000 lbs.,	9.00	"	"	"

Joint freight tariff, naming through class rates between Vancouver, Victoria, British Columbia; Seattle, Tacoma, Port Townsend, Washington; and Whitehorse, Yukon Territory, via the Alaska Steamship Company, Pacific Coast Steamship Company, Canadian Pacific Railway Company (British Columbia Coast Service), and MacKenzie Brothers, Limited, Steamship Company—the White Pass and Yukon Route:—

Note.—C. L. means carload of 20,000 pounds or over, unless a lower minimum is provided. L. C. L. means less than carload.	Whitehorse.	
Minimum Charge.	($2.75)	
	L.C.L.	C.L.
Class A	$59 50	$54 00
" B	66 50	60 00
" C	83 50	72 00

Note.—During the season for Commodity Rates, Dawson Commodity Rates will apply to Whitehorse with slight reduction in some instances.

ST. MICHAELS TO DAWSON.

The stretch of river between Dawson and St. Michaels (a distance of 1,601 miles) is generally known as the Lower


CONRAD CITY, YUKON. TERRITORY. CANADA.

river; and on this route the steamers of the Northern Commercial Company and the North American Transportation and Trading Company operate, connecting with ocean steamers at St. Michaels from Seattle and San Francisco. Nearly all the merchandise imported by these two companies is brought into the interior by this route, and delivered at their different trading posts along the river. Owing to the distance and the shortness of the season of navigation, the lower river steamers cannot make more than three trips during the summer, and each trip they not only carry a full cargo, but also push one or two heavily laden barges. The larger boats carry upwards of 600 tons, and each barge from 200 to 400 tons.

The trip between the mouth of the Yukon and Dawson in the early part of the season occupies about sixteen days on account of the strength of the current created by the volume of water in the river. In September, however, when the current is not so strong, the journey can be made in about fourteen days. The trip from Dawson to St. Michaels is made in slightly less than six days. On what is known as the Yukon flats the river opens out and attains a breadth of about sixty miles. There are numerous channels on this stretch of the river, which is tortuous and difficult to navigate, and the Northern Commercial Company employ the services of a pilot, who takes charge of all the company's boats when crossing the flats.

The passenger rate between Dawson and Seattle or San Francisco via St. Michaels is $125 first-class. On the same route the steerage rate is $105, being first-class on the river and steerage on the ocean. During the summer the companies operating steamers on the lower river transact a considerable amount of passenger business, and a large number of miners, merchants and others travelling to and from the different points in Alaska usually travel by way of Whitehorse and

Dawson. Tickets can be obtained at most of the companies' offices in Alaska direct from those points to ports in British Columbia and Puget Sound, and baggage can be checked and forwarded in bond.

WINTER.

In the early days the only route to and from Dawson during the winter season was the frozen surface of the Yukon river. For about one month while the ice was forming on the river, and for a similar period in the spring while the ice was breaking up, there was no communication between Dawson and the outside. It was dangerous and almost impossible to travel any distance on the shore ice. No mail could be carried either way for about two months each year.

In the summer of 1902 the government built a winter trail between Dawson and Whitehorse, a distance of 333 miles, at a cost of $129,000, and since that time about $50,000 have been expended in maintaining and repairing this road. During the winter season and since the construction of the new trail, the White Pass and Yukon Route run a tri-weekly stage service between Whitehorse and Dawson. From the close of navigation until sufficient snow has fallen to make good sleighing the company uses Concord coaches, which can carry twelve passengers each. Until the crossings are frozen over, passengers and baggage are taken across the rivers in canoes, which are handled by expert boatmen. As soon as there is sufficient snow for sleighing, sleighs are substituted for coaches. Each sleigh is drawn by four horses, and has accommodation for from fourteen to seventeen passengers, 1,000 pounds of passenger baggage and 1,000 pounds of mail and express. No team travels more than an average of twenty miles, and fresh horses are in readiness at each station along the route. From about the first March the passenger traffic to the interior becomes

very heavy, and from that date until about the seventh of April there is an almost daily service of stages.

The following is an extract of the passenger rates charged by the White Pass and Yukon Route, as published in Bulletin No. 19 issued by the company during the winter of 1906-07:—

NORTH BOUND.

Whitehorse to Dawson.

From the close of navigation to December 1	$100
From December 1 to March 15, inclusive	80
From March 16 to April 15, inclusive	100
From April 16 to end of season	125

SOUTH BOUND.

Dawson to Whitehorse.

From the close of navigation to December 1	$100
From December 1 to March 31, inclusive	75
From April 1 to April 15, inclusive	100
From April 16 to end of season	125

Skagway to Whitehorse.

White Pass Railroad	$ 20

The above rates do not include meals and lodgings at the different roadhouses along the trail. The regular roadhouses charges are: Meals, $1.50 each; beds, $1, and small rooms from $2 up.

Freight, express and baggage can be bonded through to Dawson during the winter on any of the stages operated by the White Pass and Yukon Route. Baggage exceeding 25 pounds in weight is charged for, north of Whitehorse, at the rate of 25 cents per pound by passenger stage, and 20 cents per pound by freight stage.

The White Pass and Yukon Route also carry freight over the winter trail on sleds specially constructed for this purpose, and the journey is made in about eight days. The rates between Whitehorse and Dawson are from 20 to 25 cents per pound according to the class of goods as defined in the company's Northern Freight Classification No. 4 and amendments. Regular dealers and mining operators are given a special rate of 15 cents to 18 cents per pound on large shipments.

Klondike Mines Railway.

The Klondike Mines Railway has been in operation since the summer of 1906. This road extends from Dawson along the Klondike valley, and up Bonanza creek to Grand Forks—at the junction of Eldorado—and then to Sulphur Springs, a distance of 32 miles from Dawson. Sulphur Springs is within a short distance of Dominion Dome, the highest point in the district. From the railway terminus stages convey passengers and freight to Granville, Dominion, Sulphur and other creeks in the vicinity.

Road Construction and Freighting.

Probably one of the most important features in the opening up of the Klondike district and other gold mining areas within the Yukon Territory is the system of road construction, which has done so much to stimulate and develop the mineral resources of the Territory, and thereby contributed in no small degree to the gold production of the world.

The construction of a system of roads in the Yukon Territory was a colossal undertaking. When it is remembered that in 1899 and 1900 miners were receiving as high as $1 an hour, it is possible to form some idea of the expenditure to be encountered. In 1899 workmen on the road were paid at the rate of 85 cents per hour; in 1900 they received 80 cents, and since 1901 they have been paid at the rate of 75 cents an hour. In 1899 a team could not be hired for less than $25 a day. In the following year this was reduced to $20, which is the rate paid at the present day throughout the Territory.

During the spring of 1909 the commissioner advertised for tenders for certain classes of teaming within the city of Dawson, and the work was awarded at the following rate, namely:—

For team of heavy horse and wagon with driver..	$14.95 per day.
For team of heavy draft horses without wagon but with driver.....	13.95 per day.
For single heavy draft horse without driver.....	6.45 per day.


CARIBOU CROSSING.
STOP
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The first road in the territory was built in 1899, along the top of the ridge between Bonanza and Hunker creek, this road being subsequently extended to Gold Run. The same year branches were constructed from this road to Bonanza, Gold Bottom and Caribou. In 1900 the present road from Dawson to Grand Forks was constructed, and in the following year this road was continued up Bonanza, connecting with the summit road which had been built the previous year. In 1901 the present wagon road was also built from the Ogilvie bridge along the Klondike valley and Hunker creek to Caribou, a distance of thirty-three miles.

In 1901 a pack trail was built from Dawson to Glacier creek, and in the following year this trail was improved and made a passable wagon road. The mining industry in the Miller and Glacier district continued with increased activity, and in 1904 warranted the expenditure of a sufficient amount to construct a good wagon road. This road commences on the opposite side of the Yukon from Dawson, but a cable ferry and scow, which were purchased by the local government, conveys horses, machinery and supplies, etc., across the river. In summer all the freight and passenger traffic from Dawson to Miller and Glacier creek is carried over this road, a distance of 73 miles. The winter trail from Dawson to Miller is by way of the Yukon river to Fortymile, up Fortymile to Brown creek, up Brown creek to its head, then over the summit to Big Gold and Glacier, a distance of 110 miles.

In winter the trail from Duncan to Dawson is by way of Hunker, Dominion, Jensen, Gravel Lake, Barlow, and across country in a straight line to Mayo, a distance of 150 miles. In summer there is steamboat communication between Dawson and Mayo, the Stewart river being navigable to Fraser falls.

The following statement shows the number of miles of sled and wagon roads constructed since 1899, namely:—

WAGON ROADS.

1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906–7.	1907–8.	1908–9.	Total.
45·00	32·00	63·36	85·81	26·00	141·00	37·00	40	35¾		105 610·92

SLEIGH ROADS.

160·00	10·00	80·25	372·0	4·00	29·00	13·00	22	105	45	840·25

The cost of the construction of wagon roads runs from $1,500 to $3,300 per mile, and sled or winter trails from $250 to $350 per mile.

In order to illustrate the saving to the mining operator by the system of roads which have been constructed in the Klondike district alone, the following is a statement of the total tonnage of freight, including supplies and mining machinery, delivered by freighters on the principal creeks in the district during the year 1903, as compared with what the cost would have been in 1899, namely:—*

District.	Tons.	1899.		1903.		Net gain to Operator.
		Rate.	Amount.	Rate.	Amount.	
		$	$	$	$	$
Bonanza	4,500	140	630,000	20	90,000	540,000
Hunker	3,750	160	600,000	30	112,500	487,50
Dominion	3,000	250	750,000	40	120,000	630,000
Gold Run	2,250	360	810,000	60	135,000	675,000
Sulphur	1,500	250	375,000	40	60,000	315,000
	15,000		3,165,000		517,500	2,647,500

*Compiled by Inspector of Works and Buildings.

The following table shows the distances and freight rates from Dawson to different points in the Territory:—

From	To	Distance	Freight Rate per lb.	
			Winter.	Summer
		Miles.	Cts.	Cts.
Dawson	Arlington Roadhouse	10.25	¼	½
	Barker Creek	* 90.00	.....	5
	Blackhills, Discovery	* 55.00	.....	3
	Bear Creek	7.33	¼	½
	Bonanza	13.00	¼	½
	Bedrock Creek (Sixtymile)	65.00	3½	8
	Boucher	43.00	2	4
	Caribou (Dominion)	31.60	1¼	1½
	Carmack's Forks	18.20	½	1
	Clear Creek (Duncan Creek District)	.....	.....	1¼°
	Dominion Creek, Dome, via Ridge	25.40	1	1½
	" Upper Discovery	28.50	1	1½
	" Caribou	31.60	1¼	1½
	" Lower Discovery	33.40	1½	2
	" 7 below Lower	34.10	1½	2
	" 92 below Lower	40.60	1½	2
	Granville	54.00	2	.....
	Duncan Creek	184.00	.....	.....
	Eldorado, Head of	19.50	¾	1
	Glacier Creek, Discovery	58.25	3½	7
	Gold Bottom	18.30	½	1
	Gold Run, Head of (via Ridge Wagon Rd.)	35.75	2	2
	" via Hunker, Summit & Ridge	38.93	.....	.....
	" No. 27 via Ridge and Gold Run	44.00	2	2½
	" via Hunker, Summit, Green Gulch	54.25	.....	.....
	Gordon's Landing	172.00	.....	.....
	Henderson Creek, via Bonanza, Calder, &c.	53.50	.....	.....
	Hunker Creek, Gold Bottom	18.30	½	1
	" Discovery	21.50	½	1
	" Head of	26.35	1	1½
	Indian River (via Calder)	29.25	.....	2°
	Last Chance	12.75	¼	1
	Miller Creek (Sixtymile)	61.50	3½	8
	Montana Creek	36.75	.....	.....
	McQuesten	105.00	.....	1½**
	Quartz Creek, 12 below A. Mack's	28.10	1	1½†
	Steel Creek	36.75	.....	.....
	Sulphur, 36 above Discovery	30.40	1¼	1½
	" 2 below Discovery	34.06	1½	2
	Scroggie Creek	101.00	.....	1 **
	Victoria Gulch	16.50	½	1
	Williams, Bonanza and Ridge	31.66	1¼	1½

*By steamer during the summer the rate is 1c.

°This rate is by steamer.

**This rate applies by Steamer during Summer.

¼White Pass fast freight package rate is 2c.

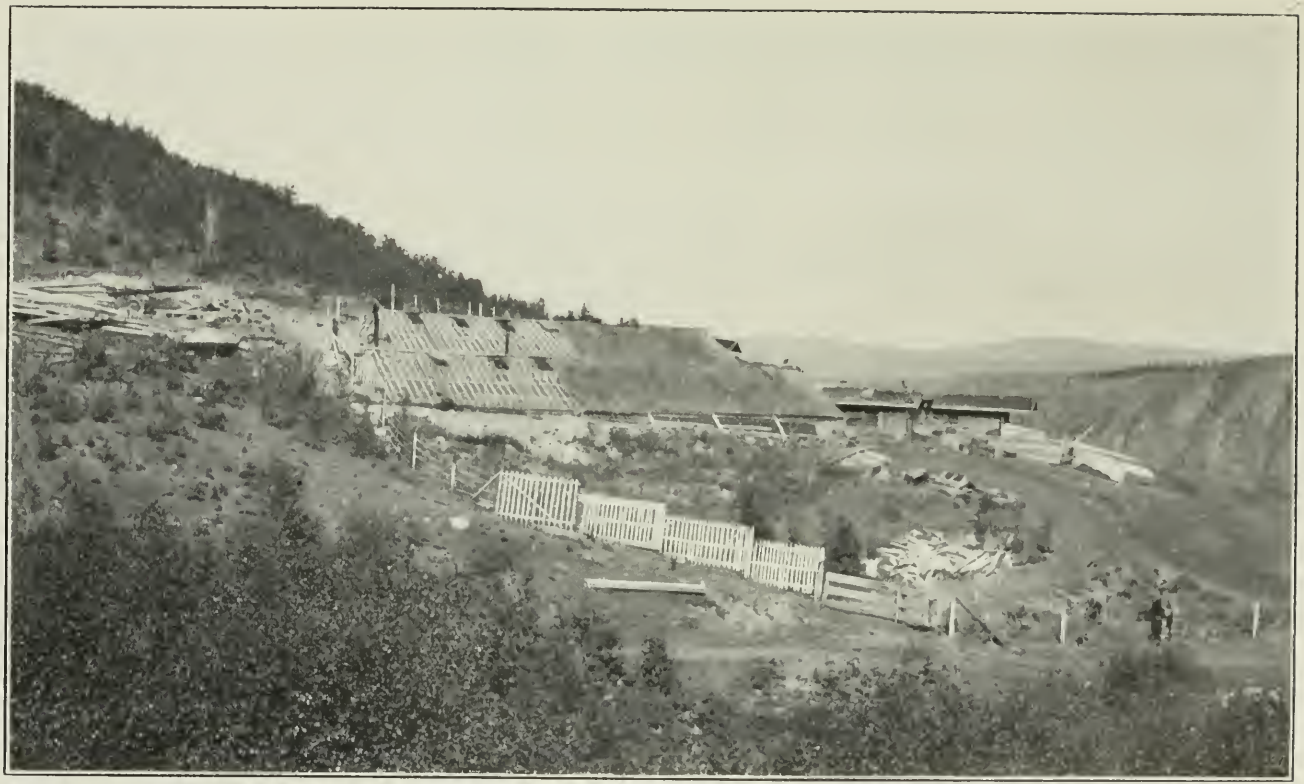
The following table shows the distances and rates along the Whitehorse-Dawson Winter Trail, namely:—

From	To	Distances.	Freight rate per lb.
		Miles.	Cts.
Dawson..	Quartz (Tystad's)	28.10	2
	Indian River	29.25	2
	Eureka Forks	43.00	3
	Wounded Moose	52.00	4
	Stewart Crossing	77.00	6
	Rosebud	87.00	7
	Stevens	99.00	7¼
	Rosebud, Right Fork	109.00	.....
	Hume's	114.00	8½
	Selkirk (Cut off)	134.00	.....
	Pelly Crossing	133 00	9¾
	Minto	157.00	11
	Lewes Crossing (Mackay's)	178.00	12¼
	Carmack's	199.00	13½
	Nordenskold (1st Crossing)	199.05	.....
	Montague	223.00	14¾
	Chico Junction	228.00	.....
	McArthur Cut-off	242.60	.....
	Nordenskold (2nd Crossing)	243.00	.....
	Braeburn	244.60	16
	Nordenskold (3rd Crossing)	251.50	.....
	Kynock (Nordenskold Post)	266.00	17¼
	Nordenskold (4th Crossing)	275.75	.....
	Little River	288.50	18½
	Tahkini River Crossing	307.00	19¾
	Whitehorse	329.00	20

The above are first freight package rates.
Special rates are quoted on shipments in quantity.

Sides Streams Navigation Company.

Considerable difficulty has been experienced by miners and prospectors in having supplies delivered at different points along the principal tributaries of the Yukon river during the summer. This is chiefly due to the fact that during the time when the side streams are navigable there is not sufficient business to warrant a transportation company in making the trip. The Side Streams Navigation Company, however, propose to operate a light draft steamer on the principal tributaries of the Yukon namely: the White river, Stewart, Pelly and to the first cañon on the Fortymile.



Paddock's Greenhouse.

The approximate standard rates which have been furnished by the company, are as follows:—

From Dawson to	Distance.	Freight rate per lb.	Passenger rate.
	Miles.	Cts.	$ cts.
Fortymile		½	
First Canyon, Fortymile River		⅔	
Stewart City	68.	¾	7 00
Scroggie, Mazie May & Barker	88.	1	10 00
Clear Creek		1¼	20 00
Nelson's Point & McQuesten	158.	1½	25 00
Mayo	230.	2	35 00
Fraser Falls	253.	2½	40 00
Mouth of White River	79.5		
Mouth of Donjek	159.5		
130 miles up White River	209.5	5*	50 00*
Mouth of Kluane River	224.5		
Kluane Lake, via Donjek, etc	291.5	7½°	50 00°
Selkirk	180.		
MacMillan	254.		
Glenlyon	345.		
Ross River	427	*$50 00	*50 00
Hoole Canyon**	450.	* 50 00	*50 00

*This rate is quoted on the basis of a cargo of 20 tons.

°The rate to Kluane and the head of the White River will depend upon the number of prospectors and miners going to these points. This is the first season (1909) that a steamer has attempted to navigate the White River and its tributaries.

**Head of navigation on the Pelly.

TABLE 4.—SHOWING FREIGHT RATES TO POINTS IN WHITEHORSE DISTRICT.

	Robinson.	Carcross.	Conrad.	Gold Hill.	Big Bend.	Lower LeBarge.	Hootalinqua.	Big Salmon.	Livingstone.	Mason's Landing.	Champagne Landing.	Kluane Lake.	Burwash Creek.	Canyon City (White R.)
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Whitehorse—														
Summer, per 100 lbs.	0 64	1 04	1 37	2 64	2 64	0 45	0 60	0 70	3 84	1 55	5 00	15 00	18 00	45 00
Winter, per 100 lbs.	0 64	1 04	1 54	2 00	2 00	3 00	5 00	7 00	5 00	7 00	4 00	10 00	12 00	35 00
Carcross—														
Summer, per 100 lbs.	0 64	.....	0 33	2 64	2 64	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winter, per 100 lbs.	0 64	.....	0 50	2 00	2 00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hootalinqua—														
Summer, per ton	.....	.....	.....	.....	.....	.....	.....	.....	25 00	15 00	.....	.....	.....	.....
Winter, per lb.	.....	.....	.....	.....	.....	0 01	.....	0 01	0 02	0 01	.....	.....	.....	.....
Kluane Lake—														
Summer, per lb.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0 03	0 33
Winter, per lb.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0 02	0 25
Teslin Lake—														
Summer, per 100 lbs.	.....	.....	.....	.....	.....	.....	2 00	.....	.....	.....	.....	.....	.....	.....
No winter freight.														

Table showing distances between points in Whitehorse district. Distances are given following roads and established routes. To reach any two points, one of which is situated in one group and one in another, it is necessary to pass through Whitehorse.

	Whitehorse.	Robinson.	Carcross.	Conrad.	Gold Hill.	Carbon Hill.	Big Bend.	Tagish.	Venus Mine.
Whitehorse	0	21	42	54	41	59	43	50	57
Robinson	21	0	21	33	20	38	22	45	36
Carcross	42	21	0	12	41	59	43	24	15
Conrad	54	43	12	0	53	71	55	20	3
Gold Hill	41	20	41	53	0	18	14	65	53
Carbon Hill	59	38	59	71	25	0	20	83	74
Big Bend (Wheaton)	43	22	43	55	14	20	0	67	58
Tagish	50	45	24	20	65	83	67	0	23
Venus Mine	57	36	15	3	53	74	58	23	0

	Whitehorse.	L. Lebarge.	Hootalinqua.	Big Salmon.	Tantalus.	Yukon Crossing.	Livingstone.	Mason's Ldg.	Teslin L.
Whitehorse	0	50	87	117	726	149	132	111	230
L. Lebarge	50	0	37	67	129	166	76	55	180
Hootalinqua	87	37	0	30	90	127	45	24	150
Big Salmon	117	67	30	0	60	97	75	54	180
Tantalus	126	129	90	60	0	23	135	111	240
Yukon Crossing	149	166	127	97	23	0	172	151	277
Livingtsone Creek	132	76	45	75	135	172	0	21	147
Mason's Landing	111	55	24	54	111	151	21	0	126
Teslin Lake	230	180	150	180	240	277	147	126	0

	Whitehorse.	Champagne.	Bear Creek.	Kluane Lake.	Burwash Creek	Canyon City.
Whitehorse	0	64	109	141	189	295
Champagne Landing	64	0	45	77	125	231
Bear Creek	109	45	0	32	80	184
Kluane Lake	141	77	32	0	48	154
Burwash Creek	189	125	80	48	0	106
Canyon City (White River)	295	231	184	154	106	0

A Dawson House.

Chapter 6.

GENERAL INFORMATION.

CLIMATE.

It is very doubtful whether people who have never lived in the Yukon can appreciate to any accurate extent the climatic conditions which exist in this Territory during the winter and summer seasons. Some are under the impression that the winter is extremely rigorous, and that the few hours of light during the day render this season of the year anything but delightful. It is quite true that at times the cold is intense, but at the same time an exceedingly low temperature does not continue for a long period at a time. The weather may be extremely cold for a week or occasionally two weeks, and then there is usually a milder period, when the thermometer registers not more than 20 or 25 below zero. A temperature of from 15 to 25 below zero, with a few hours of

sunlight, may be characterized as ideal Yukon winter weather. The snow is fine and powdery, the air is dry and crisp and the sky is clear. What may be termed the most depressing period of the year is between the middle of December and end of the first week in January. During this period the sun occasionally shines on the surrounding hills, unless there is severe cold, in which case the sun may not be seen for several weeks. By the middle of February, however, there are usually a few hours of sunlight. The trails leading from Dawson to the different creeks are comparatively level, and by the middle of January are in splendid condition for sleighing. Wrapped in furs and seated behind spanking teams, many of the citizens of Dawson avail themselves of this exhilarating form of enjoyment.

It has been well said that the climate of a country is the sum and average of the weather. If this be so, then a glance at the accompanying chart will convince the most sceptical that a Yukon winter has its periods of moderation as well as its periods of extreme cold, and that there may not be such an unfavourable comparison with the climate experienced on the western plains.

A very low temperature is usually accompanied by a thick fog, which hangs over the Yukon valley to a depth of four or five hundred feet. While Dawson is enveloped in this grey shroud the atmosphere surrounding the tops of the mountains is quite clear, and at an elevation of 800 or 1,000 feet the temperature is from 8 to 12 degrees warmer than in the valley.

Dawson is well protected from winds by the surrounding mountains, but as there is a marked absence of winds throughout the district, this condition may be due to the fact that this part of the Territory is situated on the extreme north of the Temperate Zone, and therefore outside the range of the anti-cyclonic area of the interior. Occasionally during the winter the Chinook winds sweep across the Yukon valley; which

would seem to indicate the passage of a storm centre to the eastward, if we accept the theory that the cause of these winds is similar to that of the foehn experienced in Switzerland.

One of the greatest ranges of temperature within such a short period that has been experienced in the Territory, or that has been shown by the official records, occurred in February, 1907. On the 14th the temperature was 1 below zero, on the 15th it was 45 above, and on the 18th it was 45 below, a difference of 90 degrees within three days.

As is common in all northern latitudes, the display of the Aurora Borealis is, at times during the winter nights, magnificent. For a moment a flickering light may be seen at some distant point in the sky, then with the speed of a javelin flying from the hand of Achilles, there flashes across the sky a streak of light, the end of which is lost on the opposite horizon. There is an apparent twitching of the phenomenon, and in a few seconds waves of light radiate in all directions. Vivid flashes overspread the sky, as if 'ethereal radiance' were escaping from Prometheus' reed. The sky is lit up with the lurid glare of this remarkable phenomenon, which writhes and twists in all conceivable forms; at times presenting huge parallel arches, then suddenly changing into the most irregular and fantastic shapes.

The following is an extract of a report on the climate of Dawson, by Mr. R. F. Stupart:—

'Spring may be said to open towards the end of April, the last zero temperature of the winter usually occurring about the fifth of this month. May, with an average temperature of 44 degrees, is by no means an unpleasant month, and the twenty-third is the average date of the last frost of spring. Daily observations during five summers indicate that on the average the temperature rises to 70 degrees or higher on 46 days, and to 80 degrees or higher on 14 days; 90 degrees was recorded in Dawson in June, 1899, and 95 degrees in July of the same year. These temperatures with much bright sun-

shine and an absence of frost during three months, together with the long days of a latitude within a few degrees of the Arctic circle, amply account for the success so far achieved by market gardeners near Dawson in growing a large variety of garden produce, including lettuce, radish cabbage, cauliflower, and potatoes, and warrant the belief that the hardier cereals might possibly be a successful crop both in parts of the Yukon Territory and in the far northern districts of the Mackenzie river basin. August 23rd would appear to be the average date of the first autumnal frost, the temperature rapidly declining during the close of this month. Although night frosts are not infrequent in September, the month as a whole is mild, with a mean temperature of 42 degrees. October may be fairly termed a winter month, the mean temperature being but 22 degrees, and the first zero of winter recorded on the average about the 18th.'

Professor John Macoun, in a report on the climate and flora of the Yukon Territory, described the effect of the Coast range of mountains on the climate, as follows:—

'Instead of the Coast range being an injury to the interior, it makes the climate pleasant both in summer and winter. The Yukon district has two climates, a wet and cold one on the coast, which may be called the Alaskan climate, as nearly all the coast region belongs to the United States. The climate of the Yukon district in Canada is just the reverse, being dry and warm in summer and cold in winter, with a light snowfall. Owing to the moisture rising from the warm Japanese current being carried inland by the upper southwest air current and striking the Coast range, this moisture is at once precipitated on the sea face of these mountains in the form of rain or snow, and the air freed from its moisture descends on the Yukon plain as dry air, and having an increased temperature. It follows that the rainfall must be light in summer and also the snowfall in winter.'

TABLE SHOWING MAXIMUM, MINIMUM AND MEAN TEMPERATURES IN YUKON, BETWEEN OCTOBER, 1900, AND MAY, 1909.

Year.	January.			February.			March.			April.			May.			June.		
	Maximum Temperature.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.
1900																		
1901		−68		18	−49		41	−36	11·2	35	−11	24·4	68	18		81	37	55·6
1902	16	−51		1	−47		33	−41		54	−14		73	25		85	35	
1903	14	−59	−27	14	−53	− 5	35	−31	4·7	53	−18	22 6	65	18	42	89	34	57·2
1904	20	−57	−22·4	− 3	−48	−25	35	−38	−4 5	54	− 0	32·5	67	25	42·2	74	33	53·5
1905	5	−50	−23 8	24	−37	6	42	−18	11·4	53	10	34·2	78	33	51	81	33	60
1906	13	−65 5	−33·2	12	−39	−12 5	35	−12	10·8	58	−11	25·7	79	24	49	85	41	62 3
1907	18	−59	−23 6	45	−55	−26·8	33	−39	−3·5	61	−29	30	78	23	52·5	87	31	59·4
1908	30	−42	−13	35	−44	− 9 5	35	−42	−8·8	57	− 8	23·2	77	33	49	14	84	37
1909	−12	−65	−43	13	−53	−28	16	−25	11·9	53	−15	23	81	23·5	44·81			

TABLE SHOWING MAXIMUM, MINIMUM AND MEAN TEMPERATURES IN YUKON, BETWEEN OCTOBER, 1900, AND MAY, 1909—*Concluded.*

Year.	July.			August.			September.			October.			November.			December.		
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.
1900	....	....	.....	....	....	.....	....	....	.....	....	−12	19·4	10	−42	−17	17	−48	.....
1901	85	41	.....	76	27	54	71	23	.....	47	4	.....	31	−36	.....	21	−50	.....
1902	82	42	.....	72	36	.....	61	26	.....	60	7	.....	20	−48	.....	29	−49	.....
1903	85	38	59	85	33	55·8	65	19	42	40	−4	20	40	−42	4·7	16	−33	− 0
1904	75	40	56·1	80	30	52	55	8	.....	55	8	27	22	−27	− 0	21	−31	2
1905	84	36	60·4	80	27	55	58	22	.....	48	−0	23	32	−20	10·6	16	− 4	− 9
1906	80	39	66·1	78	30	55	68	15	.....	50	12	36	27	−38	1·4	8	−55	−21
1907	88	39	60·7	79	30	56	64	24	42	49	−17	25	26	−30	·06	20	−41	− 5
1908	84	41	59	79	32	50	61	12	38·5	52	22·	16	28	−25	·05	25	−49	− 8
1909	....	....	.....	....	....	.....	....	....	.....	....	.....	.....	....	.....	.....	....	.....	.....

The following table shows the length of days at certain periods of the year between December 21 and June 21, namely:—

	Hours.	Minutes.
December 21	3	25
January 1	3	52
" 15	4	57
" 31	6	45
February 15	8	18
March 1	9	5
" 21	12	6
April 11	14	38
" 25	15	42
May 11	17	15
June 21	24	.....

Sport and Scenery.

To the tourist in search of an ideal trip, to the sportsman in search of adventure and abundance of large game, to the geologist or scientist desiring to study the enormous upheavels of the earth's crust and subsequent transformations which have taken place in this northern country, to those who desire to come in close touch with pioneer life, and view some of the most wild and rugged scenery in the world with the full comforts afforded by modern transportation facilities, to the mineralogist and capitalist who desire to see the most modern mining machinery extracting gold from the earth under conditions such as exist nowhere else in the world and who may desire to find a field for profitable investment, it is doubtful if there is a part of any country in the world affording such a wide field for exploitation and investment as can be found in the Yukon Territory. Under the heading of transportation, we have shown what can be constituted a great circular route from Pacific coast ports through the Yukon Territory and Alaska. A beautiful inland voyage, a trip of 2,000 miles down the Yukon on palatial river steamers, every part of the

Hunters and their game.

route marked by some landmark of the adventurous explorers of the early days or relics of the thrilling escapades during the great rush of 1897 and 1898; and, if desired, an ocean trip between St. Michaels and Seattle or San Francisco.

We will now endeavour to give the tourist an idea of this senic route, and the hunter a few facts concerning the abundance of game to be found in the Yukon.

Victoria or Vancouver to Skagway.

Sailing from Victoria, Vancouver or Seattle, and seated on the deck of one of the luxuriously fitted steamers plying along the Pacific coast from these ports to Skagway, passengers and tourists enjoy what 'Official Bulletin No. 10' published by the Provincial Government of British Columbia, designates as 'the trip par excellence of the American continent.' We have not the slightest hesitation, however, in assuring the prospective tourist that the trip along the coast of British Columbia, when extended to the Yukon, is the trip par excellence of the American or any other continent. Travellers who have visited all parts of the world and have admired scenery rendered immortal by poetic genius, have freely admitted that the scenery along this unparalleled inland voyage not only equals but excels even the beautiful fjords of Norway and the wondrous beauties of the 'Isles of Greece.' The official bulletin we have just mentioned, in describing the trip along the coast of British Columbia, says:—

'Free from the cares and conventionalities of every-day life, and breathing the very air of heaven itself, you burst, like the ancient mariner, into an unknown sea filled with untold beauties, and sail over a bosom of waters unruffled as glass; among myriads of islands; through deep, rugged, rock-walled channels; past ancient Indian villages, mediæval glaciers, dark, solemn, pine-clothed shores, snow-capped peaks, dashing cataracts, yawning mountain gorges, spouting monsters and sea-whelps—away to the north a thousand miles

almost, to mix with the icebergs that once floated under the sovereignty of the Czar of Russias, but now drop peacefully from ancient glaciers over which the American eagle holds watchful guard—a continuous panorama in which the purest, the rarest, the wildest, the most beautiful and the grandest forms of nature are revealed.'

On the flats of Dyea and at Skagway, which is reached in three or four days, the multitude of gold-seekers landed during the great rush. Where shiploads of supplies were piled up in almost inextricable confusion there is now a well laid out city and commodious wharfs. When the trains arrive from the north or the steamers from the south, hotel porters jostle each other in their noisy attempt to attract passengers. Busses are in readiness, and passengers are rapidly driven to some of the well-equipped hotels in the city.

Skagway to Whitehorse.

The passenger train leaves Skagway at 9.30 a.m., and arrives at Whitehorse at 4.30 p.m. The journey across the White pass is one of unique scenic grandeur. Quickly passing from the railway yards at Skagway, the railroad follows the Skagway river, passing through the cañon, and then commences the ascent across the famous White pass, which was named by Mr. Ogilvie in honour of the Honourable Thomas White, who was Minister of the Interior of Canada between 1885 and 1888, and who authorized the expeditions to the Yukon district in charge of Dr. Dawson and Mr. Ogilvie. Some remarkable engineering feats were accomplished in the construction of this road through the White pass. The distance from the bottom of the pass to the summit is 21 miles, and the altitude is 2,952 feet. Clinging to the rocks the railway winds its way up the precipitous mountain sides; on one side a sheer wall of rock, on the other a yawning chasm through which rushes a mountain torrent. Across a high

The Midnight Sun. A Dawson Scene in the month of June. (Photo by J. Toody, Dawson.) Copyright Applied for, July the 8th, 1908.

cantilever bridge which was substituted for a switchback and through several tunnels in this mountain fastness the timber line is passed and the summit is reached. At several points on the road a splendid view is obtained of the Skagway valley, and on either side of the pass are serried and jagged rocky peaks, which stand out in bold defiance like the battlements of some ancient fortress. From the summit there is a gradual descent to the north and the scenery changes. Professor John Macoun, describing this part of the route, says:—

'Here we were above the tree line, and bare mountain slopes, broken rocks, pools of water and a truly Arctic or high mountain vegetation showed the climate to be cold, while the stunted or broken trees lower down indicated the immense snowfall, which is characteristic of the whole coast region.

'As we descended towards Lake Bennett the vegetation rapidly changed, and stunted firs gave place to small spruce and the high mountain shrubs and herbaceous plants began to be replaced by forest species.....

'At Caribou crossing, twenty-four miles from Bennett, without descending one foot, the whole vegetation had changed and everything indicated a genial climate.'

The railway follows the east side of Lake Bennett to Carcross, at the foot of the lake. From this point steamers run to Conrad, on Windy Arm, where there are valuable quartz mines from which large quantities of ore have already been shipped. There is very little change in the character of the country between Caribou crossing and Whitehorse.

Whitehorse is situated on the left bank of the Lewes river, at an elevation of 2,090 feet, and is the terminus of the White Pass and Yukon Railway. It is also the head of navigation on the Yukon river, and the terminus of the winter stage route from Dawson. During the spring of 1905 the greater part of the town was destroyed by fire. The principal public buildings are the post office building, in which are situated the offices of the Mining Recorder and Crown Timber and Land Agent, the

customs office and telegraph office, erected at a cost of $35,000, and a public school at a cost in the neighbourhood of $7,000. Whitehorse is also the distributing point to the Kluane gold-fields, and several valuable copper properties. Miles cañon and Whitehorse rapids are only a short distance from Whitehorse, and are the scenes of many a wreck in the early days. Many lives were lost in shooting this turbulent portion of the Lewes, which is well worth a visit.

'The distance from the head to the foot of the cañon is five-eighths of a mile. There is a basin midway in it about 150 yards in diameter. This basin is circular in form, with steep sloping sides about 100 feet high. The lower part of the cañon is much rougher to run through than the upper part, the fall being apparently much greater. The sides are generally perpendicular, about 80 to 100 feet high, and consist of basalt, in some places showing hexagonal columns.'

'The Whitehorse rapids are about three-eights of a mile long. They are the most dangerous rapids on the river, and are confined by low basaltic banks, which at the foot suddenly close in and make the channel about thirty yards wide. It is here the danger lies, as there is a sudden drop and the water rushes through at a tremendous rate, leaping and seething like a cataract.' (Ogilvie.)

Whitehorse to Dawson.

From Whitehorse to Dawson there is an almost daily service of steamers, and the journey down the Yukon river is now made with absolute safety on the splendidly equipped steamers which ply on this route. The tourist or traveller has ample opportunity of viewing the Thirtymile river, which has just been described, Five Fingers and Rink rapids, and other interesting parts of the journey. To the sportsman in quest of valuable trophies, the Pelly, the Stewart and the Peel—the latter a tributary of the Mackenzie—afford excellent fields for

sport. Mr. F. C. Selous, who has a world-wide reputation as a hunter of big game, and who has captured many trophies in the jungle and in the African forest, his visited the Yukon on several occasions, and secured some splendid specimens of the big game which are so abundant in many parts of the Yukon.

'Among the game animals can be mentioned caribou, moose and mountain sheep. There are no goats, deer or elk in the vicinity. The caribou is of the woodlands variety; plentiful along the foothills of the mountains, travelling about during the fall in large herds, the upper Klondike being a well known range of theirs. A smaller variety, known as the barren ground caribou, inhabit the Mackenzie river country. The moose, the largest wild animal in North America, is well known in all the upper Yukon region, this section furnishing the largest specimens obtainable. The horns of both caribou and moose produced in this country are handsomer and more massive than those found in other sections. A spread of five or six feet for moose antlers is not uncommon, and most caribou heads will average over thirty points, and are of most graceful contour.

'The mountain sheep of the country is a very different animal than the Big-Horn of the Rocky mountains, being entirely white, younger animals having patches of grey. They are peculiar to Alaska and the Yukon country, and although existing here for years they have but recently been brought to the attention of the scientific world, and as yet are very rare in outside collections. They are often but erroneously termed mountain goats, the resemblance being their colour; the fleece and horns are totally different, even "ibex' and "chamois" are terms likewise applied to them. Farther north, in the barren grounds of the Arctic circle, is found the little known musk-ox, which do not extend their travels to the Yukon.

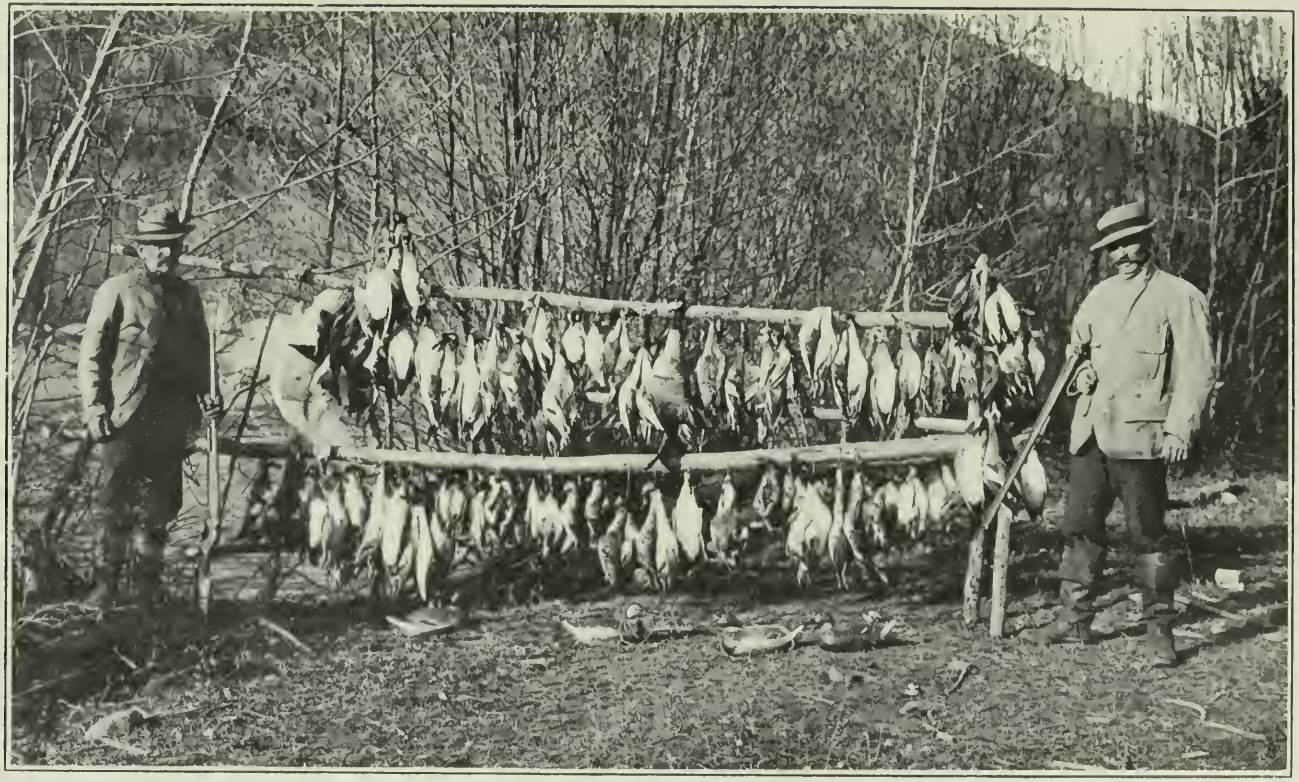
'The lakes contain fine trout, and the familiar pickerel. Brook trout are scarce, but the handsome greyling are every-

where in the swift water, affording delight to the Isaac Walton of the vicinity.

'Ducks, geese, cranes and kindred species abound, for this is their natural rendezvous; but even here in their chosen country they are of local distribution, very plentiful in the low swampy sections where they breed, and almost unknown in others except during migration. At this season of the year (latter part of October) the majority of the ducks follow up the Yukon valley, while the geese choose the downstream route and follow the salt water coast to California. Sandhill cranes in great number, however, pass Dawson in the fall, going up the Yukon. They are often mistaken for geese owing to their habit of travelling in V-shaped flocks and columns, but can be easily distinguished from them by the high pitch of their call note, and from the fact that a crane's flight consists of a series of flaps and a long sail on extended wings—something not observed with geese. The varities of duck noticed are mallard, pin-tail, long-tail, green wing teal, widegon, butter-ball, blue-bill, golden eye, surf duck and harlequins.

'Grouse are well represented by five varieties, the blue grouse of the heavy timber known as hooters, ruffed grouse, incorrectly called pheasant, Canada grouse, sometimes called fool-hens, owing to their tame unsuspecting natures, allowing themselves at times to be actually knocked over with sticks; the sharp-tailed grouse, the prairie chicken of the Northwest, and several kinds of beautiful ptarmigan, a bird peculiar to cold countries, of mottled brown coat in summer, changing in winter to rosy white. This rose tint, however, is most noticeable in life, since in market specimens or mounted birds the bloom fades to immaculate whiteness.'

Bears are also numerous, and comprise the small black variety, several specimens of brown bear and the Alaskan grizzly, which attains a great size.



Duck Shooting on the Klondike.

The sportsman who desires to devote all his time to hunting, if he selects the Pelly district, can leave the steamer at Fort Selkirk. Arrangements can be made to obtain a guide either at Whitehorse or Selkirk, together with whatever assistance may be required and the necessary outfit. There is a small steamer makes an annual trip from Whitehorse to Ross River trading post, which is situated at the mouth of Ross river, and to go by this steamer is the quickest and easiest way to reach any point in the upper Pelly district.

If the Stewart district is chosen, then it might be advisable to come to Dawson, obtain an outfit, and take the steamer *Prospector,* which usually makes several trips to Mayo and occasionally to Fraser falls. Mr. J. Keele, of the Geological Survey, in his report of 1906 on the upper Stewart river region says: 'At the mouth of Lansing river Messrs. Frank Braine and Percival Nash have established a trading post, and a small band of Indians live close by in cabins. Several Indians from Fort Goodhope, on the Mackenzie river, make regular journeys to this point, trapping and hunting along the route. A few white men make a regular business of trapping on the Hess river and its branches.

'This region offers a great field for the sportsman and explorer, most of the country between the Stewart and Pelly headwaters and the Mackenzie being quite unknown.

'Suitable boats or canoes can be poled or tracked on the main rivers well up into the watershed ranges. Several of the higher mountain groups offering sufficient inducements to the mountain climber and huntsman are situated within a day's journey from the river.'

Writing of the game in the Peel river district, which is also reached by the upper Stewart, Mr. Camsell, also of the Geological Survey, in his report of 1906, says: 'Moose, though found over the whole region explored as far as the delta of the

Mackenzie river, are never as abundant as they are on the Yukon side of the divide, and on the Peel river itself are rather scarce.

'Caribou are plentiful everywhere in the vicinity of the mountain ranges, some even being found on the plateau.

'Bears, both black and grizzly, are plentiful near the summit of the divide, and numbers of them were seen all the way down the Peel river, and particularly on the Mackenzie delta and in the mountains to the west of it. Numbers of white mountain sheep were seen on both Braine and Nash creeks. In the mountain section of the Wind river several of them were encountered on the banks of the stream, as well as the slopes of the valley. A small band was seen on Mount Goodenough, west of the Mackenzie delta, and they are said to be abundant in the mountain ranges to the west of this; so that the range of this animal covers the whole district explored.'

The tourist who does not desire to enter the field of sport, will come direct from Whitehorse to Dawson. There is splendid scenery all along the river, and many picturesque and grand views; high benches, gravel terraces, partially bare rounded hills, bluffs of rock and bold rampart-like cliffs. Between Selkirk and Dawson the Yukon valley cuts through a high undulating plateau. From the mouth of the Stewart to White river the Yukon averages about a mile in width, and is filled with many beautiful islands.

'Five Finger rapids are formed by several islands standing in the channel, and backing up the water so much as to raise it about a foot, causing a swell below for a few yards. The islands are composed of conglomerate rock similar to the cliffs on each side of the river, whence one would infer that there had been a fall here in past ages.

'Six miles below these rapids are what are known as "Rink rapids." This is simply a barrier of rocks, which extends from the westerly side of the river about half-way across.'

Tourists and others who have visited Dawson are agreeably surprised on seeing for the first time the Golden Metropolis of the North. As the steamer swings around in the stream, and gracefully steams alongside the wharf, the visitor is at once impressed by the long line of wharfs and large warehouses. Merchandise is being unloaded from steamers, which may just have arrived from St. Michaels, on Behring sea, 1,800 miles from Dawson, or from Whitehorse.

Instead of the temporary business structures and rudely constructed dwellings, which visitors expect to find in the capital of the Yukon, there are many commodious frame houses and beautifully furnished homes; spacious stores behind the large plate glass windows of which are artistically arranged the most up to date and high-class Canadian, English and American goods. There is no one who visits Dawson but admires the handsome public buildings in which the business of the different departments of government is transacted. Government House and the Court House front on the river, and are situated respectively on the north and south end of the Government reserve. The Administration building is situated in the rear portion of the reserve, and is surrounded by a well-appointed park (Minto park), around which maple, fir and other trees are planted. Behind the Administration building are the tennis courts, which are well patronized. Baseball, football, cricket and other athletic games are played on the recreation ground adjoining the south of the Administration building.

Among the other prominent buildings in the city are the two hospitals, one of which has lately been built along the most modern lines. There is a Carnegie library, containing over 5,000 volumes, amongst which are the most recent works of all classes of literature and other valuable reference books. This building contains a large general reading room, lecture room, ladies' reading room, and a room where miners and others can

transact business. Then there is the Dawson Amateur Athletic Association building, in which there is a large skating rink, a curling rink, gymnasium, reception room, billiard room, etc. There is a Masonic hall, and a large hall belonging to the Arctic Brotherhood, in which banquets, mass meetings and political meetings are held. There are also several spacious hotels providing ample first-class accommodation for tourists.

In the principal business and residental sections of the city are wide and substantially built sidewalks, upon which pedestrians can walk along the different avenues from one end of the city to the other. The Canadian Yukon Telegraph line extends from the boundary line 100 miles north of Dawson to Vancouver, a distance of over 2,000 miles. There is an evening and two weekly newspapers and each issue contains a greater amount of telegraphic despatches than can be found in any paper on the American continent published in a city of twice the population of Dawson. There is telephonic communication with all the principal creeks in the Klondike district, and miners fifty miles from Dawson can at once communicate with any of the business houses in the city.

From Dawson tourists can visit any part of the Klondike gold-fields, and see the famous claims on Bonanza and Eldorado which have produced such enormous wealth. Within a short distance of Dawson the visitor can see the various modes of placer mining; huge dredges handling every day thousands of cubic yards of auriferous gravel, and hillsides being washed down by hydraulicking. A splendid trip can also be made up the Stewart river as far as Fraser falls on a steamer belonging to the Side Streams Navigation Company. (See schedule of rates under Transportation.) If, however, the time of the traveller is limited, a few days can be spent in Dawson, and the journey down the Yukon can be resumed on some of the lower river steamers to St. Michaels. On the 21st of June hundreds of people climb the mountain behind Dawson to see the midnight

Dawson Public School.

sun, which disappears only for a short time. On the lower river, however, as soon as the steamer enters the Arctic circle, the sun can be seen the whole twenty-four hours. The scenery on the lower river somewhat resembles the scenery between Whitehorse and Dawson, with the exception of the Yukon flats. On this stretch of the route the river is about sixty miles wide and filled with islands. From St. Michaels passage can be taken on ocean steamers to ports on the Pacific coast.

A superintendent of schools for the Yukon Territory was appointed in 1902, and in the same year a general system of education was inaugurated throughout the Territory. The course of study prescribed is similar to that adopted by the new provinces of Alberta and Saskatchewan. No teachers are employed unless they hold at least a second-class certificate, with normal training, and efforts have been made to employ only specialists in the Dawson public school. The teachers in this school have been selected from some of the best educational institutions in Canada.

The high school branch of the Dawson public school was instituted in 1903. There are two teachers in charge of this branch, one a specialist in classics, modern languages and history, the other a specialist in mathematics and science. In 1904 a laboratory was established with apparatus and materials for the prescribed work in physics and chemistry. In the high grades of the Dawson high school the course of study prescribed by the University of Toronto for pass and honour matriculation is carefully followed, and candidates are prepared for university matriculation.

There are eight rooms in the Dawson public school, three of which are devoted to high school purposes, and one to the kindergarten, the latter being supplied with complete equipment for this work. Fire exits are provided for every room, and a regular fire drill is practised by the pupils, who can vacate the building in half a minute after the sounding of an alarm.

In certain districts, where the number of children does not warrant the establishment of a regular school under the provisions of the school ordinance, regulations have been made by the Commissioner for the establishment of 'assisted schools,' but the average attendance must be at least five pupils between the ages of six and sixteen, and the course of studies prescribed by the Council of Public Instruction. Teachers of 'assisted schools' are also appointed subject to the approval of the Commissioner and Superintendent of Schools.

AGRICULTURE.

Though the agricultural resources of the Yukon are beyond doubt of considerable economic value, yet it must not be considered that the territory is suitable for occupation, at the present time, by a large number of agriculturists depending absolutely upon this industry. A large agricultural community can only exist in a country where the produce of such an industry can be disposed of at a reasonable profit, or where access can be obtained to markets at a distance, provided transportation rates will permit of fair competition. In the Yukon the principal industry is mining, and agricultural development must necessarily proceed according to the requirements of the population engaged in the mining industry. Farming operations can only be successful so long as those who are engaged in agricultural pursuits produce no more than is required for consumption within the Territory. Up to the present time, however, the number of agriculturists is not sufficient to supply the local demand for farm produce, and the quality of some of the products is not quite equal to the imported article; but as Professor Macoun has pointed out in his report on the Yukon, 'these matters will right themselves in time, but the climate must not be blamed for the ignorance of the cultivator.' Careful and systematic farming operations, with due regard to the peculiarities of the climate, would abolish the importation into

Jacquemin's Greenhouse, 5th Avenue, Dawson.

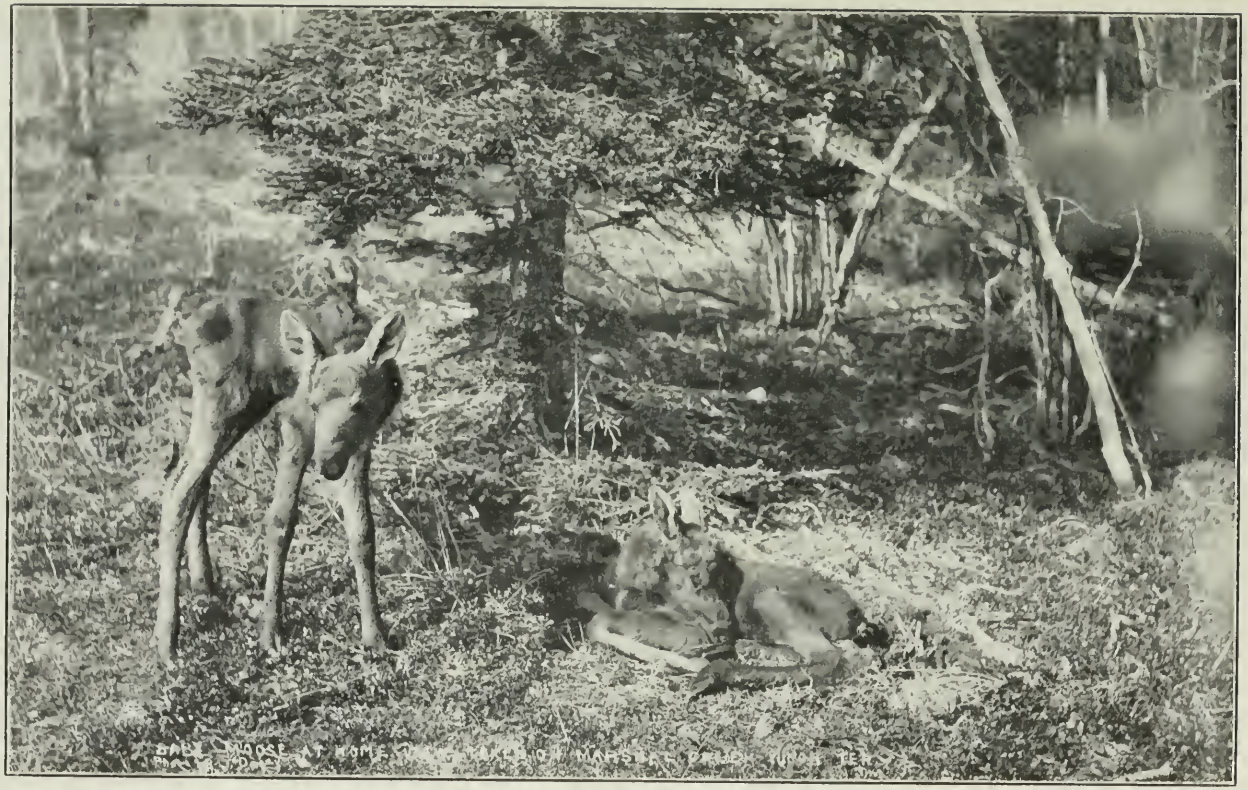
the Yukon of many of the agricultural products required by the people of Dawson and surrounding districts. If hay, oats, potatoes, etc., were grown in such quantities as would supply the local market, the price would be much less than is paid at the present time for imported products, the transportation rates would be avoided and the consumer would derive the benefit. Instead of the people of the Yukon paying large sums outside of the Teritory for these products, the agriculturists in the Yukon would transact the business, and the money would be retained in the Territory, and probably invested in such a way as would aid in its future development.

It was computed by Dr. Dawson in 1887 that within the drainage area of the Yukon, as far north as Fort Selkirk, there was an area of 60,000 square miles, of which a large proportion might be utilized for the cultivation of crops, and in which cattle and horses could be maintained for local purposes. Since that time there have been discovered other important agricultural districts, which would afford ample scope for farming operations, and the extent of territory available for agricultural purposes is greatly in excess of the area computed by Dr. Dawson. It might be interesting to quote here an extract from Dr. Dawson's report of 1887, showing how much he was impressed at that time by the agricultural possibilities of the Yukon; and it is also important to note that his remarks had immediate reference to the Pelly river district and the valley of the Lewes:—

'To instance a region which produces the general conditions of the Yukon district and adjacent northern portions of British Columbia, we must turn to the inland provinces of Russia, to which allusion has already been made in connection with climatic features. The province of Vologda, in European Russia, appears to offer the nearest parallel. It is circumstanced relatively to the western shores of Europe as is this district to the western shores of the North American continent.

Its area is 155,498 square miles, situated between the 58th and 65th degrees of latitude. The climate in both cases is a continental one, in which severe winters alternate with warm summers, and the actual degrees of cold and heat, so far as our information goes, are not dissimilar. There is no very heavy rainfall in either region, such as we find near the western coasts bordering on the Atlantic and on the Pacific respectively. The agricultural products from the province of Vologda are oats, rye, barley, hemp, flax and pulse. The mineral products comprise salt, copper, iron and marble, but the precious metals do not appear to be important, as in the Yukon district. Horses and cattle are reared, and the skins of various wild animals, as well as pitch and turpentine, are among the exports. The population of the province is 1,161,000.'

There is no reason why the agricultural products grown in the province of Vologda should not be grown equally as well in the Yukon. During the past few years comparatively large quantities of oats, potatoes and vegetables have been grown along the Yukon valley, particularly in the vicinity of Dawson, and in nearly all cases excellent results have been obtained. It is computed that the quantity of potatoes grown near Dawson last season and placed on the market aggregated 200 tons. It has been estimated that the population in the Yukon consumes annually over $200,000 worth of potatoes. Potatoes grown in the Yukon are quite equal in size to the imported product, and when the proper kind of seed is planted in suitable soil and attention is given to the cultivation, potatoes can be grown fully equal in quality to the best outside product. The best quality of potatoes so far have been grown on the islands in the Yukon river. On the land surrounding Dawson, either in the valleys or on the benches, potatoes of good quality can only be grown after the land has been cultivated for a few years. On an island in the Yukon river at Ogilvie 175 pounds of potatoes were planted on the 12th of May, 1906, and by the first or second week in September the crop was ready for lifting, and yielded



Baby Moose at home. View taken on Marshall's Bay.

Klondike Ry. Stage at No. 2 Below an Sulphur Creek.

8,000 pounds. The ground was ploughed as early in April as the frost would permit, stable manure and about 300 pounds of lime per acre being applied. The potatoes were planted as near the surface as possible and hilled up as the vines grew. It is estimated that during the present season a much larger quantity of potatoes will be grown than in former years, and some of those interested in agriculture predict that within the next few years there will be a sufficient quantity of potatoes grown to supply the market. Besides what is required for the local market, a considerable quantity of potatoes is shipped every year to Fairbanks, and other points in Alaska.

On an island in the Yukon at Ogilvie three or four bushels of oats per acre were sown about the first of May, and harvested about the middle of August. The yield was about two tons of oat-hay per acre, which was sold at an average of $50 per ton. Native hay, averaging one and one-half tons per acre, was also harvested about July 15.

About thirty miles up the Stewart river is what is known as the Mazie May ranch, owned by Mr. Samuel Henry. Mr. Henry applied for this land in 1897, and in the summer of that year harvested 26 tons of native hay. During the last five years about 100 acres have been under cultivation, and crops of oat-hay have been annually taken from the land. In 1902, 125 tons of oat and native hay were cut and sold from this ranch. Mr. Henry says he has no difficulty in selling all the hay he can grow. The native hay is cut about the middle of July and the oat-hay about the first of August. After the hay is harvested it is placed in stacks for about three weeks, and then baled in a 16 by 18 baling press. It is then shipped to Dawson by steamer, if possible, and if a steamer is not available it is brought down the river on rafts. The rate for carrying this hay to Dawson, a distance of about 100 miles, is $7.50 per ton. Mr. Henry has also grown rye and barley, but finds the oat-hay most profitable. A mixed lot of 800 pounds of

timothy, clover, and red top, was sown on a piece of well cultivated land of about eight acres, but the result was unsatisfactory. Clover seems to grow well in a wild state around Dawson, and there does not seem to be any reason why it should not grow equally as well on cultivated land if it is properly seeded. Mr. Henry is of opinion that much of the seed may have been lost by being covered too deeply. Last year the native hay grown on this ranch was sold at from $55 to $60 per ton.

In the fall, as soon as the crop has been taken from the ground, it is ploughed to a depth of about six inches. As early in the spring as possible the land is cultivated, a disc harrow being used to cut and pulverize the sod. The seed is then sown, covered with a square-tooth harrow and rolled in.

On a bench at the head of Clear creek, a tributary of the Yukon river about three miles below Dawson, the Messrs. McCluskey, who own a number of timber berths in that locality, had three-quarters of an acre under cultivation last year. Mr. R. McCluskey states that the yield of this area during the summer of 1908, was as follows: 12,600 lbs. of potatoes, 800 lbs. of cabbage, 500 heads of celery, 10 sacks of carrots, 4 sacks of beets, 6 sacks of turnips and 5 rows of peas (the peas grew to a height of ten feet.) A small patch of oats ripened and was cut on the 28th of August. In this locality the timothy hay grows to a height of over 5 feet.

At the head of Flat creek, about sixteen miles from Dominion, there is a ranch of 160 acres, on which are grown oat-hay, turnips, potatoes, vegetables, and a large quantity of native hay is also harvested. On this ranch there are eight cows and a bull, hogs, poultry, etc. Dairy farming is carried on on a small scale, butter being made, for which there is a ready demand on the creeks in the locality. Besides the native hay required for the cattle, a large quantity is sold to freighters.

It is estimated that along the Flat creek valley there are twenty square miles of good agricultural and meadow land. Of the large quantity of excellent native hay which grows wild in this valley, only a comparatively small quantity is harvested, apart from the ranch, some freighters cutting only as much as is required, under permit, for feed for their horses. There are also several farms situated along the Klondike valley.

About four miles up the Pelly there is a farm of 180 acres, which supplies oat and native hay to the roadhouses along the winter trail, and also to cattlemen who drive cattle over the winter trail in the spring, the hay for the cattle being placed at different points along the trail. Most of the root crops grown in this vicinity are disposed of at the roadhouses along the trail. Oats have been ripened and threshed in the Pelly district, but not to any great extent.

In the Duncan and Mayo districts sufficient garden produce is grown to fill the requirements of the community; and sufficient wild hay is cut to supply the local demand.

The extent of land purchased for agricultural purposes is shown in Appendix IV.

Writing of the agricultural possibilities of the Yukon, Dr. Dawson says, that to-day the Yukon Territory 'may well be characterized by the term which has been employed in connection with the Mackenzie basin, a portion of "Canada's great reserve." . . . In the future there is every reason to look forward to the time when this country (Yukon) will support a large and hardy population, attached to the soil and making the utmost of its resources.'

At the present time, however, we can only say that the development of agriculture must necessarily depend upon the development of the mining industry. Under existing conditions the Yukon agriculturist could not possibly compete in outside markets. The price of labour is high, and for competi-

tion in agricultural products, distance and transportation rates are prohibitive.

HORTICULTURE.

Many islands in the Klondike valley and along the Yukon have been cleared and made into gardens, in which vegetables of excellent quality are grown. Last season a comparatively small quantity of vegetables were imported, the market gardeners near Dawson being almost able to supply the demand. The seeds of nearly all vegetables are sown in hot-houses early in February, and then transplanted to cold frame boxes, where plants which are intended to be planted outside are strengthened and prepared for outside planting. The price of market garden produce in Dawson will be found in Appendix IV.

Writing of the growth of garden produce in the Yukon valley, Professor Macoun says: 'Growth of vegetables is so rapid and vigorous that to a person coming from the east it is so simply astounding. When I reached Dawson on July 10 early cabbages were being cut, and on August 5 their weight ranged from 3 to 5 pounds. On the 22nd, when I made my last visit, hundreds of matured cabbages and cauliflowers had been cut and sold. I measured the two lower leaves of a cabbage cut the day before, and these placed opposite each other had an expansion of 3 feet 9 inches, with a breadth of 16 inches. I cannot call this even an average one as there were hundreds larger, but later in maturing. Cauliflowers were from 6 to 10 inches in diameter, but I was told larger ones had been cut.

'No doubt the constant daylight gives the force necessary to expand the growing organs of the vegetables in cultivation, but behind the long day are climatic conditions that as yet are little understood which in my opinion are the prevailing factor in this wonderful growth.'

Flower seeds are also sown under glass, and the more

sensitive varieties can be replanted in the open by the 24th of May. Most flower seeds, however, can be sown in the open ground by May 10. Florists say that much of the soil in its natural state is detrimental to the bloom of plant life, and that it requires to be well worked before successful results can be obtained. They prefer the soil taken from the islands and bars along the river valleys. This soil requires very little treatment, and with some additional fertilizer will produce almost any flower grown out of doors; which mature before September 1st.

The Iceland poppy grows splendidly in the Yukon, and when once planted it seeds itself and continues to spread. In some cases the pansy and pink also bloom without replanting, even after a very severe winter.

The bloom and foliage of all plants are strong, bright and clean. Sweet peas will grow from 9 to 12 feet in height. Canary creeper and Japanese hops will run from 25 to 30 feet in a season, while the nasturtia grow very rank with foliage of immense size.

The bloom of the stocks, asters and nicotine cannot be surpassed in quantity or quality.

APPENDICES.

No. 1.—Tariff Items on Mining Machinery.

Items.	———	British Pref'ntial Tariff.	Inter-mediate Tariff.	General Tariff.
453	Telephone and telegraph instruments, electric and galvanic batteries, electric motors, dynamos, generators, sockets, insulators of all kinds; electric apparatus, n.o.p.; boilers, n.o.p.; and all machinery composed wholly, or in part of iron or steel, n.o.p.; and iron and steel castings, and iron or steel integral parts of all machinery specified in this item.	15 p.c.	25 p.c.	27½ p.c.
454	Manufactures, articles or wares of iron or steel or of which iron and steel (or either) are the component materials of chief value, n.o.p.	20 p.c.	27½ p.c.	30 p.c.
460	Sundry articles of metal as follows, when for use exclusively in mining or metallurgical operations, viz.:—Diamond drills, not including the motive power; coal cutting machines, except percussion coal cutters; coal heading machines; coal augers; rotary coal drills; core drills; miners' safety lamps and parts thereof, also accessories for cleaning, filling and testing such lamps; electric or magnetic machines for separating or concentrating iron ores; furnaces for the smelting of copper, zinc and nickel ores; converting apparatus for metallurgical processes in metals; copper plates, plated or not; machinery for extraction of precious metals by the chlorination or cyanide processes; amalgam safes; automatic ore samplers; automatic feeders; retorts; mercury pumps; pyrometers; bullion furnaces; amalgam cleaners; blast furnace blowing engines; wrought iron tubing, butt or lap welded, threaded or coupled or not, over four inches in diameter; and integral parts of all machinery mentioned in this item.	Free	Free.	Free.
461	Machinery and appliances of iron or steel, of a class or kind not made in Canada, and elevators, and machinery of floating dredges, when for use exclusively in alluvial gold mining.	Free.	Free.	Free.

No. I.—Tariff Items on Mining Machinery.—*Con.*

Items.		British Pref'ntial Tariff.	Inter-mediate Tariff.	General Tariff.
461*a*	Iron or steel pipe not butt or lap welded, and wirebound wooden pipe, not less than thirty inches internal diameter, when for use exclusively in alluvial gold mining....	5 p.c.	7½ p.c.	10 p.c.
462	Blowers of iron or steel of a class or kind not made in Canada, for use in the smelting of ores, or in the reduction, separation or refining of metals; rotary kilns, revolving roasters and furnaces of metal of a class or kind not made in Canada, designed for roasting ore, mineral, rock or clay; furnace slag trucks and slag pots of a class or kind not made in Canada.....	Free.	Free.	Free.
469	Well-drilling machinery and apparatus of a class or kind not made in Canada, for drilling for water, natural gas and oil, and for prospecting for minerals, not to include motive power.....	Free.	Free.	Free.

No. H.

RETURN SHOWING THE KINDS AND QUANTITIES OF FISH CAUGHT IN THE RIVERS AND LAKES OF THE YUKON TERRITORY, YEAR ENDING DECEMBER 31st, 1908.

Districts.	Salmon.	Dog Salmon.	White Fish.	Lake Trout.	Pickerel.	Ling Cod.	Tullibee.	Greyling.	Mixed and Coarse Fish.	Total.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Dawson	40,000	5,000	18,000	.....	.....	2,000	.....	20,000	1,000	86,000
Selkirk (Indians)	25,000	3,000	1,000	5,000	.....	1,000	.....	8,000	1,000	44,000
Fortymile	6,000	2,000	1,000	.....	.....	500	.....	4,000	700	14,200
Lake LeBarge	2,000	.....	10,000	12,000	2,000	.....	.....	500	1,000	27,500
Lake Tateleman	.....	.....	32,000	6,000	2,000	2,000	7,000	500	200	49,700
Carcross	1,500	1,000	1,500	1,400	.....	.....	.....	1,000	1,000	7,400
Klondike River	3,000	.....	1,000	.....	.....	.....	.....	5,000	1,000	10,000
Thistle	4,000	.....	.....	.....	.....	.....	.....	3,000	300	7,300
Yukon River, in general	20,000	4,000	5,000	.....	.....	.....	.....	10,000	1,000	40,000
	101,500	15,000	69,500	24,400	4,000	5,500	7,000	52,000	7,200	286,100

Returns from Mayo (Duncan District) not received.

The above returns were furnished by Mr. H. T. Mackay, Fishery Inspector, Dawson.

SUMMARY.

	Lbs.	At	Total.
		$ cts.	$ cts.
King Salmon	81,500	0 15	101,500 00
Dog Salmon	15,000	0 06	900 00
White Fish	69,500	0 25	17,375 00
Trout, Lake	24,400	0 35	8,540 00
Pickerel	4,000	0 20	800 00
Ling Cod	5,500	0 10	550 00
Tullibee	7,000	0 25	1,750 00
Greyling	52,000	0 25	13,000 00
Mixed and coarse fish	7,200	0 10	720 00
			145,135 00

No. III.

LUMBER PRICE LIST.

Yukon Saw Mill Company. May 22, 1909, Dawson, Y.T.

1 x 4 Size. 1 x 6 " 1 x 6 "	$60 00
1 x 10 "	62 50
1 x 12 "	65 00
All dimension	60 00
Surfaced	75 00

SLUICE LUMBER.

1¼ x 10-12 x 12 Bottoms	$75 00
1½ x 10-12 x 12 "	75 00
1½ x 12-14 x 12 "	85 00
1½ x 14-16 x 12 "	90 00
1 x 10 Sides	70 00
1 x 12 "	75 00
1¼ x 10 x 12	70 00
Shiplap 1 x 6 and 1 x 8	75 00
Flooring 1 x 4 and 1 x 6	75 00
Rustic 1 x 6 and 1 x 8	75 00
Cull	45 00

No. IV.

TABLE showing the extent of land purchased for agricultural purposes in the vicinity of Dawson, on the Klondike Stewart and Pelly rivers and at Selkirk.

Description. — Group Lot.	Group.	Locality.	Acreage.
93	2	West Dawson	10·
61	2	"	80·
9 (W. ½)	2	"	80·
166	2	"	40·
167	2	"	60·
77	2	"	80·
10	2	"	80·
9	2	" *Block K.*	
9	2	" ¾ of town lots, blocks B, D, C, and blocks D, E	5·
		Island in Yukon River about 1½ miles below Dawson	40·
163	2	Islands in Yukon River opposite Klondike City, thence up-stream 1½ miles.	11·85
82	2	Islands in Yukon River opposite Klondike City, thence up-stream 1½ miles.	10·16
88	2		
89	2	Islands in Yukon River between Dawson and Swede Creek	19·28
164	2	Islands in Yukon River between Dawson and Swede Creek	69·
412	2	Opposite O. K. Creek	10·
345	2	L. L. Yukon from opposite Klondike City, thence up-stream 1½ miles	40·
101	2	L. L. Yukon from opposite Klondike City, thence up-stream 1½ miles	25·
137	2	L. L. Yukon from opposite Klondike City, thence up-stream 1½ miles	20·
137 S. of	2	L. L. Yukon from opposite Klondike City, thence up-stream 1½ miles	15·5
102	2	L. L. Yukon from opposite Klondike City, thence up-stream 1½ miles	10·
262	2	L. L. Yukon from opposite Klondike City, thence up-stream 1½ miles	55·
168	2	L. L. Yukon from opposite Klondike City, thence up-stream 1½ miles	147·10
186	2	L. L. Yukon River from opposite Klondike City,	
Portions of		thence up-stream 1½ miles	256·00
190	2	L. L. Yukon River from opposite Klondike City, thence up-stream 1½ miles	61·00
165	2	L. L. Yukon River from opposite Klondike City, thence up-stream 1½ miles	23·00
168	2	L. L. Yukon River from opposite Klondike City, thence up-stream 1½ miles	29·42
14	2	Island at mouth of Klondike River	16·36
96	2	An island	5·51
14	2	"	22·00
8	2	Island above Ogilvie Bridge	32·00

No. IV.—Table showing the extent of land purchased for agricultural purposes in the vicinity of Dawson, &c.—*Con.*

Description. Group Lot.	Group.	Locality.	Acreage.
87	2	L. L. Klondike River about 2½ miles above Rock Creek	132·88
		Adjoining above area	40·00
		North of Group Lot 101, Group 2	51·55
			55·00
		L. L. Yukon River East of Gr. L. 192, Gr. 2	67·00
			40·00
		L. L. Yukon R. E. of Gr. L. 192, Gr. II	40·00
		L. L. Yukon R. N. W. of Gr. L. 190, Group 2	59·50
		L. L. of Yukon R. S. W. of Gr. L. 102 Gr. 2	76·00
7 & 8	3	Stewart River	310·00
		Selkirk	100·00
		R. L. Pelly River, 2 miles from mouth	20·00
			180·00
		" about 4 miles from mouth	80·00
		Total acreage	2605·61

*The above list does not include a number of small locations on the right limit of the Lewes river above Selkirk.

Since the coming into force of the Homestead Regulations of the 23rd of July, 1906, twelve entries for homesteads have been granted by the Crown Timber and Land Agent at Dawson.

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