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NORTH WEST TERRITORIES AND YUKON BRANCH

O. S. Finnie, *Director*

THE
YUKON TERRITORY
1926



F. A. ACLAND
Printer to the King's Most Excellent Majesty
Ottawa
1926

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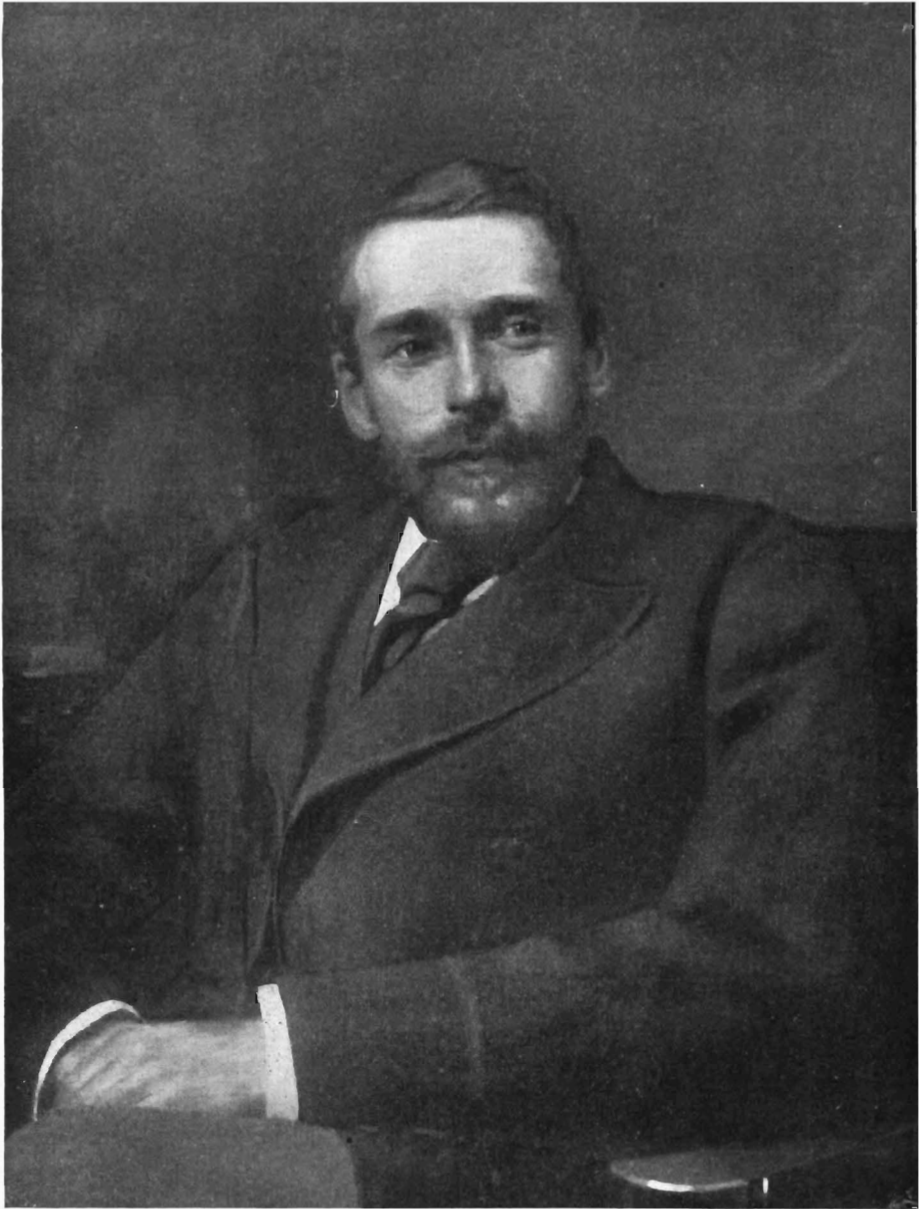
The Yukon Territory

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GEORGE MERCER DAWSON, C.M.G., LL.D., F.R.S.
1849-1901

Dawson City took its name from this sterling and unostentatious worker in the public service of Canada

The Yukon Territory

1926

CHAPTER I

Historical Sketch

THE story of the earliest explorations in the Yukon Watershed is part of the record of the Hudson's Bay Company whose intrepid and resourceful officers first explored and occupied that part of the North American Continent known now as the Yukon Territory. In 1670 this company was incorporated by Royal Charter granted by King Charles the Second to "the Governor and Company of Adventurers of England trading into Hudson's Bay" who were constituted, "the true and absolute lords and proprietors" of the territory designated as "Rupert's Land." A supplementary license was granted to the company in 1821 and this license, which was renewed on the 30th May, 1838, conferred upon the Honourable Adventurers, the exclusive right to trade in the Indian territories west of the Rocky mountains.

In 1786, the Northwest Fur Trading Company of Montreal established a post on Lake Athabaska and three years later Alexander Mackenzie, a representative of the company, explored the great river which now bears his name. In 1792 Mackenzie again started from the post on Lake Athabaska and proceeded up the Peace river. In the spring of the following year he crossed the Rocky mountains and reached tidewater at the mouth of the Bella Coola river, July 20, 1793. Elcho harbour (longitude 127° 30', latitude 52° 23'), up Dean channel, approximately fifteen miles from the town of Ocean Falls, was the westernmost point he touched. On page 333, Mackenzie, in his book "Voyages from Montreal to the Frozen and Pacific Oceans", refers to a record he left at this point, as follows: "I now mixed up some vermilion in melted grease, and inscribed, in large characters, on the southeast face of the rock on which we had slept last night this brief memorial—'Alexander Mackenzie, from Canada, by land, twenty-second day of July, one thousand seven hundred and ninety-three.'"

Within the period of fifteen years subsequent to 1778 British seamen had explored the islands and western coast of what is now British Columbia, and also a part of Alaska, while representatives of the fur companies had also reached both the Pacific coast and Arctic ocean.

As early as 1741 the Russians had been trading in furs with the natives of the Alaskan coast and in 1799 the Emperor Paul placed the control of the Russian possessions in that part of the World in the hands of the Russian Fur Company who in the same year established a trading post at Sitka.

Negotiations carried on between the representatives of Russia and Great Britain to determine the sovereign rights of the two countries in that part of the continent resulted in the signing of a treaty in 1824. Russia claimed the North Pacific coast down to latitude 51°, but by this treaty the boundary was fixed at

54° 40'; in the following year a further treaty was concluded by which the Russians relinquished to Great Britain the vast interior occupied by the Hudson's Bay Company up to the frozen ocean. Article III of the treaty of 1825 defined the southern and western boundaries of the British possessions as follows:—

"Commencing from the southernmost point of the island called "Prince of Wales" island, which point lies in the parallel of 54 degrees, 40 minutes north latitude, and between the 131st and 133rd degree of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland channel, as far as the point of the continent where it strikes the 56th degree of north latitude; from this last-mentioned point the line of demarcation shall follow the summits of the mountains situated parallel to the coast, as far as the point of intersection of the 141st degree of west longitude (of the same meridian); and, finally, from the said point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the frozen ocean, shall form the limit between the Russian and British possessions on the continent of America to the Northwest."

The line of demarcation is described in paragraph 2, article IV, of the treaty of 1825, as follows:—

'2nd: That wherever the summit of the mountains which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude, shall prove to be at the distance of more than ten marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of ten marine leagues therefrom."

In 1867 Alaska was purchased from Russia by the United States and considerable difficulty subsequently arose as to this demarcation line, but the question was finally settled in 1903 by the award of the Alaska Boundary Tribunal.

By virtue of an Act passed in 1815, the control of the territorial affairs of the Hudson's Bay Company was transferred from a committee sitting in London to a person designated as the Governor-in-Chief of Rupert's Land and his council. Seven years later Sir George Simpson, who had been a clerk in a London counting house, was appointed Governor, and for a period of nearly forty years was head of the company's fur trade and virtual ruler of almost half the continent. It was during the regime of Sir George Simpson that the Yukon territory was first explored by the company's traders.

A trading post had been established at Dease Lake, about ninety miles south of the northern boundary line of the province of British Columbia. This post was abandoned in 1839 and in the spring of the following year 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.

In pursuance of these instructions Campbell left Fort Halkett (on the lower Liard) in May with a canoe and seven men. After ascending the stream some hundreds of miles far into the mountains he entered a beautiful lake, which was 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, he set out with three Indians and an interpreter and ascended the valley of a river to its source in a lake ten miles long, which with the river was named Finlayson's lake and river.

From this point Campbell struck across to the Pelly, which he named in honour of Sir John Henry 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 he named the Lewes after John Lee Lewes, the 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 hostile. Campbell returned to the Pelly banks where boats were built during the winter of 1847-48; in the following June he established Fort Selkirk at the confluence of the Pelly and the Yukon.

The Stewart river was discovered in 1849 and named after its discoverer, James G. Stewart, son of the late Honourable 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 the Indians some distance north of the Stewart river, which he crossed on the ice. In 1850, Campbell descended the Yukon 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 a disaster, which closed Campbell's career in the Yukon. Dr. Dawson on page 139b of his "Report of an Exploration in the Yukon District, N.W.T., and Adjacent Northern Portion of British Columbia" published in 1887 by the Geological and Natural History Survey of Canada, 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 Chilcot 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 of 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 downstream 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 in the drifting ice with the tidings of the disaster on the 21st of October.

"Being anxious to obtain Sir George Simpson's permission to re-establish Fort Selkirk, Campbell 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 there is 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. 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. Civilization is indebted to these men not only on account of their remarkable daring in the face of the enormous difficulties 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."

Fort Yukon, now in United States Territory of Alaska, reached, as said above from Fort Selkirk by Campbell in 1850, had been built a few years previously by Hudson's Bay Company pioneers from the Mackenzie delta. From information furnished by Sir John Franklin as to fur-bearing animals along the river he had named in honour of Sir Robert Peel, the company had been led in 1839 to send out a party under John Bell with instructions to find a locality suitable for a trading post. During this summer Bell explored the Peel river to the sources of the Snake and next year, 1840, Fort McPherson was established near its inflow at the delta. In 1846 Bell crossed the divide for a journey down the Porcupine and saw at its mouth the mighty river called by the native Indians "Yukon."

This Indian name means "greatest river," as does the Eskimo name "Kweck-puk." The Tanana tribes call the river "Niga-to." John Bell adopted the Indian name, which was also given to the Fort Yukon post established by A. H. Murray in 1847 at the confluence of the Porcupine and the Yukon.

Gold had been discovered in the Yukon by Campbell and other traders in the service of the Hudson's Bay Company. It was not until 1872, however, that regular prospectors began to direct their steps thither. In September of that year Arthur Harper, a native of county Antrim, Ireland, together with Frederick Harper and four other miners started for the Mackenzie river and the Yukon Territory. At the mouth of the Nelson, in Hudson bay, Harper and his party met L. N. (Jack) McQuesten, Alfred H. Mayo and James McKnipp. Proceeding by way of the Mackenzie river, Harper and his party crossed from Fort MacPherson to the Porcupine and arrived at Fort Yukon on the 15th of July, 1873.

When Alaska was purchased from Russia by the United States in 1867, the Russian company's vessels and trading posts were acquired for the firm of Hutchinson, Kohl & Co., San Francisco. In 1869, the Alaska Commercial Company was incorporated and three years later this company purchased the holdings of Hutchinson, Kohl & Co. In 1901 the Alaska Commercial Company merged with the Alaska Exploration Company and the name of the joint concern became the Northern Commercial Company.

The Alaska Commercial Company established posts along the Yukon river and for many years subsequent to the retirement of the Hudson's Bay Company had a monopoly of trade in the Yukon. In 1892 a competing company known as the North American Transportation and Trading Company was organized in Chicago. This company established its chief trading and distributing post at Cudahy, a short distance below the mouth of the Fortymile river.

In 1874, Jack McQuesten had established a trading post for this Alaska Commercial Company at Fort Reliance, about six miles below the present city of Dawson. In the same year Harper joined McQuesten in the trading business and in 1875, Harper and Mayo were in charge of Fort Reliance. In the summer of 1882 twelve miners crossed Dyca pass and spent the winter at Fort Reliance. One of these miners was Joe Ladue, who later became identified with the development of the territory and who subsequently occupied the trading post at Ogilvie.

In 1885 mining began on the Stewart river and in 1886 about one hundred miners were working on its bars and according to Mr. Wm. Ogilvie were making at times as much as \$100 per day. In the same year Harper, McQuesten and Mayo, who were still trading on commission for the Alaska Commercial Company, established a trading post at the mouth of the Stewart. They also established another trading post at the mouth of the Fortymile river. Harper also commenced business at Fort Selkirk on the site of the old post which was first established by Campbell, and built a new post at Ogilvie opposite the mouth of the Sixtymile river. He was a prospector as well as a trader and prospected for gold in the Fortymile, Sixtymile and Tanana districts, and for copper in the White River district, but was not particularly successful in his



"Tagish (Skookum) Jim" discovered the first "big pay" gold in Klondike District and recorded Claim No. 1 above "Discovery" on Bonanza Creek

mining operations. He had, however, found gold on the Fortymile river, but not in paying quantities; in the late summer of 1886 he told George McCue and Dick Poplin of the fact and advised them to prospect on the bars of that river, with the result that in the early winter of 1887 they discovered gold in paying quantities on a bar known afterwards as "Discovery Bar," situated about eight or ten miles above the mouth of Moose creek on the Fortymile river. This discovery soon became known to other prospectors in the Yukon valley and resulted in most of the prospectors in the country gravitating to the new discovery. A good deal of gold was taken from the bars on the Fortymile in 1887 and the following years.

In the summers of 1886 and 1887 about 500 men were prospecting and mining in the Canadian Yukon. Perhaps, however, not more than 80 or 100 men remained in the Yukon valley during the winter in those years.

Two men named Franklin and Hughes had discovered gold on Franklin creek and a man named Davis on Davis creek in 1891. In that year some prospectors went over the divide to the headwaters of the Sixtymile river and in the following year, 1892, a man named Miller discovered gold in paying quantities on a creek still known as Miller creek. Gold was found on the nearby Glacier creek in 1893. Both of these creeks have been good producers from that time and are still being successfully mined.

DISCOVERY OF THE KLONDIKE

In 1894 Robert Henderson, of Nova Scotia, and a small party arrived in the territory. They prospected along the bars of the upper Yukon and rocked out \$54 in fine gold at the mouth of the Pelly. When they reached the trading post at Ogilvie, Joe Ladue contributed the latest information respecting the strikes or discoveries which had been made. As a result of the information furnished by Ladue and after a short stay at Ogilvie, Henderson started for Indian river. He prospected along this stream to the mouth of what is now known as Quartz creek, up which he proceeded to the divide on Hunker. No large prospects were found, and Henderson prospected on various creeks in the watershed of Indian river. After cleaning up about \$600 for the season on Quartz creek he crossed the divide to Gold Bottom where he found a two cent prospect. During the summer of 1896 Henderson made a trip to Ladue's post at Ogilvie for supplies. The water in Indian river was low and he knew that it would be almost impossible to proceed up that stream. He came to the conclusion that Gold Bottom flowed into a tributary of the Yukon some distance below Ogilvie, so proceeded down the Yukon to its confluence with the Tron Deg, now known to the world as the "Klondike," where he found George W. Carmack and two Indians named "Tagish (Skookum) Jim" and "Tagish Charlie," who were fishing for salmon. In accordance with the usual custom Henderson announced the discovery of Gold Bottom and invited Carmack to stake there. A short time afterwards Carmack and the two Indians proceeded to Gold Bottom and staked claims adjacent to Henderson's location. Henderson states that he advised Carmack and the Indians to cross the divide and prospect in the gravels of what is now known as Bonanza creek and asked Carmack to advise him, by sending back an Indian, if good prospects were discovered.

"Tagish (Skookum) Jim," Carmack and Charlie found rich prospects on Bonanza and Carmack staked Discovery (which included No. 1 below), "Tagish (Skookum) Jim" No. 1 above and "Tagish Charlie" staked No. 2 below. Carmack and the Indians, without notifying Henderson, 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 the Fortymile, but as soon as the discovery on Bonanza became known many of the miners stampeded to the new strike and in a short time the creek was staked from end to end. Meantime Henderson was working on Gold Bottom, and did not hear

Glacier
APPLICATION AND AFFIDAVIT OF DISCOVERER OF ~~MINERAL~~ MINE

I, Taghish Jim
of Forty-mile
hereby apply, under the Dominion Lands Mining Regulations, for a mining location in
a creek known as Bonanza creek
flowing into the Klondike River

No. 1 above discovery on
Bonanza creek

Shookum Receipt-1896

for the purpose of mining for Gold
and I hereby solemnly swear :-

1. That I have discovered therein a deposit of Gold
2. That I am to the best of my knowledge and belief, the first discoverer of the said deposit.
3. That I am unaware that the land is other than vacant Dominion land.
4. That I did, on the 19th day of August 1896, mark out on the ground, in accordance in every particular with the provisions of ~~sub-sections 1 and 2 of section 10 of~~ the said Mining Regulations, the location for which I make this application; and that in so doing I did not encroach on any mining location previously laid out by any other person.
5. That the said mining location contains, as nearly as could measure or estimate, an area of _____ acres, and that the description and (sketch, if any) of this date hereto attached, signed by _____, set forth in detail, to the best of _____ knowledge and ability, its position, form and dimensions.
6. That I make this application in good faith to acquire the land for the sole purpose of mining to be prosecuted by myself or by myself and associates, or by my assigns.

Sworn before me at St. Constantine this 24th day of September 1896.
W. H. [Signature] Witness
Taghish Jim made

NOTE.—In case of abandoned grounds it may be necessary to omit No. 2.

Fac-similes of the applications of George Washington Carmack, Taghish "Skookum Jim" and Taghish "Charlie" for discovery of gold on Bonanza Creek. This started the Klondike Gold rush.

for Placer
APPLICATION AND AFFIDAVIT OF DISCOVERY OF ~~DISCOVERED~~ ~~OF~~ ~~MINES~~ MINE.

I, G. W. Carmack
of Forty-mile
hereby apply, under the Dominion Lands Mining Regulations, for a mining location in

a creek known as Bonanza creek
flowing into Klondike River

Discovery claim on Bonanza
creek.

for the purpose of mining for Gold
and I hereby solemnly swear:—

1. That I have discovered therein a deposit of Gold
2. That I am, to the best of my knowledge and belief, the first discoverer of the said deposit.
3. That I am unaware that the land is other than vacant Dominion land.
4. That I did, on the 14th day of August 1896, mark out on the ground, in accordance in every particular with the provisions of ~~the said Mining Regulations~~ the said Mining Regulations, the location for which I make this application; and that in so doing I did not encroach on any mining location previously laid out by any other person.
5. That the said mining location contains, as nearly as I could measure or estimate, an area of _____ acres, and that the description and (sketch, if any) of this date hereto attached, signed by _____, set forth in detail, to the best of my knowledge and ability, its position, form and dimensions.
6. That I make this application in good faith to acquire the land for the sole purpose of mining to be prosecuted by myself or by myself and associates, or by my assigns.

Sworn before me at St. Constantine
this 24 day of September
1896. St. Constantine
city clerk } G. W. Carmack

NOTE.—In case of abandoned grounds it may be necessary to omit No. 2.

Fac-similes of the applications of George Washington Carmack, Taghish "Skookum Jim" and Taghish "Charlie" for discovery of gold on Bonanza Creek. This started the Klondike Gold rush.

APPLICATION AND AFFIDAVIT OF DISCOVERER OF QUARTZ MINE.

I, Taghish Charlie
of Forty-mile
hereby apply, under the Dominion Lands Mining Regulations, for a mining location in

a creek known as Bonanza creek
flowing into Klondike River

2 Below discovery on
Bonanza creek

140

Substantive receipt 1896
from 1896 to date

for the purpose of mining for Gold
and I hereby solemnly swear:-

1. That I have discovered therein a deposit of Gold
2. That I am, to the best of my knowledge and belief, the first discoverer of the said deposit.
3. That I am aware that the land is other than vacant Dominion land.
4. That I did, on the 14th day of August 1896, mark out on the ground, in accordance in every particular with the provisions of ~~sub-section (1) of section 14~~ of the said Mining Regulations, the location for which I make this application; and that in so doing I did not encroach on any mining location previously laid out by any other person.
5. That the said mining location contains, as nearly as I could measure or estimate, an area of acres, and that the description and (sketch, if any) of this date hereto attached, signed by , set forth in detail, to the best of knowledge and ability, its position, form and dimensions.
6. That I make this application in good faith to acquire the land for the sole purpose of mining to be prosecuted by myself or by myself and associates, or by my assigns.

Sworn before me at St. Lawrence
this 24 day of September
1896. W. W. [Signature] } Taghish Charlie
Notary Public } mark

NOTE.—In case of abandoned grounds it may be necessary to omit No. 3.

Fac-similes of the applications of George Washington Carmack, Taghish "Skookum Jim" and Taghish "Charlie" for discovery of gold on Bonanza Creek. This started the Klondike Gold rush.

of the new strike until too late to secure a claim. Extensive prospecting at once commenced on Bonanza and in a few months the remarkable wealth contained in its gravels was revealed.

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 country in the world and of almost every vocation in life, as was seen in that irresistible stream of fortune-seekers, who, in the winter and spring of 1898, climbed the Chilkoot pass and pressed on to lake Lindeman, where the most primitive boats and other flimsy craft were hastily constructed for the journey of 500 miles down the Yukon river to Dawson.

On page 117 of "Early Days in the Yukon," Wm. Ogilvie, D.L.S., who was in the Yukon at the time the strike was made and who had an intimate knowledge of the country and its people, gives the origin and meaning of "Klondike":

"Klondike is an adaptation of the native name of the river which was 'Trondiuck' or 'truick.' This in English means the 'Hammerwater' from the fact that the stream was a famous salmon run and barriers of stakes were driven across the mouth to compel the fish to enter the trap set for them. The stakes had to be driven or hammered into the gravel in the river-bed—hence the name."

A sad event 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 gold seekers were laboriously toiling along this stretch of the journey, some bearing their heavy burdens of supplies in packs and some on sleds, when suddenly a huge mass of snow came plunging down the mountain side, striking the line of travellers and burying between 50 and 60 men. Those who escaped the avalanche at once began digging for their comrades, very



Chilkoot Pass 1898

few of whom were rescued, some of the bodies not being recovered until the snow disappeared in the spring. Such is an instance of the dangers which confronted, in the early days, the thousands of adventurers who contracted the gold fever; and who were unaware of the innumerable hardships and dangers to be encountered and the obstacles to be overcome on the journey to the new diggings.

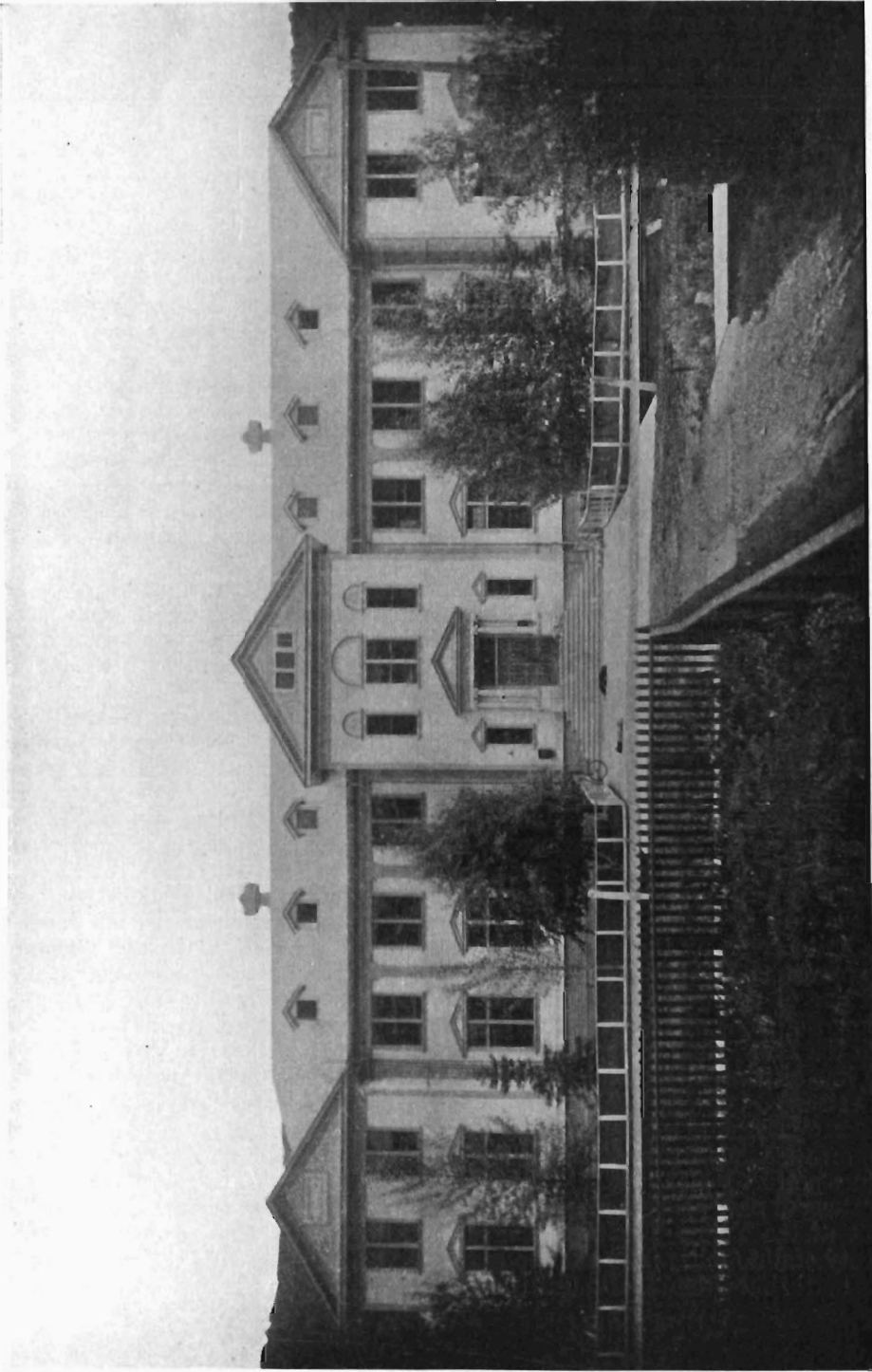
All through the summer of 1898 the gold-stakers continued to come in thousands, many of them inexperienced in mining of any kind or with knowledge gained in other placer fields that seemed to be of small service here. Against the advice and to the great amusement of the few Sourdoughs in the community the hills and benches on Bonanza and Eldorado were staked by the Cheechakos (newcomers) and proved to be immensely rich.

It was not unusual for claims, which a few days' work would have shown to be rich, to change hands for trifling sums often under amusing circumstances. Thus, a well known Swede, having made his winter's grub stake mining on the Fortymile bars in the summer of 1896, came down to Fortymile post at the end of the season to ease up for a few days and to buy his winter's outfit. While there he met a miner just returned from the new camp, who had staked a claim on the creek subsequently called "Eldorado". Not thinking the claim of any real value he is alleged to have got the Swede drunk and then sold him the claim for all the money he had left, which was \$800. On sobering up the next morning the new owner endeavoured to get his money returned but without success. He thereupon secured a small amount on credit, and as soon as the ice formed on the river went to have a look at his new claim. The first hole proved it to be exceedingly rich and the claim subsequently produced well over a million dollars in gold.

On the 3rd of July, 1897, G. A. Lancaster located a Bench claim on the left limit of No. 2 Eldorado creek. This claim included a portion of what subsequently became known as Gold Hill. Lancaster immediately started work on his claim by making an open cut. This was the first claim located, and the first gold mined from the famous White Channel gravels.

Yukon's early history is prolific of incidents and adventures worthy of record in the history of that territory but, suffice it to say, that the pioneers of this great north land worthily upheld the best traditions of an admittedly great pioneering race.

The boundaries of the Yukon are defined in the Yukon Act as follows: "On the south, by the province of British Columbia and the United States Territory of Alaska; on the west, by the said United States Territory of Alaska on the north, by that part of the Arctic ocean called Beaufort sea; and on the east, by a line beginning at the point of intersection of the left bank of the Liard river, by the northern boundary of the province of British Columbia in approximate longitude 124° 16' west of Greenwich; thence northwesterly along the line of the watershed separating the streams flowing into the Liard river below the point of beginning, or into the Mackenzie river, from those flowing into the Liard river above the point of beginning, or into the Yukon river, to the line of watershed of the basin of Peel river; thence northerly along the line of watershed between the Peel and Mackenzie rivers to the sixty-seventh degree of north latitude; thence westerly along the parallel of the sixty-seventh degree of north latitude to the line of watershed between the Peel and Yukon rivers; thence northerly along the said line of watershed to the trail across the portage in McDougall pass between Rat and Bell rivers; thence due north to the northern limit of the Yukon Territory; the said territory to include the islands within twenty statute miles from the shores of the Beaufort sea as far as the aforesaid due north line from McDougall pass."



No. 2. Administration Building, Dawson

CHAPTER II

Constitution and Government

IN 1895 a detachment of the Northwest Mounted Police had been sent to the Yukon under the command of Inspector Constantine, who was authorized to represent all the different departments of the Government in the district. In the following year the mining industry had grown to such proportions that Inspector Constantine was no longer able to handle all the business he was called upon to transact, and an officer was appointed to take charge of the customs. In the year 1897, a Gold Commissioner was appointed, and the recording office was transferred from Fortymile to the site of the present city of Dawson.

In 1898 the Yukon was created a separate territory by an Act of Parliament (the Yukon Act) and provision made for a local Government composed of a Chief Executive styled the Commissioner and a Legislative Council of six members to be appointed by the Governor in Council.

In 1902 the territory was given the right to elect a member to the House of Commons and in December of that year Mr. James H. Ross, who resigned the commissionership to contest the new constituency, was elected the first member of Parliament.

In response to representations made to the Government of the day by petition and otherwise that the new territory created be given responsible government, the Yukon Act was amended in August, 1899, to provide for the election of two members to the Council, to have the same powers and to be charged with the same duties as the appointed members.

The Act was again amended in May, 1902, to provide for the election of five members to the Council, and in 1908 by a further amendment the appointed Council was abolished and provision made for a wholly elective Council of ten members to be elected for a term of three years. This Council of ten was continued until 1918 when, by a further amendment to the Act, it was reduced to three members, and authority given the Governor in Council to abolish any office, and transfer the duties of the office to any other officer of the Crown. In pursuance of this authority the office of Commissioner was abolished and the duties of the office transferred to the Gold Commissioner.

The Yukon Act provides that the Commissioner shall administer the Government of the territory under instructions from time to time given him by the Governor in Council, or by the Minister of the Interior.

The Yukon Council sits separate from the Commissioner and presents bills passed by it to the Commissioner for his assent. A bill for the appropriation of any part of the public revenue of the territory must first be recommended to the Council by message of the Commissioner.

The Commissioner in Council has authority to make ordinances for the imposition of taxes within his jurisdiction; for the summoning of juries for the trial of civil and criminal cases; for the control and regulation of all traffic in intoxicating liquor; for the preservation of game; for the establishment and maintenance of schools and all other matters of a local nature.

The public monies and revenue over which the Commissioner in Council has the power of appropriation constitutes the Yukon Consolidated Revenue Fund, made up from the various local taxes imposed, the profit from the conduct of the Government liquor stores and the yearly grants of the Federal Government. This fund is subject to audit by the Auditor General of Canada.

The Act provides for the appointment of a Public Administrator who is paid by fees from the estates he is called upon to administer. The work and operation of his office and all accounts in connection with the estates are subject to audit by the Auditor General.

The Superior Court of Record is the Territorial Court which is presided over by a single judge. It has civil and criminal jurisdiction.

The Court of Appeal for British Columbia is a Court of Appeal for the Territory.

For the purpose of Part XIX of the Criminal Code the Court of Appeal from the judgment of the Territorial Court is the Supreme Court of Canada.

Under chapter 21 of the Consolidated Ordinances of 1914, 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 the judge of the Territorial Court, and every commissioned officer of the Royal Canadian Mounted Police, can exercise in the Yukon Territory all the powers of one or two justices of the peace, under any laws or ordinances, civil or criminal, in the Territory. All persons possessing the powers of two justices of the peace can act as coroners.

The Officer Commanding the Royal Canadian Mounted Police is Immigration Inspector in Charge at the port of Dawson and has authority to exercise the powers and discharge the duties of a Board of Inquiry in accordance with the provisions of section 22 of the Immigration Act.

Passengers or other persons seeking to enter or land in Canada from Alaska via the Lower river are examined in accordance with the provisions of the Immigration Act at the port of Dawson, and an immigration officer also examines all passengers travelling via the White pass and Yukon railroad. During the winter season, a non-commissioned officer of the Royal Canadian Mounted Police is appointed an immigration officer at Fortymile.

CHAPTER III

Placer Deposits

Gold has been produced from the Klondike, Fortymile, Sixtymile, Mayo, Big Salmon and Kluane areas. In addition a number of isolated creeks have produced small amounts of gold. The bulk of the production, however, has come from the Klondike area, to which the following descriptions particularly apply. As the royalty on placer gold did not come into force until September, 1897, and was subsequently changed into an export tax in May, 1902, the production figures for the years 1885-1902 of approximately \$180,000,000 are estimates only. There is a wide discrepancy between the official figures which are based upon the amount of gold paying royalty or export tax, and the figures compiled from records kept by the banks and express offices which place the production at well over \$200,000,000.

GOLD BEARING GRAVELS.—The auriferous gravels of the Klondike area may be classified as follows:—

Low level gravels	{ Gulch gravels Creek gravels River gravels	
Intermediate level gravels (Terrace gravels)		
High level gravels	{ River gravels " White Channel " gravels	{ White gravels. Yellow gravels.

LOW LEVEL GRAVELS.—(a) The creek gravels are the most important in the district and floor the bottoms of all the valleys to a depth of from four to ten feet. They rest on a bedrock usually consisting of schists, and are overlaid by a layer of frozen black muck of varying thickness. The gravels are local in origin and consist entirely of the rocks outcropping along the valleys. They contain leaves, roots and other vegetable remains and the bones of extinct or still existing mammals, such as the mammoth, buffalo, bear, musk-ox, mountain sheep and goat. (b) The gulch gravels occupy the upper portions of the main creek valleys and smaller tributary valleys. They differ from the creek gravels in being coarser and more angular. (c) The only river gravels of the district proven so far to contain gold in paying quantities occur on the wide flats bordering the lower portion of the Klondike river. These consist of material in large part derived from the western slopes of the Ogilvie range.

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 the former valley bottoms. The terraces support beds of gravel of varying thickness very similar to the creek gravels but showing more wear. The terrace gravels as a rule are overlaid with muck.

HIGH LEVEL GRAVELS.—(a) *River Gravels.*—These consist largely 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. They have a thickness of from 150 to 175 feet and consist of well-worn pebbles

derived in a large part from the western slopes of Ogilvie range. They are generally of little economic importance.

(b) *White Channel Gravels*.—These are ancient creek deposits laid down in the wide flat-bottomed valleys, which characterized the region previous to the last general upraise, and now occur on wide benches bordering the present valleys at elevations of 150 to 300 feet above them, the elevation increasing downstream. Their distribution is irregular as large portions were destroyed during the deepening of the valleys. They consist of rounded pebbles and boulders of quartz, in a matrix of little worn quartz and sericite. The deposit is always stratified, but there has been no sorting of the constituents into beds. The white channel gravels vary in width from 100 feet to half a mile or more, and in thickness from a few feet to 150 feet.

(c) *Yellow Gravels*.—These overlie the white compact gravels in places. They are loosely stratified and of a rusty colour and consist mainly of flat schist pebbles in a coarse sandy matrix. McConnell regards the white channel gravels as stream gravels deposited under peculiar conditions, chief among which was slow accumulation in streams of easy grades and slack currents. They are much older than the other gravels of the district and date back probably to the Pleiocene.

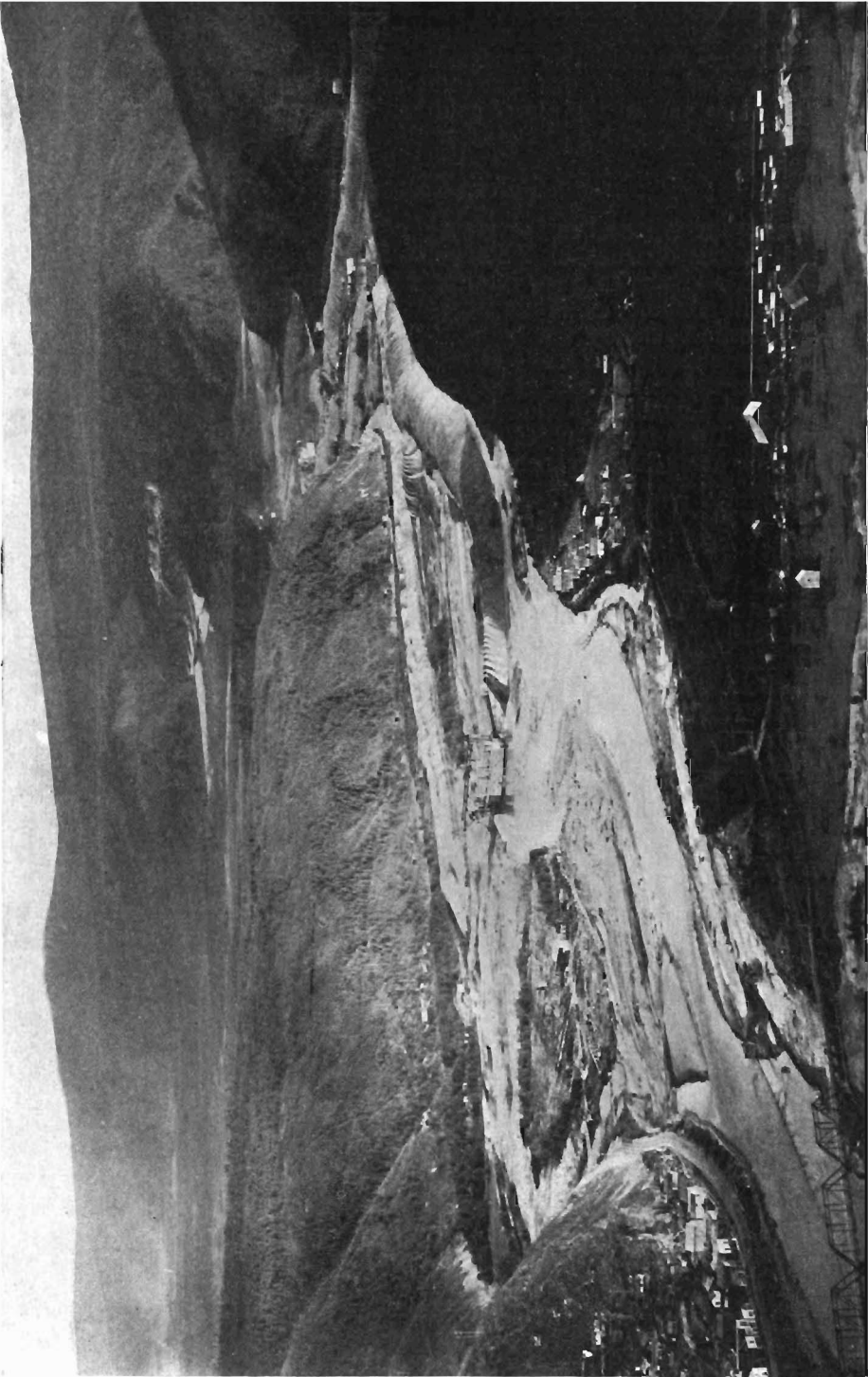
The gold values contained in the gravels varied greatly from place to place. Some of the claims on Bonanza, a high level creek gravel type, yielded upwards of half a million dollars each or over \$1,000 per running foot of valley and a fraction claim at the mouth of Little Skookum gulch, eighty feet in length, yielded over \$300,000. Eldorado proved to be the richest creek of the Klondike district and one of the greatest placer creeks ever discovered. Claim No. 17 at the mouth of French gulch yielded over a million and a half dollars.

The gold in the creek gravels is usually concentrated within a short distance of bedrock, and penetrates from two to four feet into the broken and decomposed schist which is the common type of bedrock. The distribution of the gold in the white channel gravels follows the usual rule in creek gravels. It is mostly concentrated in the lower three to five feet of gravel and in the underlying bedrock, but the deposits carry some values throughout.

ORIGIN OF THE PLACER GOLD

There is little doubt that the Klondike gold or the greater part of it at least is detrital in origin and has been derived from the auriferous quartz veins cutting the older schists. These veins are small, and the number destroyed and concentrated as pebbles in the valley bottoms is almost incalculable. The high level white channel gravels on Bonanza and Hunker creeks alone have a volume of nearly 500,000,000 cubic yards, and nearly half the whole deposit consists of quartz grains, pebbles and boulders. This figure, large as it is, represents only a fraction of the vein material destroyed, as the volume of the white channel gravels was originally at least a third, and possibly a half greater, and a further allowance must be made for the large percentage of quartz ground up and carried away. The total production of the Yukon field will approach \$200,000,000; the average gold tenor of the quartz was not, therefore, large and did not exceed a few cents to the ton.

The derivation of the placer gold from quartz veins, as pointed out by Spurr in regard to the Fortymile district, is evident from the character of the grains. The greater part of the gold occurs in irregular flattened discs or bulbs, very similar, when unworn, to those in the veins. Many of the grains, and most of the nuggets enclose quartz, and a few are themselves enclosed in quartz. Additional evidence of the detrital origin of the gold is afforded by its worn character in the creeks, while the younger grains and nuggets found in the gulches are always rough and angular. The richest gold-bearing quartz so far discovered occurs near the head of Victoria gulch, a tributary of Bonanza creek. The partially decomposed slide rock, which covers the surface of the hill side



A bird's eye view of the valley of the Klondike from the mouth to Bear Creek

below the quartz outcroppings, contains colours of gold, and it is significant that Bonanza creek is rich below the mouth of Victoria gulch, and practically barren above. Victoria gulch is itself gold-bearing, and the gold obtained from near its head is sharply angular. It is not inferred from this that all the gold in Bonanza creek came from Victoria gulch, as none of the heavy gold has travelled far, and the valley was probably repeatedly enriched from veins along its course and from the older gravels, but that some of it was so derived seems certain. While the greater part of the placer gold has been derived from broken quartz veins, a small percentage may have been precipitated from water carrying gold in solution.

PLACER COPPER

Native copper is found in the gravels of many of the streams distributed throughout various districts in Yukon, but Kletsan creek is the only stream along which it is known to occur in economically important amounts. Kletsan creek is a small tributary of White river which heads in Natayhat glacier near the Yukon-Alaska boundary line.

In 1902 an attempt was made to test the placer copper possibilities of this locality, but on account of glacial ice and snow in the high ranges at the head of the creek and a number of other adverse conditions unfavourable conclusions were reached. There is undoubtedly, however, a considerable amount of native copper not only along Kletsan creek but in the gravels of a number of neighbouring streams which may yet prove to be exploitable when transportation facilities are improved.

PLACER TUNGSTEN

Tungsten minerals in economically important amounts occurring in gold placers are known at two points in Yukon Territory: on Canadian creek and on Dublin gulch.

Canadian creek is a tributary of Bonanza creek and joins it from the southwest about five miles above its mouth.

A small tributary stream about a quarter of a mile long joins Canadian creek near its head and it is near the mouth of this tributary that the placer tungsten deposits have been found. The uppermost deposit is a layer of muck three feet thick and underneath this are pay gravels with a thickness of three to five feet. Below these gravels the various deposits down to bedrock, so far as they have been explored, do not pay to mine.

The rocks in the vicinity are chiefly Mesozoic granites. The small tributary, however, heads in a round hill about half a mile in diameter, composed largely of pegmatite and porphyry. This hill is highly mineralized, chiefly with yellow iron ochre, the decomposition product of pyrite, hematite and magnetite. The central portion of the hill is an extremely quartzose pegmatite, intersected by ramifying veins and stringers of quartz. It is evidently from this hill that the gold and wolframite found in the gravels a few hundred yards below have been derived. Shipments of wolframite from this property to the Canadian Munition Resources Commission contained 64.42 per cent tungsten oxide (WO_3).

Dublin gulch is a tributary of Haggart creek in the Mayo district. Scheelite occurs in quantity in the placer gravels along Dublin gulch, and during the war years was recovered as a by-product from the sluicing for gold. Samples of the scheelite concentrates were found to contain from 66 to 68 per cent tungsten oxide.

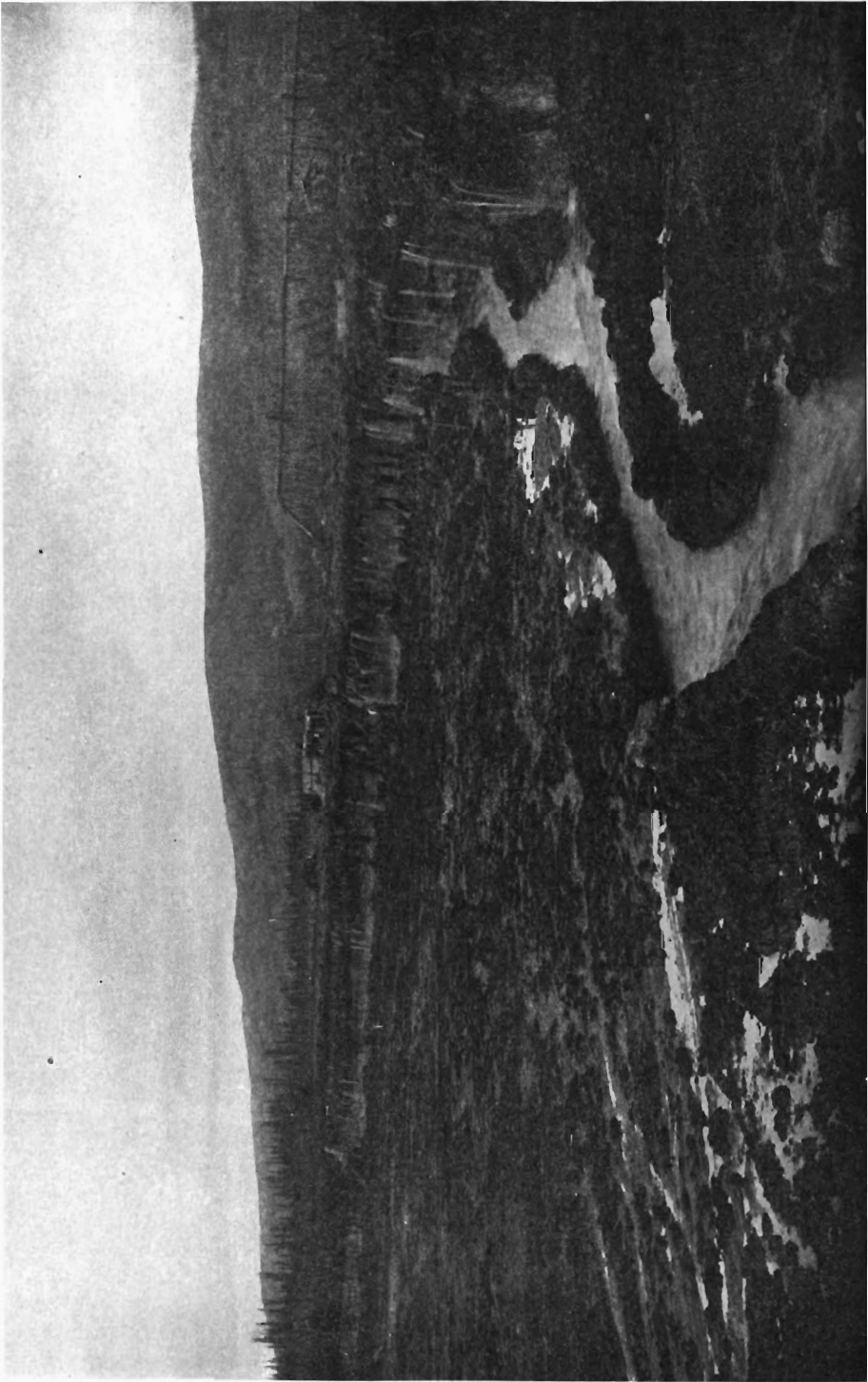
The source of the placer tungsten is discussed in connection with the lode deposits of Dublin gulch on page 45.

Both of these creeks are capable of producing considerable quantities of placer tungsten minerals at such times as the market price is high.

Sep 17-96
I the undersigned under the
consideration of a certain sum
transfer claim No 43
Discovered on Bonanza
to W W Caldwell
C. M. Johnson

Forty Nine Oct 3.96
For the sum of Eight Hundred Dollars (\$800) cash
I sell to E. J. Anderson my claim being sq on El -
Dorado belt.
Wittman
& Staff
Winfield O Leo

Facsimiles of instruments of conveyance by which some of the richest claims changed ownership in the early days of the Klondike gold rush



Ground sluicing

CHAPTER IV

Placer Mining Methods and Operators

THE methods used in mining are sinking and drifting, ground sluicing, sluicing, hydraulicking, dredging and power shovel excavating.

SINKING AND DRIFTING.—This method is used where the depth to bedrock is considerable. A shaft is sunk to bedrock through the overburden, and the pay gravels usually lying on bedrock are extracted by drifts running out from the shafts. This method is best adapted to winter mining, the pay gravel being sluiced at the surface with the first water available in the spring.

GROUND SLUICING.—This method consists of concentrating the stream on the gravels. It is essential that there be a plentiful supply of water, that the gravels be shallow and that the stream has sufficient grade to move the material. This work is best done in the early spring by taking advantage of the spring floods. The muck overburden thaws easily and the water soon cuts down to the gravel. The upper gravels, if barren, are sluiced off and the underlying pay gravels shovelled into the boxes and sluiced in the ordinary way.

SLUICING.—After a winter dump has been thawed the dirt is moved to the sluice boxes in various ways, shovelled into the boxes, and washed, the boxes usually being placed high enough to carry the tailings where desired. In open cutting in shallow ground, the dirt is either shovelled direct into the boxes, or conveyed to them by wheel barrow or drag scraper.

The self-dumping carrier, specially designed for the Yukon is used to hoist dirt from the bottom of a shaft to the dump or sluice box.

HYDRAULICKING requires water under a considerable head. The stream is applied through a nozzle to free the gravels and wash them to the head of the sluice boxes.

DREDGING.—By this method the gravels are dug and carried on board the dredge where they are washed, the gold recovered and the tailings deposited behind the dredge which is continuously afloat in the dredge pond.

ELECTRICALLY OPERATED TRACTION SHOVELS.—By this method gravels are being worked on benches too high above the water levels to admit of operation by floating dredges and not sufficiently elevated for hydraulicking. With ample power available at a low rate it is expected that many million cubic yards of low grade bench gravels, hitherto unworkable, will now be brought within the range of profitable operation.

THAWING.—The bulk of the gold-bearing gravels in the Yukon are perpetually frozen and have to be thawed before they can be mined. Various methods of thawing are in use. These may be classified, as follows:—

Natural thawing—

The sun

Artificial thawing—

Rocks

Wood

Hot water

Steam

Cold water

Natural thawing is used chiefly in connection with hydraulic works, when the heat of the sun is the only thawing medium. The monitor is placed in such

a position that it can be directed on alternate faces, so that while the water is directed on one section the others are thawing.

Thawing with rocks is not extensively practised. Rocks heated in a fire are dropped on the bottom of the shaft and covered to retain the heat.

Wood fires are used in small drifting operations. It is customary to sink two shafts and while the drift from one shaft is being thawed, the dirt from the other is being hoisted. Kindlings about a foot wide are placed along the face of the drift. Dry spruce wood is placed over the kindlings and on top of the dry wood a layer of green spruce which in turn is covered with sheet iron to hold the heat against the face of the drift.

Hot Water.—A sump-hole is made at the bottom of the shaft and a pulsometer is installed on top of the sump. Steam from the boilers is conducted to the pulsometer. At the bottom of the shaft there is a small pressure pump, to which is attached a fire hose and nozzle. The water from the sump is directed against the face and returns by means of a ditch dug along the side of the drift. The water is kept warm by steam from the boiler or the exhaust from the pump.

Steam Points.—A point is made of hydraulic pipe, which for service in a drift is 6 feet long with a solid standard head. Each point requires $1\frac{1}{2}$ horsepower boiler capacity. The point which will stand the blow of a 6- or 8-pound hammer are set in the drift with the steam turned on and gradually driven the full length. The duty of a steam point varies from 3 to 7 cubic yards in ten hours.

Thawing Ahead of Dredge.—Dredges operating in frozen ground have a thawing plant for thawing the gravels ahead of them. The boilers used run from 100 to 150 horsepower. The steam is transmitted across the area to be thawed by means of a main steam pipe with laterals conducting to batteries of 4, 6 and 8 points. The points are set 4 to 6 feet apart and are from 12 to 15 feet in length, depending on the depth to bedrock, and are left in place about eight hours.

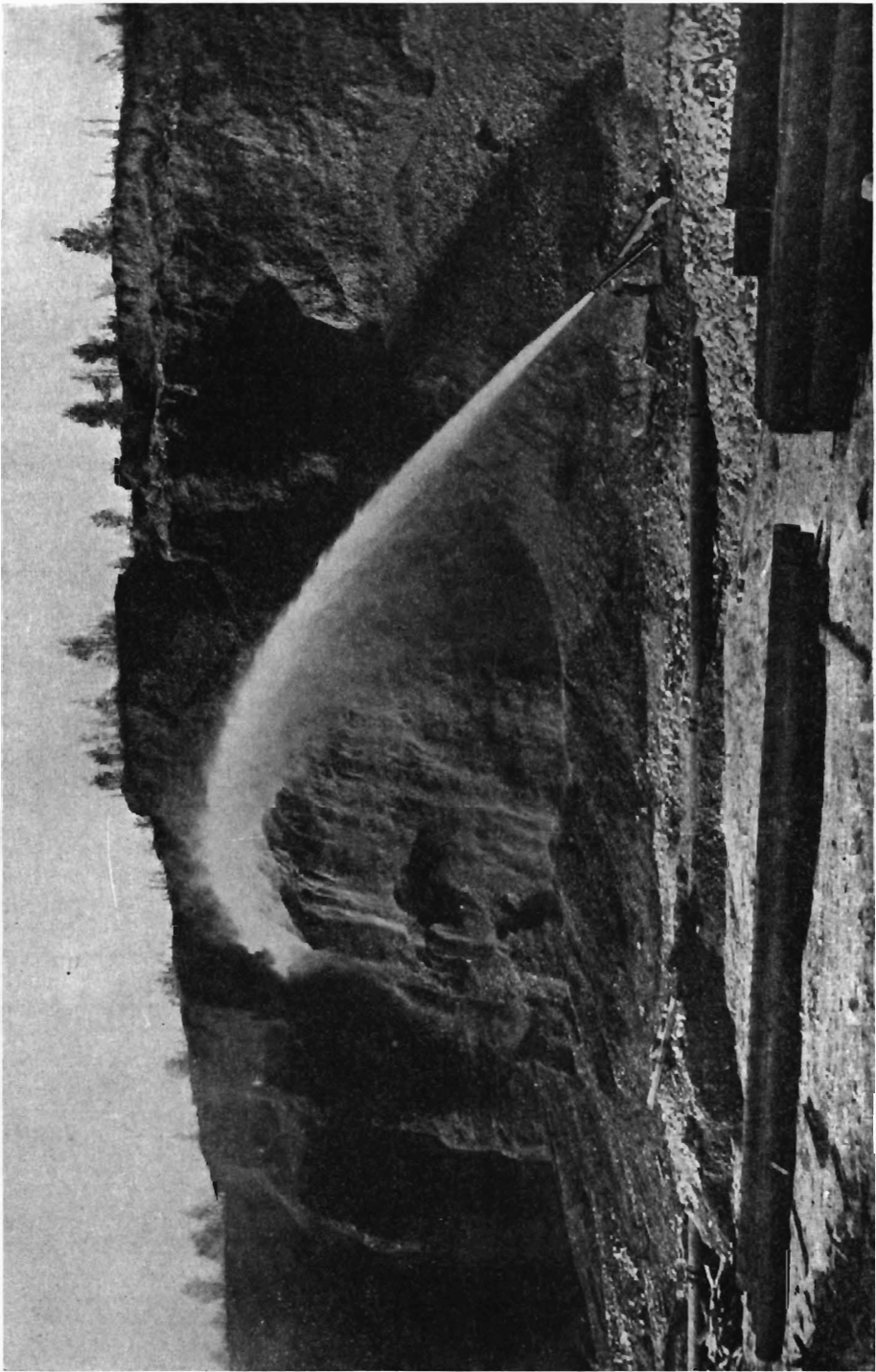
Cold Water Thawing.—This method of thawing is treated more in detail on account of its recent development. It was first tried in the Yukon in 1919 by the Yukon Gold Company and the North West Corporation. The experiment proved successful and the plants have grown in size until now the bulk of the thawing is done by this method, steam thawing being used before and after the water thawing season, or in the periods from April 10 to May 20 and from September 10 until September 30.

In actual operation it has been found that a plant consisting of 1,200 one-half-inch points using water under a pressure of 25 pounds per square inch is sufficient to thaw the ground ahead of a $7\frac{1}{2}$ -foot dredge when a sufficient quantity of water is available.

The water is conveyed through ditches but in many cases it is necessary to dam the waters of the creek and with the use of pumps placed downstream from the operations rehandle the same water over and over again. The water is carried in a main pipe of 20-inch diameter from which $1\frac{1}{2}$ -inch header pipes are tapped off at intervals to suit the point spacing, which depending on the character of the ground varies from 4 to 16 feet; the former being in areas of deep muck and the latter where gravel predominates.

The most efficient point is made up of 10-foot sections of $\frac{1}{2}$ -inch strong hydraulic steel pipe. Extra long sleeves are used at the connections. With this style of pipe the use of high ladders is obviated. The hose connections are $\frac{3}{4}$ -inch garden hose. This is light and flexible and sufficiently strong for the purpose. No hose clamps are required, the hose being held with wire cinches to the points and header connections.

The best point headers are made up of $1\frac{1}{2}$ -inch steam pipe in 30-foot lengths with $\frac{1}{2}$ -inch nipples 6 inches long welded in at suitable intervals. No valves are used except one where the header is connected to the distributing pipe.



Hydraulicicking

The time of thawing varies greatly and can only be judged by long experience. The crew required to operate one of these plants varies from 25 to 35 men, depending on the frequency with which it is necessary to move the points. The cost varies over wide limits. At the Granville plant of the New North West Corporation thawing is being done for 3 cents per cubic yard dredged. At the Upper Dominion plant of the same company the cost is 6 cents per cubic yard dredged. In general it may be stated that the cost of thawing with water is about half that of steam thawing.

INDIVIDUAL OPERATIONS

In addition to the large scale operations of the big mining companies described later the following table shows the extent of operations, at the present time, by individuals and partnerships:—

Location	Number of Operators	Location	Number of Operators
Klondike river.....	3	Miller creek.....	5
Hunker creek.....	27	Tenmile creek.....	6
Last Chance creek.....	17	Thistle creek.....	5
Dominion creek.....	13	Kirkman creek.....	11
Sulphur creek.....	8	Scroggie creek.....	4
Quartz creek.....	22	Brewer creek.....	2
Eldorado creek.....	10	Clear creek and tributaries.....	5
Bonanza creek.....	21	Hight creek.....	7
Black Hills creek.....	3	Duncan creek and tributaries.....	4
Eureka creek.....	6	Haggart creek.....	10
Glacier creek.....	9		
Big Gold creek.....	6		
Sixtymile river.....	7		

THE YUKON GOLD COMPANY

This company is incorporated under the laws of the State of Maine, and commenced operations in the Yukon in 1906. The president of the company is W. Leob, Jr., the secretary-treasurer, W. E. Bennett, the consulting engineer and general manager, O. B. Perry, all of 120 Broadway, New York, and the resident manager is Geo. T. Coffey, of Dawson, Y.T. The company, as is required of all foreign corporations, registered under the laws of the Yukon.

The holdings of the company comprise 350 creek, hill and bench claims located on Bonanza, Eldorado, Bear, Hunker and Gold Run creeks, in the Klondike district.

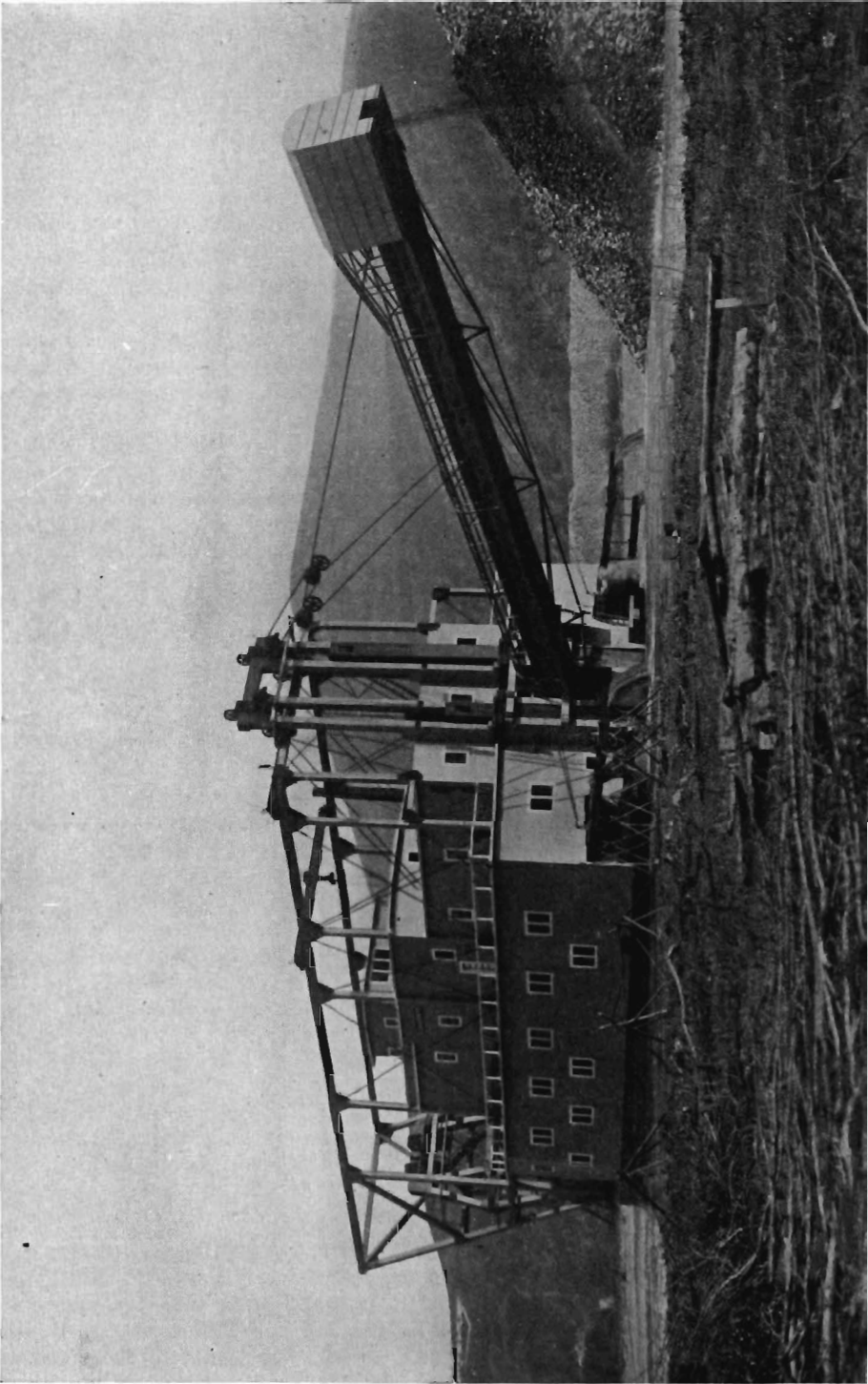
The operations of the company consist of hydraulicking on a large scale, and the operation of a dredge on Gold Run creek.

DREDGING.—The dredge used by the company is a Bucyrus 7½-foot close-connected bucket operated by hydro-electric power. The dimensions of the boat are: length, 111 feet; width on water-line, 41 feet; depth, 8 feet 6 inches; and draught, 6 feet 9 inches. There are seventy-nine buckets on the line each weighing 1,750 pounds.

The power for operating the dredge and for light and power at the company's hydraulic mines and machine shop is obtained from the company's hydro-electric plant at the mouth of Little Twelvemile river.

The operating costs per cubic yard are for an average year, as follows:—

Direct charge, made up of labour, fuel, shop expense, material and supplies and power.....	.0801	
Indirect charge, consisting of preliminary, bullion, general, insurance, assay office, stables, company telephones, transportation, miscellaneous and dredge construction.....	.0875	
Thawing.....	.1570	
Total operating costs.....		.3255
Hours possible.....	3,376.45	
Hours lost.....	379.30	
Hours dredging.....	2,997.15	
Per cent of possible.....	88.8	
Cubic yards dredged.....	710,977.0	
Cubic yards dredged per day.....	5,053.0	



Stern View of Dredge operating in the Klondike Valley near Dawson

HYDRAULICKING.—While there are many hydraulic plants in operation on various gold-producing creeks in the territory, because of the fact that the operations of the Yukon Gold Company comprise one of the largest undertakings of the kind in the world their plant only will be described in detail. Over 3,000 000 cubic yards are handled by this company each season of three months.

WATER SUPPLY.—The water used in these operations is conveyed from the Twelvemile river watershed through a ditch system 60 miles long to a point on the Klondike flat where the water is diverted for use at the different mines. The system consists of ditch, flume and pipe alternately and delivers a maximum of 5,500 Miners Inches of water at this point when running to capacity. The system extends up Bonanza creek for a distance of 10 miles but its maximum carrying capacity beyond Trail gulch is 3,000 Miners Inches.

PARADISE HILL.—*Location.*—This hill is located on the left limit of Hunker creek between Hester creek and Eighty Pup and is approximately one and one-half miles long with an average channel width of between six and seven hundred feet. The deposit is a part of the Hunker creek "White Channel" so called, as the gravels are either white or light grey in colour. This is due to the preponderance of quartz boulders and quartz sand in the deposit.

The main pipe line from the penstock into the mine, a distance of about 400 feet, is 15 inches in diameter, the sub-lines are 10 inches in diameter, and supply three No. 1 hydraulic giants. Two of these are used at a time, and the washing is assisted by an "over-bank" head of about 100 inches. The total head in the present pit is about 80 feet. The sluice line has a gradient of 10½ inches to 12 feet.

LOVETT GULCH AND TRAIL GULCH.—*Location.*—The channel of Bonanza creek opposite these two gulches really constitutes one mine and is being worked as such. The white (or pay) channel is located on the right limit of this part of the creek, and extends from Trail gulch through to Jackson gulch on the Klondike river slope, a distance of one and one-half miles. It is much greater in volume than higher up the creek, attaining a maximum width of 2,000 feet and a maximum depth of nearly 400 feet.

Hydraulic Plant.—The main distributing pipe line for this mine, from the penstock to a point on the ridge between the two gulches, is 2,500 feet in length, contains pipe of diameters varying from 30 inches at the intake to 22 inches at the lower end. The sub-distributing lines consist of two lines, one 16 inches in diameter and the other 14 inches in diameter, into Lovett gulch, and one line into Trail gulch 16 inches in diameter. In addition to these there is a line 14 inches in diameter, extending down the ridge between the two gulches which furnishes bank head water for each place as required.

All these lines are constructed of spiral riveted sheet steel pipe with bolted joint connections, the thickness of the steel varying with the pressures and diameters of pipes. From the sub-distributing lines to the giants 12-inch pipe, both plain and spiral riveted, is used. There are four of these lines at each mine, each fitted with a 12-inch gate, which supply the water to four No. 3 ball-bearing hydraulic giants. The pressure per square inch at the nozzles varies with the number of streams used and runs from 40 pounds to 150 pounds to the square inch. The gravels disintegrate so readily that the greater pressures are only required at such times as the top gravels are being washed.

ADAMS HILL, AMERICAN GULCH, OROFINO HILL, GOLD HILL, KING SOLOMON HILL, MONTE CRISTO GULCH.—*Location.*—The "White Channel" on Bonanza creek at these points presents practically an unbroken face of gravel four miles long, extending from the confluence of Bonanza and Eldorado creeks to Boulder creek. The deposit for this entire distance is on the left limit of the creek and parallels the course of the present Bonanza creek valley. It is virtually one mine and the subcaptions above refer to the points at which hydraulic operations have been started.



Type of dredge Klondike valley near Dawson

Deposit.—The deposit shows no stratification, the gravels rest on a decomposed schist bedrock and the major values are contained in the lower 20 feet of gravel and the first three feet of bedrock. The channel for this section has an elevation of 195 feet above the present Bonanza creek valley, and is of width varying from 500 feet to 1,000 feet—depending on whether or not any of the section has been eroded away—and with depths varying from 10 to 20 feet on the rim to 150 feet in the deepest sections. The deposit is frozen for its entire depth and is not covered with “muck” as are the creek gravels. The gravel when thawed disintegrates readily and the greater percentage of the values is recovered in the first 50 feet of sluice. The gold also is easily amalgamated, thus differing somewhat from some of the gold obtained from the present creek beds.

The ditch system from Lovett up Bonanza follows the right limit to a point opposite Fox Gulch where it is taken across Bonanza creek by means of an inverted syphon and thence up the left limit of Gold hill—the end of the ditch.

The sluices are lined with manganese steel riffles lengthwise and angle iron riffles crosswise, or, in some instances, wooden blocks 11 by 11 by 10 inches.

British Columbia fir, clear of knots and two inches thick, is used for bottoms in all of the sluices. Lumber from local mills is used for the remainder of the sluice construction.

The following table shows the extent of and the results of the hydraulic operations of this company up to 1923:—

Year	Period of operation	Percentage of possible time operated	Water supply M.I.	Cu. yds. handled	Cu. yds. mined per M.I.	Pro-duction
	days					\$ cts.
1910.....			371, 206	1, 656, 020	4·5	226, 025 93
1911.....			482, 580	2, 125, 750	5·4	298, 007 22
1912.....	168	96·8	524, 249	2, 967, 750	5·4	628, 874 72
1913.....	150	93·3	406, 135	2, 875, 952	6·6	247, 557 06
1914.....	168	96·3	519, 834	3, 241, 641	6·0	544, 262 15
1915.....	166	95·5	494, 755	3, 031, 647	6·1	412, 535 02
1916.....	164	92·9	488, 540	2, 245, 084	4·6	435, 666 47
1917.....	157	99·5	512, 270	2, 143, 444	4·2	460, 312 90
1918.....	146	98·5	473, 115	2, 054, 390	4·4	329, 277 93
1919.....	145	100·0	519, 940	2, 220, 656	4·1	334, 181 23
1920.....	132	100·0	345, 130	1, 702, 264	4·9	284, 968 50
1921.....	141	96·3	320, 660	1, 069, 468	3·3	269, 632 90
1922.....	138	96·9	378, 690	1, 586, 666	4·2	177, 616 43
1923.....	155	94·8	388, 186	1, 320, 360	3·4	197, 842 24

BURRALL AND BAIRD, LIMITED

This company was incorporated under the Companies' Ordinance, Yukon Territory, on September 26, 1921. It is the successor in title to the Canadian Klondike Mining Company, Limited, and is operating the placer ground included in hydraulic lease No. 18. This lease embraces approximately six miles of the Klondike valley, extending from the mouth of Bonanza creek upstream to the mouth of Hunker creek. In addition to this it owns in its own right, or controls through its subsidiaries, the Dago Hill Mining Company, Limited, and the Deepvale Mining Company, Limited, one hundred and thirty-six placer mining claims situated in the Klondike watershed of the Yukon Territory.

The officers of the company are A. N. C. Treadgold, President; W. J. Rendell, Vice-President; and Andrew Baird, Secretary-Treasurer and Acting Manager.

The company is operating one dredge with close-connected buckets of seventeen and one-half cubic feet capacity. It handles eleven thousand cubic yards of gravel and bedrock per day. It is electrically operated with motor capacity of eleven hundred horse-power. The current used is three-phase, sixty cycles,

twenty-two hundred volts. The dredging cost is slightly above five cents per cubic yard, and the operating cost, which includes overhead, approximately six and one-half cents per cubic yard.

The work of repairing and reconditioning the dredge commences about April 1 and dredging operations begin about May 10. With the exception of a few days in the latter portion of October when the power plant is unable to carry the load on account of a run of slush ice in the Klondike river, operations are carried on continuously until the fifteenth of December.

During the season of 1925 two Standard Model 37 electric two-belt rigid crawling traction revolving shovels were installed. These will be used in digging canals to divert a portion of the water from the Klondike river through the frozen sections of the concession. It has been demonstrated that the continuous flow of a body of water thaws the porous gravels of these areas rapidly and this should eliminate the high cost of thawing with steam or water points.



Tailings on Klondike river, mouth of Bonanza, 1922

The main camp is situated in the Klondike valley at the mouth of Bear creek. It includes living quarters for the employees, mess-house, warehouse, stable, gold room, a machine shop where all repairs for the operating units of the company, and those of the New North West Corporation, Limited, and its subsidiaries are made.

THE NEW NORTH WEST CORPORATION, LIMITED

The New North West Corporation, Limited, was incorporated on March 26, 1921, under the Companies Act of the Dominion of Canada. It is the successor in title to the North West Corporation, Limited, and the Canadian Klondike Power Company, Limited, and was incorporated for the purpose of acquiring the assets and operating the properties of those companies.

Its officers are A. N. C. Treadgold, President; F. H. Chrysler, Vice-President; J. B. Watson, Secretary, and Andrew Baird, Acting Manager.

The company owns or controls either in its own right or through its subsidiaries, the Dominion Mining Company, Limited, the Big Creek Mining Company, Limited, the Calder Mining Company, Limited, or the Sulphur Mining Company, Limited, nine hundred and fifty-six placer mining claims situated in the Indian River watershed of the Yukon Territory.

It operates a hydro-electric plant on the North fork of the Klondike river of six thousand K.V.A. capacity. This supplies power to operate all the electrical equipment of its subsidiary companies, as well as that of Burrall and Baird, Limited, and the Dawson Electric Light and Power Company, Limited. The cost of production varies from one-half cent to one cent per K.W.H., according to the volume of sales.

The Dominion Mining Company and the Big Creek Mining Company each operate one dredge with close-connected buckets of seven and one-half cubic feet capacity. Each boat handles an average of four thousand cubic feet of gravel and bedrock per day. Dredging commences about May 15 and closes about November 15. The dredging costs of the Dominion Mining Company are about twenty-one cents per cubic yard and the operating costs, which include overhead, about twenty-two and one-half cents. The dredging costs of the Big Creek Mining Company are about fifteen and one-half cents per cubic yard, and the operating costs about seventeen cents.

During the season of 1925, the Dominion Mining Company installed on Hillside No. 78 below Lower Discovery Dominion creek one Standard Model 37 Electric two-belt rigid crawling traction revolving shovel. This was operated on bench ground which cannot be worked by a floating dredge, and cannot be profitably hydraulicked on account of the lack of space for depoisting tailings.

CHAPTER V

Lode Deposits*

LODE deposits are widely distributed throughout the explored portions of Yukon, and embrace a considerable variety of types, including gold-quartz veins, silver-lead veins, gold-silver veins, antimony-silver veins, tungsten veins, copper veins and contact metamorphic deposits which are valuable chiefly for the copper ore they contain. In the central part of the territory deposits are known in the Mayo, Beaver river, Twelvemile and Klondike districts; further south are the White river, Williams creek and Giltana lake districts and in southern Yukon the Whitehorse, Wheaton and Windy Arm districts which constitute portions of a mineralized belt which appears to follow along the eastern edge of the Coast range.

It must be remembered in writing of the lode deposits of Yukon that barely twenty per cent of the territory has been prospected and it is to be hoped that the remaining eighty per cent will prove to be relatively as rich as the twenty per cent already examined. This hope is strengthened somewhat by the fact that most of the explored territory is adjacent to the main streams and it is scarcely to be supposed that the rivers in cutting their courses were able to select only those areas possessing mineral wealth.

The development of lode mining in Yukon has been slow. This in many instances is due to the lack of cheap transportation, for while the transportation companies have undoubtedly assisted with favourable rates on outgoing ores still it cannot be denied that the mining and shipping of ores to smelters on the Pacific coast, frequently entailing the wait of a year from the time the ore is mined until the proceeds become available, is expensive, and requires the discovery of bonanza ore to make it pay. Such ore bodies prove frequently to be small or irregular, adding to the already high cost of mining. Further, there are not, as in other regions, extensive agricultural, lumbering or manufacturing industries to assist in the building of railroads. Such lumbering and agricultural industries as exist are largely, if not wholly, dependent upon the success of the mining industry.

Even under circumstances such as these, many attempts have been made to mine deposits discovered in different districts. Some, either from lack of merit in the deposits themselves or from bad management, have proved unsuccessful. Others, while entirely successful from the financial standpoint, nevertheless have been short-lived, mining operations ceasing with the exhaustion of the high-grade ore. At the present time one camp only, the Mayo district, is actually a producer of ore. The industry there began with the extraction of a single high-grade ore shoot; other deposits were discovered. A mill of one hundred tons per day capacity has been in operation since January, 1925, and a period of steady production is in sight.

Some of the other known deposits of Yukon, merit much more attention than they have had in the past, and it is only reasonable to expect that as the mining industry grows, more and more interest will be taken in prospecting, with the result that further discoveries are almost sure to follow.

* This chapter prepared by Dr. W. E. Cockfield, of the Geological Survey of Canada, with approval of the Director.

MAYO DISTRICT

GENERAL CONDITIONS

Mayo mining district embraces that portion of the watershed of Stewart river lying east of the mouth of McQuesten river. It thus includes not only the Mayo area proper but also the newly-discovered Beaver river area. The district is named from the town of Mayo, which acts as a distributing centre.

Mayo is situated on Stewart river 180 miles above its mouth. During the summer months, that is from May until October, the White Pass and Yukon route maintain a regular passenger and freight steamer service on Stewart river, connecting with its Yukon steamers at the mouth of Stewart river. In winter a stage line connects with the Whitehorse-Dawson mail stages at the mouth of Crooked creek, some thirty miles from Mayo.

Within the district a road leads from Mayo to Minto Bridge, a village ten miles north of Mayo, and from which roads radiate to all the important mining centres. The road from Mayo to Keno hill is kept in excellent condition, and is quite passable for automobiles.

Mayo also is connected with the outside world by means of a wireless station erected two years ago by the Federal Government. Within the district a telephone line, constructed by private enterprise, connects Mayo and Keno hill.

HISTORY OF LODE MINING

Within the past five years Mayo has developed into an important lode mining centre. This is because of the high-grade ores discovered in the vicinity of Keno hill. While silver-lead ores were known in the Mayo district as early as 1906 no attempt at mining was made until 1914. The Silver King mine on Galena creek was the first property to operate. Discovered in 1906¹ by H. W. McWhorter, the claim was allowed to lapse and was subsequently restaked by Mr. McWhorter who leased it to J. Alverson and G. Hoffman. These lessees did the first real development work on the property and proved it to be of importance; they shipped 59 tons of ore to Trail, British Columbia, the returns being \$269 a ton in gold, silver and lead. In 1914 the property was acquired by T. P. Aitken and H. Munroe. During the winter of 1914-15 these owners shipped 1,180 tons of ore to Selby smelter at San Francisco, the yield being \$3 a ton in gold, 270 ounces of silver and about 31 per cent lead. Subsequent shipments were made in the two years following, but ceased in 1917 when the ore-shoot which was yielding the high-grade ore became exhausted. The Silver King mine although short in life nevertheless stimulated prospecting in the Mayo district. The next attempt to mine silver-lead ores was at Lookout mountain. Here a company formed from local capital endeavoured to mine a vein discovered in 1917. A large amount of work was done but failure to find much ore of a grade that could be shipped without concentration forced the abandonment of the project. In the meantime, however, Keno hill had been discovered by L. Beauvet in 1919. Almost immediately the Yukon Gold Company took options on the original locations, and development work was pushed so that the property was producing at the end of 1920. In 1921 the Sadie-Treadwell vein, destined to become one of the most important of the camp was discovered on the western slope of Keno hill. Yukon Gold Company and Treadwell Yukon Company secured the properties lying along this vein. Development work on these properties brought them to the producing stage during the winter of 1922-23. In the meantime, many other discoveries had been made. These included Rambler hill, Mt. Cameron, Bunker hill, Sourdough hill, Galena hill, and the prospectors pushing ever further afield discovered and staked the deposits of Beaver river district.

¹ Cairnes, D. D., Geological Survey, Sum. Rept., 1915.



Dredge operating in the Klondike river

THE ORE DEPOSITS

GENERAL GEOLOGY.—Mayo district as a whole is underlain chiefly by crystalline schists and gneisses, thought to be Precambrian in age. These crystalline rocks are largely altered sediments and consist of quartzites, quartz-mica schists, sericite schists and chlorite schists. These older rocks are pierced by numerous dikes, sills and laccoliths of greenstone, which are frequently sheared and altered and now consist of secondary minerals to such an extent that it is difficult to determine their original composition. Later than these greenstones, are dikes and sills of quartz and granite porphyries.

ORE DEPOSITS.—General Statement.—Practically all the ore deposits of Mayo district are fissure veins, that is they represent vein material, deposited in fault fissures. The faults which gave rise to these veins are all of the normal type; no reverse faults have been recognized. The displacement along the faults is as a general rule, small. In general the mineralization is simple, consisting of galena, zinc blende and freibergite (argentiferous tetrahedrite) in a gangue of siderite or quartz, the latter being subordinate.

DESCRIPTION OF LOCALITIES

The Silver King mine is situated on Galena creek, about three miles from the mouth of the creek. It is reached by wagon road from Mayo, a distance of thirty miles.

The vein outcrops in the walls of the canyon of the creek, but to either side along its strike is not exposed, being covered with a heavy mantle of drift. The vein occurs in a fissure traversing old altered sediments, probably of Precambrian age. These, where exposed in the canyon are greyish to greyish-green schistose, quartzitic and sericitic rocks, which in places occur in heavy massive quartzite beds with relatively little sericite, but also grade into more finely-laminated phases that become typical sericite schists. All these rocks are contorted and contain a great amount of secondary quartz in lenses, stringers and bunches.

The vein strikes north 65 degrees east astronomic, and dips to the southeast at angles ranging from 55 to 80 degrees. The extension of this vein on the northeast side of the canyon is really a fault zone about five feet in thickness, which includes crushed and sheared wall rock interspersed with small quartz stringers, only slightly mineralized. An adit 100 feet long has been driven on this zone from an elevation only a few feet above the creek level, and along this adit the quartz and all other evidence of mineralization gradually disappear until at the end there is only about 2 feet of barren sheared country rock.

On the southwest side of the canyon, the vein is highly mineralized chiefly with galena and ruby silver (pyrargyrite) although a certain amount of iron pyrites also occurs and in one place a band of zinc blende 2 inches in thickness follows the foot-wall. In the mine workings one main shoot of highly mineralized rich ore was encountered which averaged over \$150 a ton in gold, silver and lead.¹ This shoot dipped to the northeast along the vein, was 30 to 35 feet long and near the middle 40 to 48 inches thick, thinning to 6 or 8 inches at the edges. A second smaller shoot of ore was encountered on the 185-foot level.

Keno Hill² is situated 40 miles northeast of Mayo, at the head of Duncan creek and its tributary Lightning creek. It is reached by wagon road from Mayo.

The veins of Keno hill may be divided into two classes which for the sake of description may be termed longitudinal and transverse depending on whether they follow the trend of the strata or cut across the strata. These represent two fault systems and two periods of mineralization, the longitudinal faults being the earlier. In general these strike north 30 to 40 degrees east magnetic

¹ At the time the Silver King mine was worked silver had a market value of \$0.50 an ounce.

² Cockfield, W. E., Geological Survey, Summary Reports 1920 and 1923.

and the transverse faults make an angle of 70 to 80 degrees with them. There is, however, considerable variation in the direction of the faults in different parts of the area. The strata have a general east-west trend but near the hillock known as Monument hill the beds bend sharply to the southward across Lightning creek where they gradually resume their former direction. It is believed that the transverse faults are attributable to this flexure; the origin of the longitudinal faults has not been satisfactorily solved.

The rocks of the area consist of crystalline schists intruded by greenstone and granite and quartz porphyry. Further to the east a mass of grey biotite granite outcrops. The dykes and sills of quartz porphyry, though thin are extraordinarily persistent. Included in these are small specks of some of the ore minerals. It is believed that the magma which gave rise to these rocks was also responsible for the mineralization of the faults.

The earlier mineralization consists of quartz, arsenopyrite and pyrite. After being filled the longitudinal fissures remained planes of weakness, affected by subsequent movements. When the transverse fissures were filled the longitudinal fissures probably acted as the main circulation channels for the ore-bearing solutions, and considerable amounts of the ore minerals were deposited in them. The chief minerals of the second stage are siderite, freibergite, galena and sphalerite. These are accompanied by other minerals of lesser importance, such as native silver, pyrargyrite (ruby silver), jamesonite, chalcopyrite, covellite, argentite, polybasite, calcite, barite, cerrussite, malachite, azurite, limonite and manganite.

DESCRIPTION OF PROPERTIES

As upwards of a thousand claims have been staked in the vicinity of Keno hill, and it is manifestly impossible to describe all these, certain claims have been selected which from the amount of work done throw the most light on the deposits.

KENO HILL, LIMITED

This company was organized in 1920 to work certain claims then held by Yukon Gold Company, Limited. The original property consisted of seven claims: Roulette, Keno, Scotty Solo No. 2, Pinochle, Wolverine and Reco, and a number of fractions. Work was commenced within a month after the discovery, but winter set in before much surface prospecting could be done. Six veins, however, had been recognized. These were numbered from 1 to 6. During the first winter (1919-20) the first three were prospected, an adit being



Treadwell-Yukon property, Keno Hill, Y.T.
(Photo by W. E. C.—Geological Survey)

started on Vein No. 1, a shaft on No. 2 which was abandoned at 35 feet and a shaft on No. 3 was sunk 80 feet. The summer of 1920 was spent in surface work which resulted in the discovery of Veins Nos. 7 to 13. A power plant was built on Duncan creek and a transmission line 5 miles long run to the top of the hill. The plant burns wood to generate electricity and is of 100 horse-power. During the following winter of 1920-21 about 2,200 tons of ore was mined from Veins Nos. 9 and 3 and a smaller amount from Nos. 1, 4 and 5. This was hauled to Mayo by teams at a cost of \$30 a ton. The summer of 1921 saw the building of a more permanent camp on the hill and a warehouse in Mayo. During the summer the well known Treadwell-Sadie vein was discovered on the northwest end of the hill about two miles from the original group. Claims were optioned on this.

The Keno hill mine on No. 9 vein during the winter of 1921-22 produced 3,300 tons of high grade ore which was hauled by teams. Prospecting was carried on at the Sadie group to as great depth as was possible without pumping. In the winter of 1922-23 over 4,000 tons of ore was produced from No. 9 vein and 400 tons from the Sadie-Friendship group.

Keno Hill, Ltd., has thus produced nearly 10,000 tons of ore from the original group which assayed 200 ounces of silver and over 50 per cent lead. The maximum vertical depth reached on No. 9 vein was 500 feet. This vein was in massive quartzite underneath a thick band of schist. It occupies a normal fault with over 100 feet throw. There was very little gangue mineral included with the ore, and the ore was only partly oxidized to the lowest depth attained. Frost also extended to the lowest levels reached.

In the fall of 1923, Keno Hill, Limited, exhausted the shipping ore in No. 9 vein. A considerable tonnage of mixed or concentrating ore still remained but as the other veins Nos. 1-8 and 10-13 did not contain large ore shoots the company decided to close down the original group and prospect the Sadie-Friendship group. This was done during the winter of 1923-24. A considerable tonnage of milling ore was discovered but no shipping ore. The company therefore withdrew from the field, leasing the Sadie property to the Treadwell Yukon Company, Limited, and certain claims of the original group to individual miners, the option on the Friendship claim being allowed to lapse.

TREADWELL YUKON COMPANY, LIMITED

This property consists of 17 claims, totalling 340 acres. The chief holdings include the Bluestone, Ladue, Lotub, Mary, Lansing, Blue Bell, Poca Plata, Tunnel, Travice and Silver Bell.

The workings are situated on the northern extension of the Sadie-Friendship vein. Three shafts have been sunk, No. 1—332 feet deep, No. 2—157 feet deep, and No. 13—15 feet deep. Sinking was suspended on account of water encountered. Levels known as the 50-, 100-, 200-, 300-foot levels have been driven connecting shafts No. 1 and No. 2. In addition a tunnel 2,600 feet long was driven on the 600-foot level for drainage purposes and connected to shaft No. 2. Some development has been done on the 400 and 600 levels.

PLANT.—The plant includes the following equipment:

- No. 1 Shaft: 1 100 horse-power boiler,
1 35 horse-power boiler,
1 25 horse-power boiler,
1 Steam driven compressor,
1 Steam hoist,
1 Steam driven light generating plant.
- No. 2 Shaft: 1 25 horse-power boiler,
1 Gas driven compressor,
1 Gas hoist,
1 Diesel engine and compressor.

General: Completely equipped machine shop.

MILL.—A mill with a capacity of 100 tons daily has been erected on the Treadwell property. The separation of ore from the gangue is accomplished by flotation and the power is furnished by a Diesel engine. This mill represents a distinct advance in the mining practice of the district, as heretofore only those ores with sufficiently high content of silver to permit of shipping to smelters on the Pacific coast have been mined. Lower grade ores can now be handled. It is estimated that there is sufficient ore in sight for the mill for a period of about four years. These reserves will doubtless be added to considerably by the development work now in progress.

HAULAGE.—Treadwell Yukon Company does its hauling both of supplies to the mine and ore out to Mayo by means of caterpillar tractors, of which there are three in service. The 10-ton caterpillar tractor is the type used. During the first winter of operation these machines hauled ore to Mayo at a cost of approximately \$8.50 a ton as compared with the former contract price by teams of \$26.50. The cost of haulage however depends greatly on the condition of the roads, and it must be remembered that during the first winter conditions for haulage were ideal.

PRODUCTION.—During the winter of 1922-23 the company produced and hauled to Mayo for shipment 4,000 tons of ore. During the following winter a slightly smaller tonnage was produced.

THE ORE BODY.—The ore is deposited along a complex fault zone. The faulting shattered the country rock and possibly also emphasized the jointing. The ore-bearing solutions filled the fissures and penetrated the country rock along all available openings, so that in places the country rock is cut by a network of veinlets of siderite. The growth of the ore-bodies along the openings is due in part to replacement of country rock. The ore minerals are irregularly distributed. In many cases they are sufficiently concentrated to permit of hand-sorting to a grade that can be shipped, in others concentration is required. Similar ore was found in the prospect (No. 3 shaft) but this has not yet been developed. On the Lansing claim float from the same vein has been discovered. The total distance from the Sadie claim to the Ladue claim over which the vein has been traced is 2,200 feet and it is extremely likely that prospecting will show it to continue farther north and south.

SHAMROCK GROUP.—This group consists of six claims located immediately to the west of the original workings of Keno Hill, Limited. An adit was driven into a promising vein on the hillside overlooking Erickson gulch. This vein, however, proved to be largely carbonates and very little shipping ore was obtained. A shaft sunk 70 feet beyond the end of the adit encountered an ore shoot and 61 tons of ore were extracted during the winter of 1922-23. In the spring the workings filled with water, but three shafts were sunk to the vein the following winter and another shipment made. Work on this vein by the owners is still in progress. Several other veins, as yet unprospected, have been located on the property.

SILVER BASIN GROUP.—The chief claim of this group is the Silver Basin claim situated on the western slope of Silver Basin gulch. Five veins, numbered in the order of their discovery, have been located. No. 1 is a galena, siderite freibergite vein exposed in a short adit. No. 2 is a quartz-arsenopyrite vein carrying small amounts of galena. No. 3 and No. 5 are similar to No. 1, occurring within 150 feet of each other. No. 4 is probably the most important showing on the property. It has been traced 100 feet by means of open cuts, has a width of 4 feet and shows galena, siderite and freibergite.

GAMBLER GROUP is situated in the basin at the head of Faro gulch. A prominent vein crosses the basin of the gulch at this point. It is mineralized with quartz, arsenopyrite, siderite, galena, freibergite and zinc blende. Two adits were driven into the vein and a winze to connect the two was also driven. From the winze which is situated on an ore shoot a shipment of 50 tons of selected ore was made.

STONE CLAIM.—This claim is situated on the northern slope of Keno hill. A good surface showing was located and an adit driven into the hill below it. This adit is 250 feet long with two cross cuts 12 and 14 feet. The ore encountered in the adit is disseminated and much lower in grade than on the surface.

CARIBOU CLAIM.—This claim is located on the eastern end of Keno hill. The development work includes a shaft 18 feet deep and an adit 35 feet long which drifts along the vein for the greater part of the distance. In the shaft a vein carrying 8 to 10 inches of massive galena was followed. In the adit the ore was disseminated and fairly low in grade.

LAKE GROUP.—On the Lake group a promising vein carrying freibergite in a siderite gangue was located by ground sluicing. A shaft was started, but surface water prevented further development.

There are a number of other claims on the hill where veins have been found. As the veins are nearly always similar in their characteristics, and the amount of actual development work is small, it would involve considerable repetition to give the details.

SOURDOUGH, BUNKER AND GALENA HILLS.—These hills lie immediately to the south and west of Keno hill, and the prospects discovered to date represent simply an extension of the Keno hill deposits. The type of veins and the mineralization is identical with that of Keno hill, and consequently no description of these deposits need be given. A number of promising prospects have been discovered at different localities on these hills but to date very little development work has been done. It is expected that a small shipment of ore will be made this winter (1924-25) by lessees of one of the properties on Galena hill.

RAMBLER HILL¹

Rambler hill is situated about eight miles north of Keno hill. The main workings lie above timber line on the eastern side of Cache creek, about six miles from the mouth of the creek. They are connected by a trail to the winter trail from Galena creek to mount Cameron. The workings consist of a shaft 80 feet deep with a cross cut of 12 feet. In addition the vein has been traced down the hill about 300 feet in elevation by open cuts and an adit started there.



• Modern method of transporting silver lead ore

¹ W. E. Cockfield, Summary Report, Geological Survey Branch, 1921, Part A, pp. 1-6.

The vein varies in width from 3 to 6 feet, and is mineralized with quartz, galena, pyrite, chalcopyrite, limonite and siderite. The galena occurs in small bands in the vein. Picked samples of this galena yielded 36 ounces of silver and 53 per cent lead.

Other veins occur in the vicinity. One of these on the Lucknow claim where examined had a width of 6 to 7 feet, and the vein can be traced on the surface by means of float for a distance of about 2,000 feet. Float from other veins in the vicinity occurs but these have not yet been located in place.

STAND-TO HILL

Stand-to hill is situated across Ladue valley to the north of Keno hill. The Stand-to property is situated on the east side of Homestead creek, about two miles from its mouth. The workings are about 500 feet above the creek level.

The vein has formed in a fault fissure which at the elevation of the workings brings a band of schist into juxtaposition with a greenstone sill, the fault having a vertical displacement of about 50 feet. The vein has been traced on the surface by open cuts for 200 feet, and may extend farther as bedrock is covered by soil and talus and the extent of the vein can only be ascertained by trenching. The vein which varies in width from 16 to 24 inches is mineralized with galena, calcite, siderite, chalcopyrite and quartz. Two samples taken from an adit driven on the vein assayed 17.6 and 3.3 ounces of silver per ton and 19.36 and 4.40 per cent lead, respectively.

MOUNT CAMERON.—The Mount Cameron property is situated on Cameron mountain about 45 miles in a direct line northeast of Mayo. The distance from Mayo to the property by way of the winter road from Galena creek is about 65 miles.

The workings consist of an adit and cross cut which, however, at the time of the examination of the property were caved. All that could be seen was the decomposed mass of iron and copper minerals forming the outcrop. The chief minerals present apparently are pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, limonite, siderite and calcite. The galena apparently occurs in bands reaching a width of from 6 to 8 inches. The width of the outcrop is about 50 feet. A sample of the best galena ore on the dump assayed 76 ounces of silver to the ton and 56.82 per cent lead.

LOOKOUT PROPERTY.—A number of claims were located on mount Haldane in 1918 but development work was done only on one group, the Lookout property. This is situated on a spur of the mountain, about 26 miles by road from Mayo.

The development work included three adits, with drifts on the vein, a shaft from the level of the third or lower adit and several crosscuts and winzes. The vein follows an irregular fracture in quartzites striking north 30 degrees to north 60 degrees east and dipping 45 to 55 degrees to the southwest. The vein filling consists of galena, siderite, limonite, cerussite, maganite, pyrite and occasional specks of copper minerals.

In addition to this vein, there are several others as yet undeveloped lying to the east across Bighorn gulch. A shipment of 27 tons of ore was hand-sorted from the Lookout property in 1920. The smelter returns on this were 95 ounces of silver and 59 per cent lead.

DUBLIN GULCH¹

A number of mineral veins have been discovered in the vicinity of Dublin gulch, a small stream about 4 miles long which is a tributary of Haggart creek. There are two types of veins: quartz-arsenopyrite-gold veins and quartz-scheelite veins.

¹ T. A. McLean, "Lode Mining in Yukon," Mines Branch, Department of Mines 1914, pp. 127-139.

D. D. Cairnes, Geological Survey, Department of Mines, Summary Report, 1915, pp. 29-33. Summary Report 1916, pp. 12-19.

W. E. Cockfield, Geological Survey, Summary Report 1916, Part B, pp. 7-14.

The geological formations in the vicinity of Dublin gulch include mainly old, probably Precambrian, schistose rocks, consisting of quartzites, mica and sericite schists. In the vicinity of Dublin gulch these have been somewhat extensively invaded by granitic intrusives, and it is near the contact of the older rocks with the intrusives that the quartz-arsenopyrite veins occur. The scheelite veins for the most part occur within the intrusives.

The quartz-arsenopyrite veins range in thickness from an inch or even less up to 4 or 5 feet; but well-mineralized deposits of more than 2 feet are exceptional. They consist of a quartz gangue which is mineralized with arsenopyrite and pyrite; all the better mineralized portions of the veins, and particularly those found to carry important amounts of gold, are heavily stained with scorodite (hydrous arsenate of ferric iron). The veins contain in general from \$2 to \$16 a ton in gold with a general average of between \$8 and \$9. Occasional samples give high values. It is evident from the sampling that has been done that none of the deposits is sufficiently high grade to pay for shipping to outside points for treatment. If a small mill were erected in the vicinity considerable portions at least of some of the veins would pay for treatment, and the oxidized zone of many of them would yield important amounts of gold.

STEWART-CATTO GROUP.—This group embraces one unsurveyed fraction and five claims and one fraction which are crown granted. These claims are located on the divide between Olive and Stewart gulches. At least eight veins have been discovered on the property, but work has been confined to three known as the Cabin, Victoria and Green veins.

On the Cabin vein, an adit encountered the vein at a distance of 132 feet. Where encountered underground it has a thickness of 5½ feet, and consists dominantly of quartz somewhat sparsely mineralized with arsenopyrite and pyrite.

On the Victoria claim a cross cut has been driven into the hill a distance of 140 feet, and encountered two veins at distances of 85 and 100 feet. On the first, the Victoria vein, a drift has been run 27 feet to the right of the cross cut and 30 feet to the left. The vein is about a foot in thickness, and is well mineralized. The second vein although thick in places is not where exposed as well mineralized as the Victoria vein.

The Green vein has an adit or cross cut 60 feet long, which in reality drifts along the vein for 50 feet, and from the end of this cross cut a drift is continued along the strike of the vein for 130 feet. The workings also include several cross cuts and a raise. The vein varies in thickness from 10 to 36 inches but in most places is from 12 to 20 inches thick. It is also generally well-mineralized.

The Blue Lead and Eagle groups extend along the left side of Dublin gulch from Stewart gulch to near the valley of Haggart creek. Quite a number of veins have been discovered on these groups ranging from stringers about an inch thick to veins two or three feet thick. A considerable amount of development work has been done including numerous trenches, pits, open-cuts, three adits 38, 120 and 35 feet long and a 35-foot shaft.

The Olive claim is located on the left side of Dublin gulch about 2 miles from Haggart creek. A vein was discovered on this property on which a drift 100 feet in length has been driven. Throughout the drift the vein has a thickness of from 8 to 14 inches, and consists mainly of quartz heavily mineralized with arsenopyrite and pyrite.

The Shamrock group is situated on the right side of Dublin gulch 2½ miles from Haggart creek. Two adits, the lower 25 feet in length and the upper 90 feet in length, have been driven. The lower adit was caved when visited, the upper, however, showed a vein having a thickness of 6 inches to 3 feet, well mineralized with arsenopyrite.

TUNGSTEN DEPOSITS.—Scheelite (CaWO_4) is calcium tungstate and is the principal tungsten mineral found in the vicinity of Dublin gulch. During the war years several shipments of this mineral were made, the mineral being recovered as a by-product from the concentrates obtained in washing for placer gold. Search eventually led to the discovery of the scheelite in its original associations. The scheelite veins are situated in the granite mass referred to before, and around its borders. It was at first thought that the scheelite might be associated with the quartz-arsenopyrite veins but it was subsequently found that the tungsten bearing veins, although occurring in the same locality, were distinct. Samples taken from the various exposures showed from traces up to 10 per cent of tungstic oxide, but no gold or silver. The veins consist of stringers of quartz occurring in the granite mass and around its borders. They vary from an inch up to six inches in thickness, and none of them has been traced for any considerable distance. The scheelite occurs as crystals in the veins but principally in the wall rock adjacent to them. In one case a pegmatite vein of quartz and muscovite, with some feldspar, hornblende, tourmaline, siderite, graphite, wolframite and scheelite was noted. The scheelite occurs as crystals in the pegmatite mass and also lining vugs and cavities. None of the veins so far located can be considered as an economic source of tungsten at the present time; shipments of concentrates from the placer workings could be made at any time a market for these developed.

UPPER BEAVER RIVER DISTRICT

Silver-lead ores were discovered in upper Beaver River district in 1922. Following so closely upon the discovery of Keno hill, the initial discovery led to a stampede in which a large number of claims were staked. The ores however proved to be low grade, and many of these claims were subsequently allowed to lapse. In 1923, however, high grade float was discovered on Grey Copper hill, and a second stampede to the district occurred. About fifty claims were located most of them in mid-winter on the snow, and it was not until the summer of 1924 that any prospecting could be done.

The upper Beaver River district as referred to here lies between Beaver river and the height of land between Yukon and Mackenzie drainage basins, and west of Braine creek. The present means of entry to the district is a pack trail from Keno hill, the distances being estimated as follows: McKay hill, 45 miles; Grey Copper hill, 57 miles; Silver hill, 65 miles.

The district lies within the Ogilvie range, a spur of the Mackenzie mountains, where here forms the height of land between Yukon and Mackenzie basins. The range at this point is one of rather rugged relief, the higher peaks reaching 6,300 to 6,500 feet, and the valley floors being about 3,000 feet above sea-level. The rocks of this portion of Ogilvie range comprise both sedimentary and igneous rocks. The former, however, predominate and underlie the greater part of the district. The sedimentary rocks may for the present be divided into three major subdivisions; one of these lying entirely to the south of the main depression of Beaver river and its tributary, Police creek. Its relation to the other two was not ascertained on account of the intervening valley. It consists of quartzite, red, green and black slate, limestone and conglomerate. To the north of this main valley is a series of ferruginous slates, calcareous sandstones, argillites and limestones, followed unconformably by thick accumulation of limestone from which fossils ranging from Ordovician to Devonian in age were collected. The igneous rocks are chiefly volcanics, with associated tuffs and breccias. These are chiefly hornblende and augite andesites. Several masses of hornblende diorite were also noted.

The ore deposits with one exception, consists mainly of galena in a gangue of either quartz or calcite. Subordinate zinc blende, tetrahedrite, pyrite and chalcopyrite occur. The exception noted is a tetrahedrite-siderite-pyrite vein on Grey Copper hill.

Silver hill is situated near the head of the left fork of Carpenter creek. A group of eight claims has been staked along the ridge. The ore bodies occur in the calcareous sandstones of pre-Ordovician age. These sandstones contain considerable limestone at this point. Several bodies of greenstone occur within 1,500 feet of the deposits, the rocks containing the ore bodies lying above the upper contact of a large body of greenstone. The ore bodies consist of lenses and irregular deposits of galena following short transverse fissures in the sediments, the limestone carrying the chief deposits, which were probably formed by replacement of limestone along the fissures. The bodies vary from a foot up to twenty feet in width. The mineralization is simple. Galena forms the bulk of the deposits with a little pyrite, zinc blende, calcite and sometimes siderite and quartz. Seven ore-bodies have been located, and it is probable that others exist. Two samples taken from the best showings assayed $4\frac{1}{2}$ ounces of silver and 9 ounces of silver with lead content of 65.46 per cent and 69.38 per cent, respectively. A considerable amount of trenching has been done on the property.

Grey Copper hill is situated two miles north of the junction of Carpenter and Police creeks. Discovery was made there in the fall of 1923 of a rich freibergite float carrying 900 to 1,000 ounces of silver to the ton. This float was discovered on the King Tut claim in a small gulch near the summit of the hill. Float shows that there is a siderite vein crossing the gulch, but on account of the thick accumulation of frozen soil and talus, the prospecting trenches did not reach bedrock during the summer. Lower down in the gulch a siderite-tetrahedrite vein crosses the Grey Copper King claim. This proved upon sampling to be rather low grade yielding 52 ounces of silver to the ton.

McKay hill is situated between the Beaver river and end of Police creek. The main showing consists of a vein cutting diagonally across the southern face of the hill, and judging from the float, consisting of a series of lenses of quartz containing galena. In places the galena is disseminated through the quartz while in others the galena is massive and fairly free from gangue. At one point an open cut has exposed the vein, which here has a width of 12 feet 6 inches—this width including several stringers of barren quartz. The galena contains tetrahedrite and zinc blende. Other veins in a general way parallel to this are indicated by float. All the veins occur cutting amygdaloidal volcanics which are leached and heavily stained with iron, making the hill conspicuous for a distance of many miles. The average of eighteen samples taken from the veins of McKay hill, including both picked and average samples gives 17.92 ounces of silver and 42.04 per cent lead. Deposits similar to those of McKay hill occur on Horsehoe hill, immediately across a small gulch to the east of McKay hill and also on Sullivan hill, the ridge lying to the west of McKay hill.

Other deposits are indicated by float on the southern end of Carpenter hill, which is situated across the valley of Carpenter creek to the west of Grey Copper hill. A selected sample of this float gave 3.25 ounces of silver to the ton and 56.45 per cent lead. Further prospects have been discovered on Elliott hill to the west of Carpenter hill, but in these the chief values appear to be in the copper content. Prospectors who crossed the pass at the head of Police creek towards Wind river report galena as far as thirty miles down this valley.

KLONDIKE DISTRICT¹

In Klondike district quartz occurs very plentifully scattered through the schistose rocks which there are extensively developed. The aggregate amount of quartz is very great, although the individual bodies as a rule are small and non-persistent. The quartz is all free-milling, but is only very slightly mineral-

¹ Brock, R. W., Geol. Surv., Canada. Summary Report 1909, pp. 18-23.

Cairnes, D. D. "Quartz Mining in the Klondike," Summary Report for 1911, pp. 33-40.

McLean, T. A. "Lode Mining in Yukon," Mines Branch 1914, pp. 17-127.

ized with pyrite, magnetite, galena, chalcopyrite and native gold. These deposits have been thoroughly sampled and the average returns have been low, but occasionally very encouraging assays have been obtained.

Considerable development work has been done at many places, but there is only one property, the Lone Star, which can be considered a producing mine. On this property a small stamp mill was erected, and a certain amount of ore milled which resulted in the recovery of a few thousand dollars of gold. The results so far obtained show that the gold recovered to date would not nearly pay the cost of mining and equipment, but nevertheless show that some of the quartz contains gold in considerable quantities. It is, however, uncertain whether there is any considerable tonnage of gold-bearing quartz in the Klondike which could be profitably mined under existing conditions.

TWELVEMILE AREA¹

Chandindu or Twelvemile river is a tributary of Yukon river, joining it 17 miles below Dawson. It forks 28 miles above its mouth into two branches, the easternmost of which is known as Little Twelvemile creek. The power plant of the Yukon Gold Company lies at the forks of the Twelvemile and a road has been constructed from this point to Dawson, a distance of about 40 miles. The deposits are situated on Spotted Fawn gulch, a tributary of Little Twelvemile.

The area lies within Ogilvie range, a spur of the Mackenzie mountains, and as might be expected the geology differs widely from that of Yukon plateau. The older crystalline schists are nowhere in evidence, and the region is floored with sediments. There are chiefly red and green slates, phyllites, quartzites, limestone and black slates. These are cut by intrusions of greenstone and diorites.

The ore is exposed in a dyke of greenstone in small fissures apparently confined to the greenstone. At one locality on the Ophir claim, there are two veins, nearly parallel in strike and about four feet apart. These dip at different angles and intersect at six feet below the surface. The vein filling is coarsely-crystalline galena with pyrite and calcite and included angular fragments of greenstone. About 75 feet upstream from this point is a second vein which, however, is much more sparingly mineralized. Samples taken across the veins showed from 30 to 105 ounces of silver to the ton and from 20 to 63 per cent lead.

MACKS COPPER.—A property usually known as Macks Copper is situated a few miles southwest of Montague and is reached by a branch trail from the Whitehorse-Dawson road following the old Dalton trail up Hutshi river.

The ore occurs at or near the contact between a fine-grained, greenish porphyrite and limestone, and consists of magnetite with subordinate hematite, both more or less impregnated with copper minerals, chiefly chalcopyrite, malachite and azurite. The main mass of the ore is in the form of a small knob of almost solid iron ore 200 feet wide by 300 to 400 feet long. On the south side of the hill the ore carries considerable copper. Samples taken from the best showings on the property indicate copper content ranging from 1.80 per cent up to 5.55 per cent.

WILLIAMS AND MERRITT CREEKS.²—These creeks join the Lewes river 5 to 6 miles below Yukon crossing. The rock formations in the vicinity consist of amphibolites and granites. The amphibolites are dark green sheared eruptives, the schistose structure being prominent but the rocks are never finely laminated. The granite is a greyish to pinkish coarsely crystalline rock.

¹ W. E. Cockfield, "Silver-lead Deposits of the Twelve-mile Area."

Geological Survey, Department of Mines, Sum. Rept. 1918, Pt. B, pp. 15-17.

² Cairnes, D. D., Geological Survey, Summary Report 1909, pp. 57-60.

The ore deposits occur at or near the contacts between the granites and amphibolites, and consist of veins of quartz impregnated with copper minerals, chiefly bornite and chalcopyrite, with malachite and azurite. A considerable amount of development has been done on the veins. Average samples of the property assayed from less than 1 per cent up to 4 per cent copper with a silver and gold content of from a few cents up to \$1 a ton.

NATIVE COPPER—The placer copper of White River district has already been described. At one point, however, native copper has been found in place. This is known as Discovery Copper grant, on upper White river, 1½ miles above Canyon city. The formation consists dominantly of reddish and greenish andesitic volcanics, similar to those associated with the copper deposits of the White-Nabesna district. The copper veins occur in a reddish amygdaloid, the amygdules being filled with chlorite. Three adits have been driven and this development work has shown that the volcanics are traversed by numerous irregular fractures, which in places contain native copper. A number of slabs have weathered out or been dug up which weigh as much as several hundred pounds each, while one large slab 8 by 3½ feet by 4½ inches is estimated to weigh 3 tons.

Narrow calcite veins containing chalcocite as well as stringers of cuprite and disseminated native copper traverse the rock in places. It is evident that the native copper is a surface oxidation product of the chalcocite. Further, as occasional particles of chalcopyrite occur, this may prove with depth to be the primary mineral. Although in the aggregate the amount of copper in this vicinity appears large it is problematical if it is anywhere sufficiently concentrated to form commercial ore bodies.

WHITEHORSE MINING DISTRICT

GENERAL CHARACTERISTICS OF THE ORE DEPOSITS¹

The Whitehorse copper belt extends along the valley of Lewes river from a point east of Dugdale on the White Pass railway, northwestward to the base of Mount Haeckel, a distance of twelve miles. The width of the belt seldom exceeds a mile, and the distribution of discoveries along it is extremely irregular. The croppings are a series of limestone areas enclosed in granite or lying between granite and porphyrite. Where the limestone is absent the belt is barren. Considerable stretches of it otherwise favourable, such as that extending from Spring creek to the Pueblo claim, a distance of three and a half miles, are hopelessly buried beneath heavy accumulations of drift.

ORE-BEARING FORMATIONS

The rock formations of the district consist of limestone, porphyrites, granites and grandiorites, and basalts. Of these only the limestones and granitic intrusives are of importance economically. The principal ore bodies occur in the limestone close to or adjoining the granite. Numerous discoveries have been made in the granite, often at considerable distances from the limestone. The work done on these has not so far disclosed ore bodies of commercial size. The ore bodies are of the type known as contact metamorphic.

PRINCIPAL MINERALS

The principal economic minerals of the district are the two copper sulphides, bornite and chalcopyrite. Tetrahedrite occurs at the Arctic Chief and small bunches of chalcocite at the Best Chance and other places. Copper minerals resulting from the oxidation of sulphides are conspicuous at all the workings; but except at the Pueblo, are seldom important as ores. They include the carbonates, azurite and malachite, the red and black oxides, cuprite and malacconite, and the silicate chrysocholla. The cuprite is occasionally associated with small grains of native copper.

¹ "The Whitehorse Copper Belt", R. G. McConnell, Geological Survey, Department of Mines, No. 1050.

The iron sulphides are not abundant and nowhere form large masses. Scattered grains of pyrite occur in the granites, altered limestones and more frequently in the porphyrites, but are rarely found in connection with the ore bodies. Small quantities of pyrrhotite occur at the Arctic Chief.

The iron oxides, magnetite and hematite on the other hand are widely distributed and both occur in large masses. Magnetite is especially abundant and is seldom absent from the mineralized areas. Lenses of this mineral, ranging in size from a few inches to 360 feet in length, are found all along the belt, mostly in the altered limestones, but also occasionally in the altered granites. Hematite is less common, although occurring at a number of places and is the chief mineral in the great Pueblo lode.

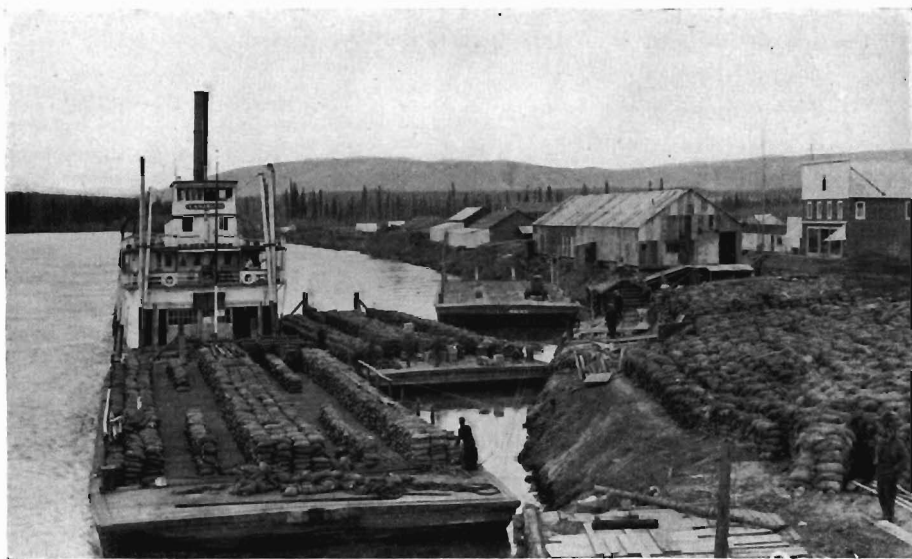
Other metallic minerals of less frequent occurrence are, arsenopyrite, stibnite, galena, sphalerite and molybdenite. Gold and silver occur in some quantity in nearly all the ores, the values ranging from traces up to several dollars a ton. Both are occasionally found native.

The principal non-metallic minerals accompanying the ores are garnet (andradite) augite, wollastonite, actinolite, epidote, calcite, clinocllore, serpentine and quartz. Of these garnet, epidote, augite, calcite and wollastonite are the most abundant.

ORE BODIES

The ore bodies fall into two classes: those in which the copper minerals are associated with magnetite and hematite, and those in which various silicates, principally garnet, augite and wollastonite are the chief gangue minerals.

The magnetite ore bodies are numerous, and occur enclosed completely in altered limestone, along the lime-granite contact, and in a few instances, in areas of altered granite. The largest bodies so far discovered are the Best Chance, 360 feet in length; the Arctic Chief, 230 feet; and the Little Chief, 100 feet. The magnetite masses are always sprinkled more or less plentifully throughout with grains and small masses of bornite and chalcopyrite. The two sulphides occur both separately and intergrown, and are of the same age as the enclosing magnetite. The copper percentage varies greatly in different parts of the same lode, the general average approximating four per cent. The gold and silver are negligible in some ore bodies and important in others. Besides the copper minerals, serpentine, calcite, clinocllore and other secondary minerals are associated with the magnetite, and rarely pyrrhotite and sphalerite.



Silver-ore awaiting shipment, Mayo

Hematite masses are much less common than magnetite, only one large body being known. This is the Pueblo mine on Porter creek. The upper explored portion has developed altogether in limestone. Granite outcrops in the vicinity but its contact with the limestone is concealed by drift. It differs from the magnetite bodies principally in the greater oxidation of the copper minerals. It is more porous and the original sulphides have been largely converted by surface waters into carbonates, oxides and silicates. Some chalcopyrite remains in portions of the lode, but no bornite has been found.

Showings characterized by an augite-garnet-wollastonite gangue are numerous wherever the lime-granite contact is exposed. They vary in size from a sprinkling of copper minerals to considerable lenses of shipping ore such as those developed on the Grafter, Copper King, War Eagle and Valerie. All the important ore bodies of this class, so far discovered, occur in the limestone close to the granite, and are often separated from the granite by a zone of more or less completely replaced limestone. The valuable minerals are similar to those in the iron masses, and consist of bornite and chalcopyrite carrying small amounts of gold and silver. At the Valerie, bornite is absent, and the chalcopyrite is associated with arsenopyrite, the only known occurrence of this mineral in the belt.

The ore bodies of this class are occasionally tabular in shape and have the appearance of following particular limestone beds; but in most cases the outlines are very irregular. The Copper King and Valerie lodes are short and blunt, while that on the Grafter is shaped like a horseshoe and partially encircles a core of unreplaced limestone. The copper minerals on the Copper King and Grafter stop rather abruptly against a marble footwall, but as a rule they have no definite limit and extend in diminishing quantities for some distance beyond the valuable portions of the lode. In some instances as on the Anaconda, the ore alternates with bands of limestone, and limestone replaced by garnet and augite.

None of the properties in the Whitehorse Copper Belt are at present in operation. Some of the more important properties of the belt are the Pueblo, War Eagle, Copper King, Grafter, Arctic Chief, Anaconda, Rabbits Foot and Valerie.

WHEATON DISTRICT¹

The ore deposits of Wheaton district may be classified as follows:—

1. Gold-silver quartz veins.
2. Antimony-silver veins.
3. Silver-lead veins.
4. Contact metamorphic deposits.

GOLD-SILVER QUARTZ VEINS.—The majority of these veins in Wheaton district are limited to a belt 16 miles long by 2 miles wide, which extends in a southeasterly direction from Watson river on the north to the southern portion of Mount Stevens. Ten miles further to the southeast and in line with the general direction of this mineral belt are a number of similar veins in the Windy Arm district. Also ores which probably belong to this class are reported to have been found north of the Watson river in line with those known to the south, so that when this portion of Yukon has become more explored it may be found that these veins exist throughout an area greatly in excess of that existing in Wheaton district.

The narrow belt above described includes Mount Stevens, Tally-Ho Mount, Wheaton mountain, Gold hill, Hodnett mountain and Mineral hill. In addi-

¹ D. D. Cairnes, Geological Survey, Memoir No. 31.

tion a few veins have been found on either side of this area. The most important of these lie on mount Anderson and others were noted on the eastern end of Red Ridge. The veins vary considerably in length and thickness. The filling consists mainly of quartz with subordinate calcite, galena is the most common metalliferous mineral, zinc blende, pyrite, chalcopyrite, native gold, sylvanite, hessite, petzite and telluric ochre also occur. The gold is generally very fine and occurs apparently both as a primary mineral and as an oxidation product of the tellurides.

ANTIMONY-SILVER VEINS.—These antimony-silver ores occur distributed throughout a westerly-trending belt 5 miles long by $1\frac{1}{2}$ miles wide, which includes all the southern portion of Carbon hill and extends west across the Wheaton river and embraces the eastern face of Chieftain hill. These ores occur in the Jurassic Coast range granitic rocks, and in the Chieftain hill andesites and volcanic breccias. Two veins are traceable on the surface for over 2,000 feet but in other cases outcrops of other veins are generally covered with superficial deposits. The thickness of the veins is from 2 inches to 6 feet about 1 to 3 feet being the average of the more valuable.

The ores consist chiefly of quartz, calcite, barite, stibnite, sphalerite, jamesonite, galena and grey copper. Stibnite constitutes the greater part of the vein fillings in some parts of the veins, and in such cases is generally associated with minor amounts of sphalerite and jamesonite. The gangue is predominantly quartz; barite and calcite occur only in subordinate amounts. The veins that are richest in silver consist of quartz impregnated with more or less galena and grey copper. In fact, the ores high in silver are low in antimony, and vice versa. Samples of the better class of ores containing galena and grey copper often carry 100 to 200 ounces of silver. The better grades of the stibnite ores contain 50 to 65 per cent of antimony.

SILVER-LEAD VEINS.—The silver-lead veins have been found chiefly in a northerly-trending belt about 3,000 feet long and 1,000 feet wide, situated on the eastern face of Idaho hill. A few veins are found to the south and one is reported on Folle mountain.

The veins occur in an arkose. At least 12 veins have been discovered which may be traced for from 10 to 200 feet along their strike, and surface stripping may show that some extend farther. The vein materials consist of quartz, calcite, galena, arsenopyrite, zinc blende, pyrite and chalcopyrite. The ores contain usually only a few cents in gold to the ton; silver and lead are the economically valuable constituents. Assays of the better grade of galena ores yielded approximately 50 ounces of silver to the ton and 40 per cent lead. The deposits were formed by replacement of the country rock. The mineral-bearing solutions appear to have travelled chiefly along the bedding planes of the clastic rock.

CONTACT METAMORPHIC DEPOSITS.—Ore deposits of this class are known in Wheaton district at only one place, which is situated east of Becker creek on a small ridge facing Wheaton river. The ores occur in pre-Devonian hornblende-gneisses, near their contact with Jurassic granodiorites. The deposits follow the banding of the gneisses. The largest deposit is about 30 feet wide, but its length is unknown. The ore is actually exposed for 10 feet only, but the occurrence of float indicates that it may extend for several hundred feet. Near this deposit two bands 4 to 6 feet wide were noted.

The material constituting the mineral deposits consist of magnetite, specularite, chalcopyrite, pyrite, quartz, calcite, epidote, actinolite and a yellow garnet, apparently grossularite. The central portion of the deposit consists of iron and copper minerals and contains about 1 per cent copper.

WINDY ARM DISTRICT¹

Windy Arm district lies south of Caribou (Carcross P.O.) between lake Bennett and Windy Arm. Caribou, a point on the railway 68 miles from Skagway, serves as a distributing centre for the district, and wagon roads have been constructed from it to the Big Thing and Venus mines.

Very little mining has been done on Windy Arm since 1912. For a number of years previous to that mining was carried on, in most cases none too economically, and the ore shipped by rail and water to smelters on the Pacific coast for treatment. The cost of operating in this way prohibits the development of the ore bodies on an extensive scale, as only limited amounts of the ore are rich enough to cover these expenses. To operate at all economically a modern concentrating plant at or near the properties is essential.

The ore bodies of the Windy Arm district are fissure veins, that is, they are fault fissures in which mineral has been deposited. The veins are chiefly quartz mineralized with pyrite, arsenopyrite and galena, with chalcopyrite, stibnite, pyrargyrite (ruby silver) argentite, tetrahedrite, freibergite, native silver, jamesonite, chalcocite, and yukonite.² In most cases the principal values are in silver and gold. The more important properties include the Big Thing, Montana, M and M, Venus and Dail and Fleming groups.

Big Thing.—This property is located about 6 miles due south of Caribou. A considerable amount of development work has been done, much of which is now of little value. The ore body is a fissure vein cutting granitic rocks of Jurassic age. It varies from 2 to 12 feet in thickness, and is mineralized chiefly with quartz and pyrite but contains also arsenopyrite with a little galena, chalcopyrite and stibnite.

To the east of a shaft sunk on it, the vein is highly faulted and great difficulty has been experienced in following it there. To the west of the shaft, the vein, where exposed in the various levels, is quite regular. On the 400 level to the west of the shaft the vein is 2½ to 8 feet in thickness, and is well mineralized, quite as much so as in the upper levels. It is estimated that in 1916, 75,000 tons of ore were practically in sight, excluding the faulted zone to the east of the shaft, and that the total probable ore might easily be several times this amount as the vein had every appearance of persisting to important distances both vertically and horizontally to the west. Since that time practically no ore has been extracted. The value of the ore in sight is hard to estimate. A careful checking of the available samples, however, resulted in the estimate that it would average \$15 per ton.

MONTANA.—The Montana is located about three miles southeast of the Big Thing, high above timber line, and about 2½ miles from the shore of Windy Arm.

The vein occurs in a fissure crossing greenish volcanic rocks, dominantly andesites and basalts, of Jurassic age. The vein ranges in thickness from 2 to 5 feet and is composed mainly of quartz with which are associated galena, pyrite, arsenopyrite, pyrargyrite, argentite, tetrahedrite, native silver and lead carbonate. The principal values are in silver, but the pyrite portions also contain gold. In places, particularly adjoining the walls, the vein matter is highly impregnated with silver minerals and assays \$80 to \$90 per ton. The rest of the vein is of much lower grade and would require concentration before shipment.

The development work includes a drift along the vein for 700 feet, an incline shaft following the vein for part of its depth but departing from it where the vein changes its dip. A cross cut has been run from the bottom of the

¹ Cairnes, D. D., Geological Survey. Summary Report 1916, pp. 35-44.

Cairnes, D. D., portions of Conrad and Whitehorse districts., Geol. Survey, 1908.

McLean, T. A. "Lode Mining in Yukon," Mines Branch, Dept. of Mines, 1914, pp. 188-201.

McConnell, R. G. Geological Survey, Summary Report, 1905, pp. 26-32.

² A hydrated arsenate of calcium and iron. R. A. A. Johnston, Geological Survey, Canada. Mem. 74, 1915, p. 240.

incline to the vein. Also on the adjoining Mountain Hero claim a cross cut adit 300 feet long was driven to intersect the vein in depth, but no important vein was encountered. The property is connected with Windy Arm by a double cable aerial tramway, which however would require relocation if the property were to be worked.

M AND M.—The M and M vein outcrops on the left bank of Poolsy canyon near the top of the hill and has been traced for 400 feet. The vein is a fissure in andesite and is in most places from 6 to 12 inches in thickness. It is composed mainly of quartz with which occur pyrrargyrite, stephanite, freibergite, tetrahedrite and copper carbonates. This deposit is especially rich in the high grade silver minerals and part of the ore could be handsorted to carry \$100 to \$200 per ton, but parts of the vein do not carry over \$20 per ton or even less.

VENUS GROUPS.—The Venus vein occurs in a compound fissure traversing andesites of Jurassic age, striking north 10 degrees east and having a dip into the hill ranging from nearly flat to 60 degrees. The vein itself has been produced largely by direct deposition in open crevices as indicated by the pronounced banding and comb structure, but is also partly the result of replacement of wall rock. The vein is defined by two main fault planes from a few inches to 9 feet apart. The actual ore material ranges from several inches up to 7 feet in thickness, but is usually, where exposed underground, about 3 feet thick. The vein consists of quartz mineralized with pyrite, galena and arsenopyrite with some jamesonite, yukonite, chalcopyrite and copper glance, as well as the oxidation products, lead and copper carbonates. The values in the vein are mainly in silver but important amounts of gold occur chiefly associated with the arsenopyrite. Samples have been obtained in which the values ran over \$200 per ton, but on the average the ore in the higher grade shoots averages from \$30 to \$50, while much of the vein is low grade, running under \$20 per ton.

The property is equipped with a concentrating mill, which however was run only a very short time as the losses in the sluices were very high, in some cases the values in the tailings being 50 per cent of the values in the heads.

DAIL AND FLEMING GROUP.—A number of claims located south of the Venus are locally known as the Dail and Fleming group. The bulk of the development work has been done on one claim, the Venus Extension, which joins the Venus No. 2 on the south. This development includes an inclined shaft of 120 feet with drifts, and an adit and drift of a total length of 205 feet.

Three principal veins have been found on these claims; these are known as the Venus, Humber and Red Deer veins. The Venus vein is the same as the one developed on the Venus property and has been traced from the Venus No. 2 across the Venus Extension, but has not yet been found on the adjoining property, the Nipper No. 2. The vein possesses the same main characteristics as on the Venus No. 2 but is more intensely oxidized. In the drift no sulphides appear for 30 feet, after which some galena, pyrite and arsenopyrite occur. In the shaft these minerals occur together with yukonite, cerrussite, orpiment and realgar. The total values in gold, silver and lead range from \$5 to over \$100 a ton, but the average for this vein on the Venus Extension is rather low.

The Humber vein also occurs in a fissure traversing andesitic rocks. The thickness, where it has been explored, is from 10 to 24 inches, and the vein is mineralized with argentite, pyrrargyrite, stephanite, galena, pyrite and native silver in a gangue of quartz. The Red Deer vein also fills a fissure from a few inches up to 3 feet in thickness and consists of quartz, pyrite, and galena, carrying high grade silver minerals. Very little is known of this vein as it has been so slightly developed.

COAL

The coal-bearing formations of Yukon are all of either Tertiary or Jurassic-Cretaceous age. The mineral fuels in the Tertiary beds throughout the territory are lignites characterized in most places by containing considerable fossil resin

or amber while those of Jura-Cretaceous age range from high grade lignites to anthracites.

Tertiary coal-bearing beds do not cover very extensive areas in Yukon, but have a somewhat wide distribution. All these lignite-bearing Tertiary beds appear to belong to the Kenai series which is generally referred to the upper Eocene.

The Jura-Cretaceous coal-bearing beds appear to be remnants of more extensive areas which were originally all connected but have been reduced by erosion to their present proportions. In these beds two distinct coal-bearing horizons have been recognized.



Hydraulic mining

The beds found to be coal-bearing in Yukon occur in at least nineteen distinct areas. In fourteen of these coal of economic importance has been found and in the other areas may yet be found when these have been prospected.

The following table gives the extent of these rocks:—

	Sq. miles
Extent of known Tertiary beds in Yukon.....	2, 140
Extent of known Jura-Cretaceous beds.....	4, 110
Total.....	6, 250
Probable extent of Tertiary beds in Yukon.....	4, 500
Probable extent of Jura-Cretaceous beds in Yukon.....	19, 700
	24, 200

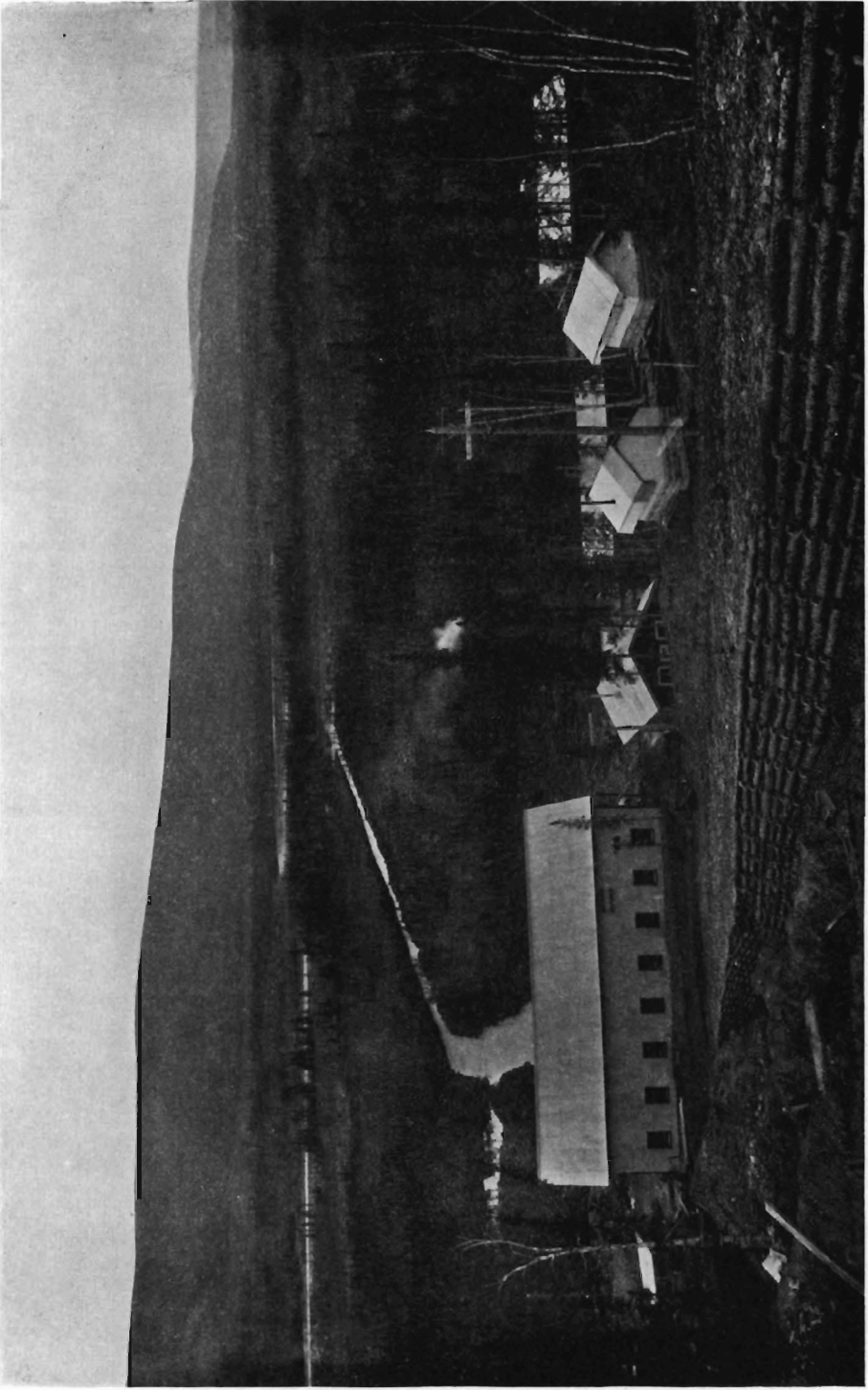
At only five points in Yukon has coal actually been mined; on Cliff creek (tributary of Yukon river), on Coal creek (tributary of Rock creek), on Coal creek (tributary of Yukon river) at Five Fingers mine, and at Tantalus mine. The first three of these are situated in the Rock creek Tertiary basin and the

last two are situated within the Tantalus Jura-Cretaceous basin. At two or three other points the coal measures have been somewhat prospected. The following table gives proximate analyses of a number of typical coals from different parts of the territory:—

Locality	Age	Water	Volatile Combustible	Fixed Carbon	Ash
Cliff creek.....	Tertiary....	8.57	42.04	45.77	3.62
	"	10.58	40.10	46.74	2.58
Sour Dough mine.....	"	17.10	34.50	38.40	10.00
	"	14.57	33.11	37.15	15.17
Coal creek (Rock creek).....	"	18.31	34.96	40.88	5.85
	"	19.37	33.85	37.45	9.33
Duke River area—Kluane district.....	"	11.20	40.90	42.50	5.40
	"	9.80	43.90	44.70	1.60
Five Fingers Mine, Tantalus Butte.....	J.-C.....	5.95	40.46	45.16	8.43
	"	13.64	31.83	51.84	2.69
	"	12.87	31.72	49.51	5.90
Braeburn Kynocks area.....	"	8.98	29.62	48.30	13.10
	"	12.02	34.28	42.56	11.14
Whitehorse area.....	"	2.15	6.01	69.86	21.98
	"	3.76	8.34	62.50	25.40

The following table gives the probable amount of coal in Yukon in seams of 1 foot or more in thickness.

Field	Age	Tons (long)
Whitehorse area.....	Jura-Cretaceous....	40,000,000
Tantalus area.....	"	150,000,000
Braeburn Kynocks area.....	"	50,000,000
Selkirk area	"	10,000,000
Pelly River area		
Arctic area	Tertiary.....	3,000,000,000
Rock Creek area.....		
Sheep Creek area } Kluane district.....	"	40,000,000
Jarvis river area	"	250,000,000
Duke river area—Kluane district.....		
Bonnet Plume area.....	"	1,500,000,000
Indian River area.....	.....	.....
Old Crow basin.....	.....	150,000,000
Frances and Laird basins.....	.....	.....
Total.....	.....	5,190,000,000



The New Northwest Corporation Hydro-Electric Plant, North Fork of the Klondike River—26 miles above Dawson

CHAPTER VI

Water-Powers¹

THE water-powers of the Yukon Territory are inseparably linked with the mining development, since mining provides the only considerable market for power, and water-power the only feasible source of energy for large-scale mining enterprises.

These water-powers are administered by the Dominion Water Power and Reclamation Service, Department of the Interior, Ottawa, working in co-operation with the Gold Commissioner.

This service has made reconnaissance surveys of the possible sources of power in the Whitehorse and Mayo districts, but as yet no general examination of the water-power possibilities has been undertaken.

All the territory with the exception of the Peel river in the northeast, the Alsek river in the southwest and the Upper Liard on the southeast, lies within the Yukon River watershed, information regarding the run-off of which is contained in the report of the United States Geological Survey on the flow of the Yukon river at Eagle, Alaska, near the western boundary of the territory.

The climate and topography of the territory apparently indicate the existence of a large amount of power during the open season with a much diminished supply during the winter months.

The annual average temperature is slightly below freezing point and the ground with the exception of a few inches on the surface in the summer is frozen to bedrock.

The precipitation, which is evenly distributed, amounts to only about twelve inches per annum, two-thirds of which appears as run-off, due apparently to the frozen condition of the ground preventing penetration and to the moderate temperatures and stunted vegetation restricting loss by evaporation and transpiration; consequently the surface is quickly saturated and the surplus water rapidly makes its way over the steep gradients to the numerous water courses.

Although there are many large lakes on some of the tributaries to the Yukon river they are not extensive enough to provide sufficient natural storage to maintain a high rate of flow in the rivers, as a whole, during the winter. For this reason it appears that while the water-power resources of the territory generally are ample for all open season requirements, a very marked and progressive curtailment must be looked for with the coming of winter.

It is difficult to hazard an estimate as to the value of the power resources as a whole since the costs of development provide a problem individual to each site in accordance with its physical characteristics and the costs of bringing the necessary materials and equipment thereto, and the value of the power when produced depends almost entirely upon the economics of the mining field which it is to serve. That water-power can solve the question of power for mining satisfactorily has already been demonstrated in two notable cases and the reconnaissances above referred to indicate that in all probability it will be of material benefit in the Whitehorse and Mayo districts when these fields develop sufficiently to require a large block of power. In general, from such information as is available, it seems reasonable to suppose that there are sufficient water-power possibilities in the Yukon to satisfy all probable requirements.

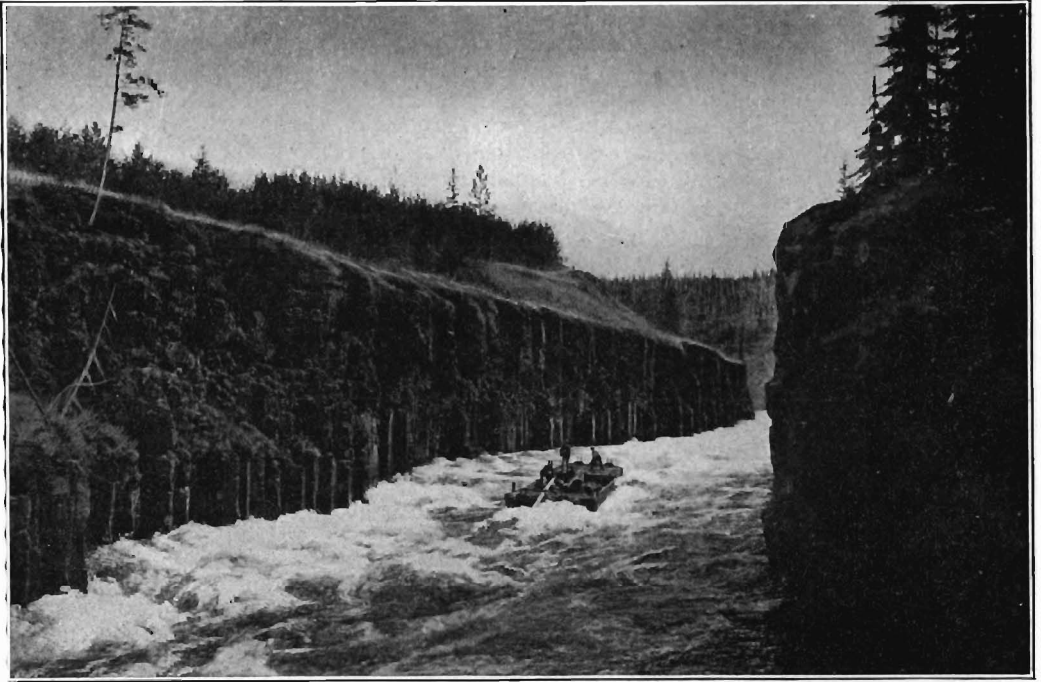
Having dealt with the question of water-power resources in general, a brief outline of the developed and known undeveloped sites may be of interest.

¹ This chapter prepared by Water Power and Reclamation Service, Department of the Interior.

DEVELOPED POWER

YUKON GOLD COMPANY.—This company has a power development on the Little Twelve-Mile river. Water is drawn from this stream and carried five miles through a flume and thence by a pipe-line to the power plant where it operates three impulse water-wheels under a head of 650 feet. Each wheel is connected to a 650-kw. generator. The power produced is transmitted 36 miles at 35,000 volts and through 18 miles of extensions and secondaries to the gold-dredges of the company. This plant is operated only during the open season.

THE NEW NORTHWEST CORPORATION.—The company owns and operates a hydro-electric plant on the North fork of the Klondike river, about 26 miles above Dawson. The water is conveyed from the point of diversion by means



Miles Canyon at Whitehorse

of a ditch, 6 miles long, 18 feet wide at the bottom and 28 feet at the top, with a minimum depth of 5 feet, and water is delivered on the hillside facing the main valley of the Klondike to two lines of pipe 1,676 feet in length with an effective head of 228 feet.

For operating in cold weather the ditch is filled bank full and allowed to freeze over. Electric heaters are installed at the intake and at the pressure box at the head of the pipe lines. This pipe line has been covered with a roof, leaving an air space. These precautions have enabled the plant to operate the entire year and through temperatures extending to 70 degrees below zero, and in one instance through a week with an average temperature of 60 degrees below zero.

The installation consists of two 5,000 horse-power turbines direct connected to two 3,000 k.v.a. alternators, 2,000 volts, 3-phase, 60-cycle, 514 r.p.m. There are two 85 Kw. exciters, one direct connected to a 36-inch Pelton wheel, and the other exciter direct connected to a 110 horse-power induction motor. There are two banks of transformers, each consisting of three 1,250 kw. transformers which step up the voltage to 33,000 volts.

There are two transmission lines. The Dawson line, which runs to Dawson 22 miles from the power house and supplies power to the pumping plant at the mouth of Hunker creek, to machine shops and dredges of Burrall & Baird, Limited, and to the Dawson Light and Power Company and the Dawson City Water and Power Company, which furnish the city of Dawson with power, light and water services (including fire protection service), all of which are electrically operated. The second or Dominion line, 35 miles long, runs to Granville by way of Dominion creek, and furnishes power to operate the dredges of the Dominion Mining Company and the Big Creek Mining Company.



Fraser Falls on the Stewart River

UNDEVELOPED POWER SITES

WHITEHORSE DISTRICT

LEWIS RIVER.—At Whitehorse are Miles Canyon and the Whitehorse rapids with a fall of 30 feet and 22 feet, respectively. While it would be possible to combine these drops the reconnaissance indicated that such procedure would prove expensive and that all the power likely to be required in the initial development could be more cheaply secured by a development of the fall in the canyon only, where, by raising the head water 20 feet by means of a dam, 50 feet head could be secured. The best method of developing this site can only be determined by a complete survey and examination of the physical conditions. Two alternatives have been suggested: first, the erection of a 20-foot dam above the canyon and the diversion of the water through a tunnel 3,500 feet long and a steel penstock to a power house situated on the right bank below the canyon; and, second, by the erection of a high dam below the canyon with spillways and powerhouse as an integral portion thereof. The selection between these alternatives would have to be arrived at by determining the relative costs and deciding whether the higher dam at the foot of the canyon would entail a greater expenditure than required by the lower dam above and the tunnel combined. Also the important question of providing navigation facilities would require a satisfactory solution, particularly since this dam would take over the control of the water level of Marsh lake at present regulated by the timber crib dam of the British Yukon Navigation Company near the outlet of the lake, except during low water stages when the navigation dam would restrict the outflow from Marsh lake. No estimate has been made

of the power available under ordinary low water conditions but it is estimated that with the storage to be created on Marsh lake by the power dam and by storage dams on Atlin, Tagish and Bennett lakes, a continuous twenty-four hour supply of 1,800 horse-power could be secured.

MAYO DISTRICT

In 1920 an engineer of the Dominion Water Power and Reclamation Service made a reconnaissance of several sites located in the Mayo mining district with a view to estimating their suitability as sources of power for the development of the silver-lead properties in the vicinity. The sites examined were Fraser falls on the Stewart river; the Mayo river canyon and Janet creek; and the notes that follow are based upon this examination, which it should be remembered was merely of a reconnaissance nature.

FRASER FALLS, STEWART RIVER.—This site is about 200 miles from the mouth of the river and 40 miles above Mayo. The natural fall here is 22 feet but it is suggested that by erecting a dam 60 feet high at the rapids above the falls and constructing a canal and pipe-line to a bay below the falls a head of 80 feet could be secured, making 7,000 horse-power available under ordinary minimum flow and 22,000 horse-power continuously available for six months of the year. These figures are based on some measurements of flow made during the reconnaissance and from the general characteristics of the Yukon run-off already referred to. While a more comprehensive study based upon actual flow measurements and gauge readings would be required to confirm these power estimates and careful surveys and designs to determine the costs of development, it nevertheless appears probable that Fraser falls could supply a valuable amount of power to the Mayo district.

MAYO RIVER CANYON.—This site is situated 2 miles from a point on a good wagon road, 5 miles from Mayo. The total fall between Mayo lake and the mouth of the river is about 300 feet, of which 110 feet occurs in the 3½ miles of canyon, and it is estimated that 250-foot head could be concentrated in one site, although it might be cheaper to develop this head at two sites. Under ordinary minimum flow 2,400 horse-power would be available and 7,200 horse-power continuously for six months of the year. With storage developed upon Mayo lake 30 miles above the canyon it is estimated that an all year continuous supply of 14,000 horse-power could be secured. These figures are subject to the same limitations as those noted for Fraser falls.

JANET CREEK.—In the rapids and falls on Janet creek between Janet lake and Stewart river there is a drop of 255 feet and by constructing 2 miles of ditch or pipe-line through difficult country 220 feet of this head could be developed, giving with ordinary minimum flow 240 horse-power and 720 horse-power continuously for half the year. Janet lake, 9 square miles in area, might be used as a storage reservoir in conjunction with this development and would, it is estimated, render 1,400 horse-power continuously available. Here again the reservations already noted in regard to the two previous sites must be borne in mind.

OTHER POSSIBILITIES

In addition to these sites power may be available at three sites on the Pelly river mentioned in the reports of the Geological Survey of Canada, namely in the rapids below Hoole river, in the Hoole canyon and in Granite canyon. The first two mentioned sites are a considerable distance up the river.

The sites mentioned in this chapter are among the larger opportunities for power development. It is probable that many smaller rivers and creeks are capable of supplying valuable quantities of power for mining work, at least during the open season.

CHAPTER VII

Agriculture

THOUGH the agricultural resources of the Yukon are of great 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 upon this industry.

In the Yukon, the principal industry is mining and under present conditions the agricultural development can only keep pace with the mining development, as the requirements of the local market determine absolutely the amount of farm produce that may be profitably disposed of, the transportation costs making shipment to other markets prohibitive. Practically all the vegetables now consumed in the territory are home grown and the quality is unsurpassed.

In 1917 the Dominion Department of Agriculture established an experimental sub-station at Swede creek, which joins the left bank of the Yukon river six miles above Dawson. Preliminary to actual experiments the first three years were devoted principally to soil improvements and a variety of tests of grains, grasses and vegetables. On account of early frost the ploughing under of green crops does not materially improve the condition of the soil until the second year. The plot tests, during these years yielded as high as 60 bushels of wheat; 134½ bushels of oats; 66½ bushels of barley and 21½ bushels of peas, per acre. Wheat has been grown at this location for ten successive years and when selected seeds were used the earliest varieties matured well. Varied tests are now being carried on under a three-year rotation, namely: first year hoed crop, second year grain seeded to clover and third year hay with the aftermath ploughed under. Of the four varieties of wheat tested under this condition, Ruby yielded 54 bushels and Prelude 41½ bushels per acre, the quality being excellent. The other two varieties, Marquis and Huron, were a failure, local seed having been used. Barley yielded as high as 42½ bushels per acre and oats as high as 100.

In forage crops small fields were sown with the following: (1) a mixture of alsike red clover and timothy; (2) sweet clover; (3) a mixture of clover; (4) with oats, peas and red clover; (5) with rye and buckwheat; (6) corn and sunflower.

With the exception of buckwheat, the growth of all these was excellent, but in the spring of 1923 it was found that the winter killing had been very severe. A small crop of timothy was cut, but the clover had been entirely destroyed. In 1923 these areas were resown for further test, in the hope that winter hardiness might gradually develop.

The following is the sunshine report kept at the sub-station:—

Year	March	April	May	June	July	August
1919.....	204.6	206.0	229.1	204.4	236.4	223.0
1920.....	151.0	249.3	288.8	291.8	324.7	197.9
1921.....	135.8	241.0	202.5	278.2	253.6	218.5
1922.....	198.4	189.0	277.3	260.8	167.8	188.6
1923.....	158.4	203.6	286.1	281.1	287.2	250.4

In 1924, at a farm a few miles from Dawson, wheat seeded April 27 was harvested July 26, thus being matured in eighty-seven days. The hay crops grown throughout the territory consist of timothy, western rye and Brome grass, also oats cut green. The Brome grass has proved to be the most dependable and

a relatively large quantity of it is grown. This hay sells in the local market from \$80 to \$100 per ton, pressed. Perhaps the most extensive farming operations in the territory are conducted on what is known as Pelly farm, located on the Pelly river near its mouth. Grain and hay is grown here in quite a large way and considerable stock kept. The farm is equipped with up-to-date farming implements of every kind.

The Indian River valley is well suited for hay growing; one large hay ranch annually cuts from 100 to 150 tons of Brome grass. This particular farm has up-to-date farm implements such as side delivery hay rakes, loaders, and hay slings for unloading and during the summer of 1923 the entire crop was harvested without any rainfall.



Potato field near Dawson

What is probably a world's record for potatoes was grown in Dawson in 1923 when from 9 pounds of seed a yield of 1,135 pounds was obtained. The weight of a single tuber was $3\frac{1}{2}$ pounds measuring $24\frac{1}{2}$ inches round the large way and 17 inches round the small way, at the rate of about 42 tons per acre. The seed was selected from a lot obtained at the sub-station.

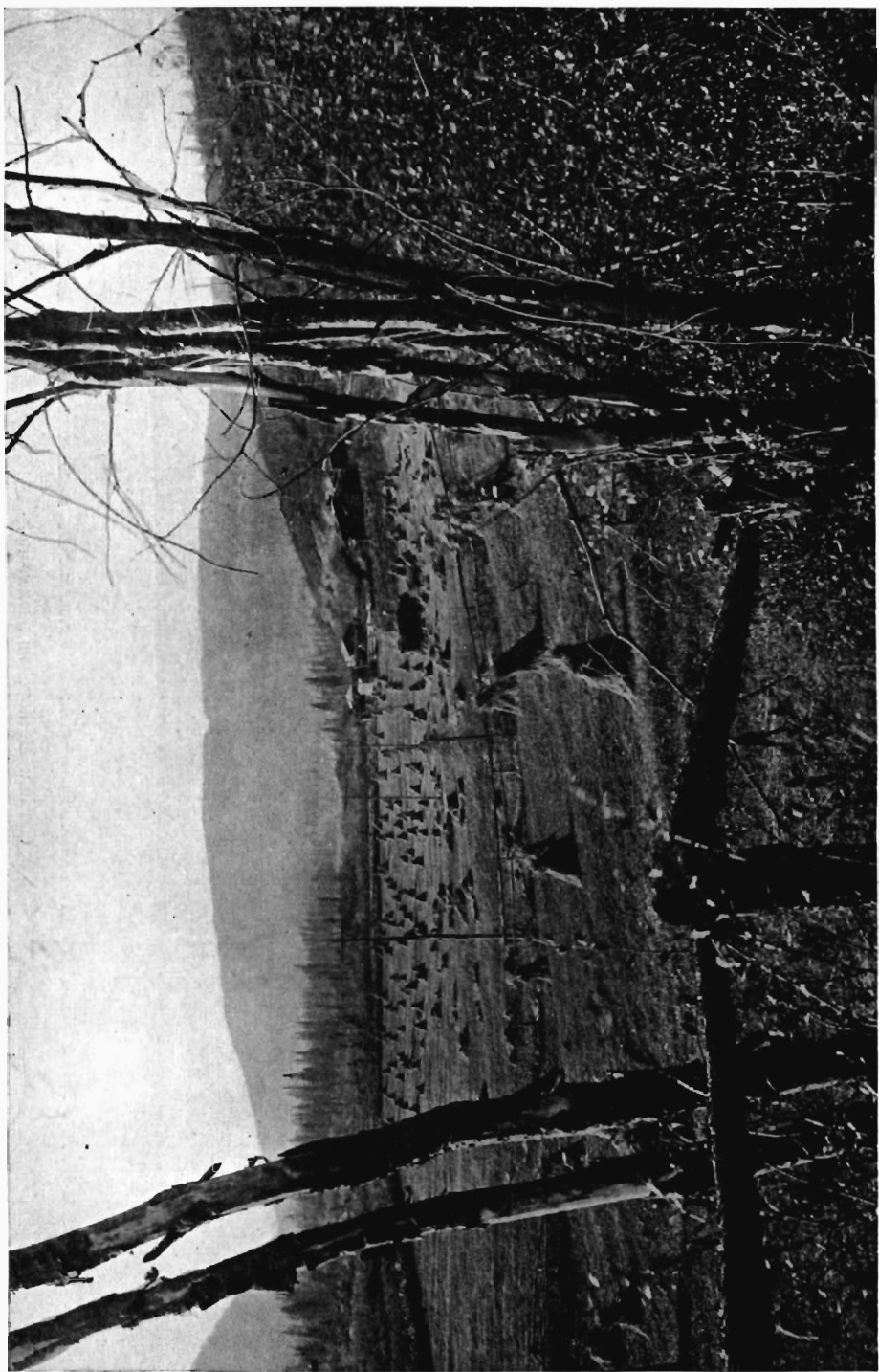
Tomatoes grown at Dawson are of excellent quality. Tomatoes and cucumbers as well as citron can only be grown successfully under glass.

Garden peas are a sure crop; garden beans bear well in favourable seasons.

Rhubarb is a sure crop and the quality of the very best. Radishes, lettuce and green onions do well.

Carrots, beets, turnips, parsnips, cauliflower, cabbage and celery for growth and excellent flavour cannot be surpassed. This produce is marketed in Dawson and vicinity, the price averaging \$5 per 100 pounds.

Quite a large number of pigs and chickens are being raised in the territory. A number of farmers are raising cattle for beef, and a few venturing into sheep.



Crain on Hunker creek.



Caribou Herd passing Dawson

CHAPTER VIII

Game, Fur and Fish

THE Yukon is the paradise of the big game hunter and no place on the North American Continent to-day offers greater inducements, not only for the different varieties of big game obtainable, but more particularly, for the large dimensions of the trophies secured, the killing of which, is to every sport-loving hunter the apex of achievement.

The most widely known hunting grounds occupy an immense stretch of territory, extending from Kluane lake to the upper White River district. Big game is plentiful, sheep, moose, goat, caribou and bear being particularly numerous. Other favourite hunting districts in the territory include Teslin lake, Big Salmon, McMillan, Ross and Stewart rivers.

The sheep are the White Alaskan variety (*Ovis Dalli*); these feed during the winter months in the main valleys, but with the approach of summer, they work farther and farther back into the higher mountains, and choose especially the lofty rugged, cragged summits, and are frequently found in the vicinity of glaciers. They rarely return to the valleys during the summer except in crossing from one mountain to another.

The moose are the large giant moose (*Alces gigas*); these magnificent animals range the lowlands in considerable numbers and are particularly plentiful in the flats bordering White river.

The following are the certified measurements of the head of a particularly fine specimen of moose killed on the Hootalinqua river in the summer of 1922, which, so far as is known, is a record for the Yukon: Palm length, 47 $\frac{3}{4}$ inches; palm width, 21 inches; spread, 71 $\frac{1}{2}$ inches; points, 40 inches; and weight, 72 pounds.

The caribou are of two varieties, the Barren Lands caribou and the giant or Osborne caribou (*Rangifer Osborni*). The giant caribou is frequently seen either one or two at a time or in small herds of twenty or thirty. Between Porcupine river and the Arctic ocean there are also vast herds of Barren Lands caribou which trek to the south of the Porcupine after the "Freeze-up" in the autumn.

Black, brown and grizzly bears are plentiful throughout the territory, the grizzly being the most difficult to secure by the big game hunter owing to its habitat being mostly confined to districts that are not easily accessible.

Kluane lake is approximately 151 miles from Whitehorse, and can be reached in comfort by automobile, the territorial Government having completed a road to Silver (Kluane) in the summer of 1923. Burwash is 37 miles from Silver by launch and it is there the guides await the big game hunter with pack trains in readiness and with all the equipment necessary for a big game expedition. Hunting parties are taken by these expert guides from Burwash Landing to the Donjek river, gateway to the hunting fields. From here on to the head of the White river, the big game hunter is in a wondrous country, abounding in game, while on every side the scenery is majestic. It is a vast region of glaciers with all their mystic phenomena, of moraines and of lofty mountains. (Mount Logan, in the southwest corner of the Yukon Territory, the first ascent of which was made in 1925, is the second highest peak in North America, height 19,850 feet.)

The hunting belt generally traversed by hunters and accessible for pack trains, includes the Donjek river, Wolverine creek, Tepee lake, Harris creek, St. Clair river, Lake creek, Koidern river, Genero river, Big and Little Boundary creeks, and the head of the White river.

Under the provisions of the Yukon Game Ordinance every non-resident must have a license to hunt. Section 10, subsection(1) provides:—

“No person not a resident of and domiciled in the territory shall be entitled to hunt, trap, take, shoot at, wound or kill any moose, caribou, deer, mountain sheep or mountain goat, or any furbearing animal, whether protected by the Ordinance or not, without first obtaining a license in that behalf. The license fee is \$100.”

NUMBER OF ANIMALS THAT MAY BE KILLED BY LICENSEES

Such license shall entitle the holder thereof to kill during the open season one moose, two caribou, two deer, one mountain sheep, one mountain goat, and no more. Provided, that each such license holder may, under his license, during the open season which is from August 1 to March 1, in addition to the number of animals above specified, kill one moose, two caribou, two deer, one mountain sheep and one mountain goat, but for each such additional animal so killed a fee of \$25 shall be paid.

A holder of any such license shall be entitled to take with him or to ship out of the territory, as trophies, the head, hide and hoofs of any big game lawfully killed by him.

It is provided that every such license holder shall before leaving the territory be required to make and subscribe before a game guardian a statement under oath that he has not violated any of the provisions of the Ordinance, giving such particulars in relation thereto as may be required by the game guardian. And upon such statement being made the game guardian shall give to such license holder a certificate that such game has been lawfully killed or taken and that such license holder is entitled to export the same from the Territory subject to any customs regulations existing in regard thereto.

Every such license holder shall be entitled to receive from the Territorial Secretary or the Territorial Agent at Whitehorse, a certificate enumerating the game killed by him under the authority of this license, in such form and manner as may be prescribed by the Territorial Secretary. Such certificate shall set forth, a description of the game killed, together with the measurements of the trophy produced therefrom, the number of the license, the locality where such game was killed, and the name of the Chief Guide accompanying the licensee. The Territorial Secretary and the Territorial Agent at Whitehorse shall keep a record book of all certificates issued and such record book shall contain an official record of all game killed and exported as trophies by licensed non-resident hunters.

Whitehorse is the centre for the big game hunting business in the Yukon and final arrangements with guides and hunters are generally completed there. Information respecting guides, etc. may be secured from the Territorial Agent at Whitehorse.

The prices charged by guides for a big game hunting expedition with horses and complete packing outfit, vary, but the following tariff may be accepted as a basis for computing the cost of a hunting trip.

Party of two hunters for sixty-day hunting trip, from date of leaving Whitehorse until return there, \$4,600. Everything furnished except personal effects, licenses and auto transportation to Kluane or return. Outfit to include 16 horses (10 pack, 6 saddle), 2 guides, 1 cook, 1 horse wrangler.

Party of three hunters for sixty-day hunting trip, from date of leaving Whitehorse until return there, \$6,000. Everything furnished except personal effects, licenses and auto transportation to Kluane or return. Outfit to include 22 horses, 3 guides, 1 cook, 1 horse wrangler.

Party of four hunters for sixty-day trip, from date of leaving Whitehorse until return there, \$8,000. Everything furnished except personal effects, licenses and auto transportation to Kluane or return. Outfit to include 28 horses, 4 guides, 1 cook, 1 horse wrangler.

Spring Bear Hunt—

Party of two hunters for forty day trip. \$ 2,000
Party of four hunters for forty day trip. 4,000

Complete pack outfit with horses. Hunting all the way from Whitehorse to White River.

In arranging hunting expeditions, guides require intending hunters to deposit \$500 per hunter with the Canadian Bank of Commerce in Whitehorse. It is desirable that arrangements for guides be made not later than February of the year in which the hunt is to take place.



Fox Farm at Carcross

FUR

The Yukon has a great resource in her fur-bearing animals. The quality of the fur is unsurpassed and commands the highest price in the world's markets. Through intensive trapping the number of some of the most valuable fur bearers have been greatly reduced. This matter is now, however, receiving the careful consideration of the game authorities and proper steps are being taken for the conservation of such of the fur-bearing animals as appear to require it. The close season of five years on beaver which ended January 1, 1924, has resulted in a marked increase in these valuable fur bearers. After protracted negotiations concerted action has now been taken by the Governments of Yukon, Alaska and northern British Columbia, for the protection of marten and a close season declared.

Fur farming, or the raising of fur-bearing animals in captivity, especially foxes, is assuming very considerable proportions.

The wild fox (*Vulpes Alacensis*) of the Yukon has long been recognized as a superior type, is larger than the eastern fox and has a coat of lustrous beauty. These foxes are the foundation stock of the Yukon breeder and because of their quality there is a growing demand for them for breeding stock by fox farmers

in other parts of the world. It is worthy of note that at the Spring sales of Lampson & Co., London, in 1922-23 the pelts of silver foxes from Whitehorse fox farms brought the top price in competition with thousands of other pelts sold at the same time. The raw fur shipped from the territory for the past three years is as follows:—

	Year ending July 31, 1925	Year ending July 31, 1924	Year ending July 31, 1923
Weasel.....	1,248	1,689	2,508
Muskrat.....	20,929	34,904	36,960
Lynx.....	3,757	2,526	1,433
Wolverine.....	213	207	277
Bear.....	199	330	225
Otter.....	82	78	81
Marten.....	147	1,170	964
Mink.....	2,578	2,578	1,754
Red fox.....	2,488	1,749	1,136
White fox.....	783	1,080	78
Cross fox.....	544	528	360
Silver fox.....	156	111	162
Wolf.....	181	168	154
Coyote.....	519	371	112
Beaver.....	2,792	2,531	.....

FISH

Practically every stream in the territory is well supplied with fish, chiefly grayling (*Thymallus signifer*) and in the lakes in most districts is an abundance of lake trout (*Salvelinus Namaycush*) and whitefish (*Coregonus Nelsoni*). At Tagish and Carcross, a species of fresh water herring abound in great schools, which are easily taken with the net. At Tagish, an old abandoned Royal North West Mounted Police Post, trolling for lake trout has become a favourite pastime for big game hunters before leaving the Yukon. Lake trout weighing as high as thirty pounds have been taken with rod and troll at Tagish and the adjoining lakes. Tagish is easy of access for the ardent angler, being only two hours distant from Carcross by launch.

The larger rivers are generally well supplied with fish, a variety of grayling, whitefish, king salmon, pike and inconnu.

CHAPTER IX

Transportation

THE Yukon river is navigable from Behring sea to Whitehorse, a distance of over 2,000 miles, and, during the season, from about the 10th of June until the 5th of October, this river and its tributaries is the great channel of transportation from the coast to the interior of the Yukon and Alaska. The railway of the White Pass and Yukon route extends from tidewater at Skagway, Alaska, where connection is made with ocean-going vessels, to Whitehorse, Yukon Territory, 110 miles distant and the head of steamboat navigation on the Yukon river. This railroad crosses the coast range of mountains and at 19.7 miles from Skagway attains an altitude on the White Pass summit of 2,887 feet. At this point the railroad crosses the boundary between Alaska and British Columbia. The scenery between Skagway and White Pass is of the most wild and rugged description. From White pass summit to lake Bennett, British Columbia, the railway passes through the foothills of the coast range and then follows the shore of lake Bennett where it enters the Yukon Territory and reaches Carcross which has an altitude of 2,171 feet and is 66.7 miles from Skagway.

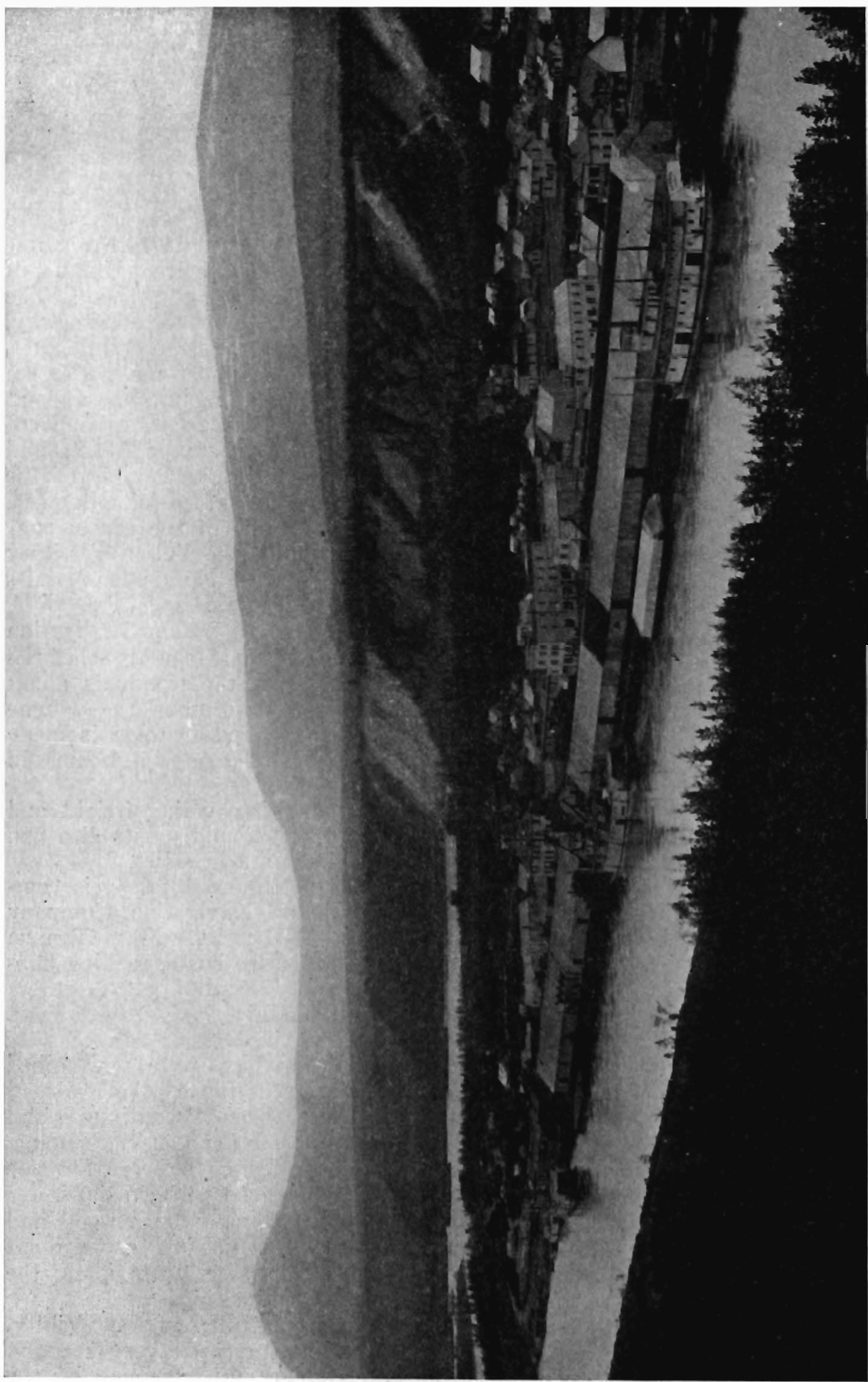
The splendidly equipped fleet of steamers of the British Yukon Navigation Company of the White Pass and Yukon system ply on regular schedules between Whitehorse and Dawson, giving a service from the terminals about each alternate day but depending to a considerable extent upon the volume of traffic to be handled. The trip between Whitehorse and Dawson is made in two days (down-stream) and from Dawson to Whitehorse (up-stream) in four days.

During the period of open navigation through tariffs covering freight and passenger business between British Columbia and Puget Sound points also San Francisco, California, to points in the Yukon Territory are in effect.

The stretch of the Yukon river from Dawson north, 1,601 miles, is commonly called the Lower river. The American Yukon Navigation Company operate one steamer between Dawson and Tanana—700 miles. From Tanana to Holycross—543 miles—the Alaska Railroad operates two boats, making trips about once per week. From Holycross to St. Michael—358 miles—the Northern Commercial Company operate a motor boat service making trips once per week. Prior to 1922 freight and passengers destined to the interior of Alaska were handled via St. Michael and via Dawson and regular services were maintained out of Dawson and St. Michael. Since the completion of the Alaska railroad from Seward to the Tanana river these services have been discontinued and freight and passengers for the interior of Alaska are largely handled via Nenana. The American Yukon Navigation Company have one steamer between Dawson and Nenana, providing a service of approximately once every fifteen days.

The steamers of the British Yukon Navigation Company burn wood and consume approximately 8,000 cords during a season. This fuel costs about \$55,000, practically all of which amount is disbursed to residents along the different rivers supplying the wood for the steamers' consumption.

Since the opening of the silver lead mines at Keno Hill and the vicinity, the transportation business on the Stewart river has increased very rapidly. Supplies and mining equipment going in and ore coming out, together with the increased passenger traffic, justify the British Yukon Navigation Company in



Whitehorse, where rail and water transportation meet

operating three steamers regularly between the mouth of the river and Mayo. These steamers make close connection with the steamers operating between Whitehorse and Dawson on the main river. The Taylor Drury Company, a large mercantile and fur trading company, with posts at different points throughout the territory, make a number of trips with their steamer between Whitehorse and Mayo. The same steamer is also operated intermittently on the Pelly and Hootalinqua rivers.

FREIGHT

The through freight traffic is rated in a joint classification which has been adopted by the steamship lines operating into Skagway, and the White Pass and Yukon route operating from Skagway to the interior. The terms "A. B. C."



Scene on White Pass and Yukon Route

designate the rating of goods under the tariff rates, the application of these lettered terms being somewhat similar to a reversed rating 4th, 2nd and 1st classes of the Canadian official classification. While necessarily a large amount of freight is rated under "class rates," the bulk of tonnage is handled under "commodity tariff rates," which is limited in application to the period of most favourable navigation. It often happens that a considerable amount of freight accumulates at Whitehorse before navigation opens; also that after navigation opens a low stage of water exists which permits of handling but small cargoes until the latter part of June. There is generally a low stage of water also near the close of navigation. During these periods there is no wish to stimulate the movement of heavy freight traffic, which would necessitate storing in warehouses until conditions permitted its movement, and to avoid congestion at the close of navigation, and the necessity of storing goods at Whitehorse over winter, the period of application of commodity rates is restricted.

EXPRESS

The interior of the Yukon Territory and Alaska is served by the American Railway Express Company. This company has taken over the business formerly handled by the Wells-Fargo Express Company, and is providing a reliable express service in connection with the British Yukon Navigation Company, and serves all stations reached by the steamers of that company.



Boat going through Five Finger Rapids, Yukon river

ROADS AND OVERLAND TRANSPORTATION

The conditions governing land transportation in the Yukon are in many respects different from those existing in other parts of Canada. The population is chiefly engaged in mining and at widely divergent points. Roads and trails are indispensable to mining and frequently extend through uninhabited territory to serve some remote mining centre.

Road construction costs are very high on account of the cost of labour, supplies and equipment and because in the main the ground is frozen at all times of the year to within a very few inches of the surface. As a consequence the moss and other vegetation which acts as an insulator must be stripped from the surface to give the ground an opportunity to thaw. Except on occasional gravel benches from three to four years is necessary after the ground is first broken before the road bed is thawed to a sufficient depth to permit of permanent drainage and surfacing.

Good roads have, however, been constructed to all the permanent mining areas connecting them with some one of the three main distributing centres, Dawson, Whitehorse and Mayo.

From Dawson good roads radiate to Hollenbeck's on the Klondike river; to Granville on Dominion creek, to Quartz creek and to Miller creek. From

Whitehorse there are good wagon roads to Kluane and to Yukon Crossing; various shorter roads serve the mining areas within twenty miles of Whitehorse. One of the best roads in the territory extends from Mayo to Wernecke, the centre of the silver lead mining industry.

During the period of river navigation land communication is not maintained between the three centres, Dawson, Whitehorse and Mayo. When navigation is closed communication between Dawson and Whitehorse is by what is known as the Overland trail. Prior to 1902 this winter trail was on the ice of the Yukon but in that year the Government built a winter road between these two centres. In 1912 extensive changes were made in the location of the road from the Pelly to Dawson, principally for the purpose of serving the then important mining centres on tributaries of the lower Stewart river. In 1924 the location of the road from Minto to Dawson was again changed, this time



Winter freighting

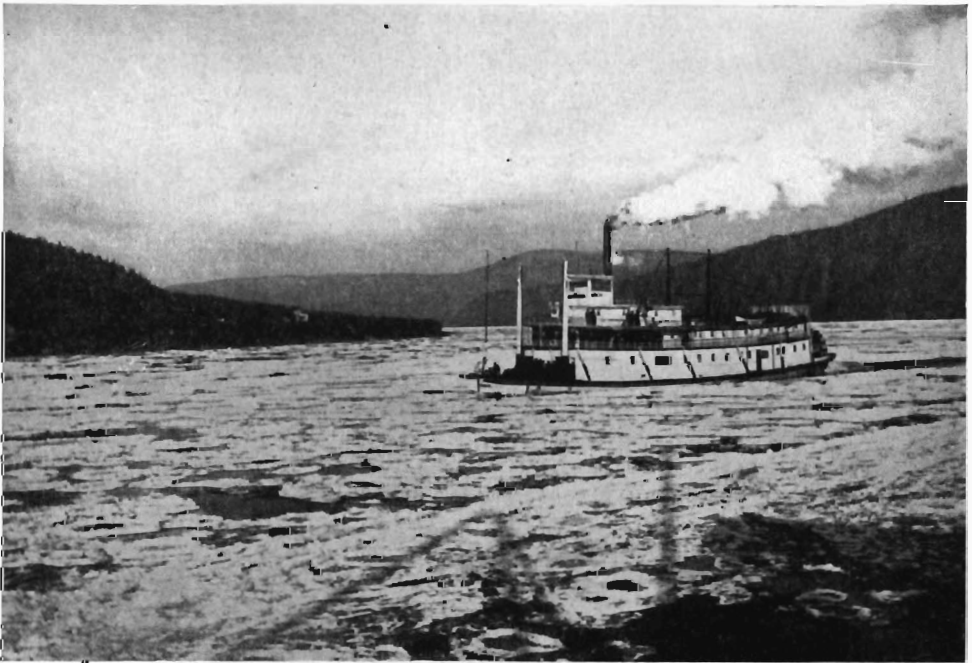
for the purpose of giving better and more direct communication between Dawson and Mayo and Whitehorse and Mayo, a centre of rapidly growing importance. This new road crosses the Pelly 35 miles from its mouth and at Crooked creek comes within 33 miles of Mayo to which centre a connecting road has been built. From Crooked Creek Junction the road follows the left limit of the Stewart river for 21 miles where it crosses the river, then follows the right limit to Clear creek and then across country down Flat creek and the Klondike river to Dawson.

During the period of closed navigation and for the primary purpose of carrying the mails, stages are operated on a weekly schedule between Whitehorse and Dawson, with a connecting service from Mayo to Crooked Creek. Trucks and caterpillars are used in this service between Whitehorse and Yukon Crossing and stages, drawn by four horses, for the rest of the distance. A trip over this trail during February or March, when the trail is at its best, is a delightful experience. Every comfort is provided on the stages and at the various road houses en route.

Dog teams are still used by the Indians and by prospectors, hunters and trappers, in sections of the territory remote from the larger centres. Caterpillars are gradually supplanting horses for heavy freighting and have entirely done so in hauling ore from Wernecke and Keno to Mayo.



Silver-ore shipments, Mayo



Steamer leaving Dawson on last trip of season

CHAPTER X

Communication

WHEN the extent and richness of the placer gold deposits in Yukon were fully established, the Government decided to furnish the people of that territory with communication to and from the outside world. To this end the Government system of telegraphs in British Columbia was extended in the year 1899 from Ashcroft through the northern section of that province via Telegraph Creek and Atlin to Whitehorse in the Yukon Territory, thence along the Yukon river through Dawson and on to the international boundary where the line was connected with the American telegraph line to Eagle, Alaska. Where the line runs through northern British Columbia and southern Yukon, the country, in the main, is uninhabited, and especially during the winter season when the snowfall is heavy and the temperature is low the maintenance of the line is both difficult and hazardous. The service, however, has been of inestimable value to the Territory, and has assisted greatly in its development.

Because of the heavy expense entailed in maintaining and operating the line, and also the necessity for establishing communication with Mayo, the Government decided to install a radio telegraph system to supplement and, at least in part, supplant the land line. While considering the problem it was decided that the system should be so planned that it would provide communication, not only for the Yukon, but for the Mackenzie district of the Northwest Territories as well. This necessitated the use of a relay system which would provide more communication by touching a greater number of points, and minimize the capital cost of equipment per station. The system was inaugurated by the North West Territories and Yukon Branch of the Department of the Interior, while the Royal Canadian Corps of Signals, Department of National Defence, was responsible for its installation and operation.

The system was laid out with a central or control station at Fort Simpson, Northwest Territories, at the junction of the Liard and Mackenzie rivers, with the southern terminal at Edmonton, Alberta, where reliable telegraph and cable connections with the rest of the world was assured. The equipment was designed for steps of approximately 600 miles each.

A standard type of building, mast gear and equipment was designed, the main essentials being reliability, lightness and ease of assembly and erection. The same type of building is used at all stations, the equipment occupying the first floor, with accommodation for personnel on the second floor. The source of power and light is a small electrical unit gasoline driven with a station storage battery for emergency use. The radio telegraph set was of the valve type, capable of delivering half a kilowatt of energy into the antenna system.

In order to provide an outlet for business at the new mining centre in the Keno district the first two stations installed were at Dawson and Mayo, Yukon Territory, in 1923. These stations have been successfully operated, giving valuable service to mining and commercial companies. The Dawson station also works with the American Government Radio Stations in Alaska. Traffic may also be cleared from Dawson over the Government telegraph line to Ashcroft, British Columbia.

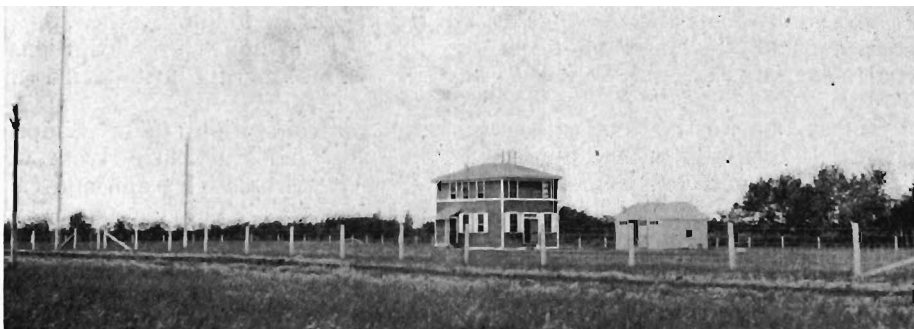
During the summer of 1924 stations were established at Edmonton and Fort Simpson, and on December 5 of that year the system was officially opened by the Minister of the Interior and the Minister of National Defence. The Hudson's Bay Company auxiliary schooner *Lady Kindersley*, carrying equipment and supplies for the Herschel station, was unfortunately lost off Point Barrow, Alaska, in July, 1924. New equipment was sent in during the summer of 1925 and a station was erected at Aklavik, N.W.T. The whole system is working satisfactorily and supplying a long-felt want in the Canadian hinterland.

The list of stations now completed and in working order is as follows: Edmonton, Alberta; Dawson, Y.T.; Mayo, Y.T.; Fort Smith, N.W.T.; Fort Simpson, N.W.T.; Aklavik, N.W.T.

During 1926 the erection of a temporary station at Herschel is contemplated. It is intended to operate it during the period of open navigation only.

TELEPHONE COMMUNICATION

The Yukon Telephone Syndicate operate a telephone system in the city of Dawson and from Dawson to the various mining centres in the outlying districts. Burrall & Baird, Limited, have a telephone line from their power station on the north fork of the Klondike river to Bear Creek, a distance of 20 miles, and there connection is made with the Yukon Telephone Syndicate's line. The Yukon Gold Company have a telephone line from their power station on Twelvemile creek to Dawson, a distance of approximately 50 miles. The Mayo Utilities Company operate a telephone line between Mayo, Keno and Wernecke and intermediate points, a distance of 40 miles.



Standard Radio Station

CHAPTER XI

General Information

CLIMATE

THE climate of the Yukon Territory is characterized by extremes in temperature and a very moderate precipitation. There is no more delightful climate than prevails from May 1 to October 1. The continuous light for the whole twenty-four hours, during the period from the middle of May to the first week in August, although anticipated, is a source of delight and wonder to the visitor. While the winters are long and cold, on account of the absence of high winds and the dryness of the atmosphere the low temperatures are borne with less discomfort than in other parts of the north not so favoured.

The climate is healthful at all seasons of the year as is well evidenced by the robust type of children seen in all parts of the territory. The extreme range of temperature is from 125 to 153 degrees or an average of about 142 degrees. The maximum recorded at the Dawson Meteorological Station is 92 degrees above and the minimum 68 degrees below zero. The average precipitation is 12.8 inches per year, the greatest precipitation of record being 17.9 and the least 9.3 inches. The accumulated measurements of each snowfall averages about 60 inches a year. The depth of snow remaining on the ground would be equal to the sum of the previous falls if no causes of diminution existed, but as the depth is reduced by compression and by waste attendant on evaporation and melting,



Anemone Patens (Crocus Plant)

particularly in the fall and spring months, the actual depth remaining at any time is usually about 30 inches.

There are a large number of optical atmospheric phenomena which, more than many places, arrest the attention of observers on account of their magnificence and beauty, such as the Aurora Borealis presenting itself in varied and magnificent forms, solar and lunar halos, parhelia and paraselenæ displaying brilliant and wonderful prismatic colours, solar and lunar coronæ, rainbows and colorations of the sky.

The Yukon is a land of flowers. Hundreds of types of flowers, plants and shrubs grow wild on every hill and valley. Nature responds generously where flowers are cultivated and one of the lasting impressions left with the visitor is the variety and beauty of the flowers which decorate the homes and beautify the grounds of Dawson.

CHAPTER XII

Aborigines

INDIANS

THE Indians who were the original inhabitants of the Yukon were of a different type from those found on the prairies of Canada. Those in the northern end of the territory are part of the "Takudln" tribe. Those in the centre part are "Stick" Indians and those in the south are part of the "Tlingit" tribe. There are also two fair sized bands who migrated from Mackenzie valley and who are of the "Athabaska" stock.

Although not definitely known it is believed that most of the Yukon Indians are of Siberian or Japanese stock. Many of them greatly resemble the Japanese in figure and feature, and there is a tradition among them that their ancestors came over the big water in war canoes. Three different languages or dialects are spoken. The Indians of the north are not able to converse with those of the south.

Before the advent of the white man the Indians were very ingenious in providing themselves with the things they needed in their daily life. They lived entirely on the game, fish and berries of the country and their clothing was made from dressed caribou and moose hides.

These Indians are nomadic in their habits and very few of them live regularly in cabins or houses. They formerly lived in Tee-pees built of the skins of moose or caribou, hair side out, but in modern times they use the ordinary canvas tent.

There are many legends among the Indians, kept alive by the old women of the tribes. These legends, at one time fully believed by the Indians, are now viewed in much the same light as the whites view fairy tales. One of the legends is in connection with a heavy land slide which it is obvious occurred at some time on the hillside, back of St. Mary's hospital at Oawson. According to this legend an Indian Chief who lived under the shadow of the mountain had a beautiful daughter who was sought in marriage by the son of a neighbouring chief. As a result of negotiations between the two chiefs the beautiful daughter was promised in marriage if the son proved himself a good hunter and trapper, which he did. On the day set for the bridal feast the Indians with the chief and his daughter asked permission of their visitors to retire up the mountain side for a final parting ceremony. When safely out of the way the "medicine man" of the tribe started his fetish working and caused the slide to occur, which buried all visitors including the bridegroom, and thus the beautiful daughter was saved from being taken away from her own people.

The education of the Indians has not been neglected. As early as 1858 missionaries visited them journeying from place to place and reduced their language to writing; later on mission stations were opened and regular day schools conducted in connection with these.

The Yukon Indians are not treaty Indians but the Department of Indian Affairs makes grants of money and school material to assist in their education. A per capita grant is also made to a residential school conducted by the Anglican Church at Carcross. At this school boys and girls selected from the various tribes are given an elementary education; the boys are taught carpentry,

blacksmithing, etc., and the girls to do general domestic work. Provision is made for medical attention to the Indians and for hospital care when necessary. The Department of Indian Affairs is represented in the Territory by an agent who looks after the general welfare of the Indians.

ESKIMOS

Living on the Arctic coast of the Yukon Territory are nomadic tribes of Eskimos. Their numbers vary at different seasons of the year, at times being as high as 500. They make their head quarters at Herschel Island, which has the only harbour on the Yukon coast line and the only safe harbour on the Arctic coast for hundreds of miles east or west of that point.

These Eskimos make their living entirely by hunting and fishing. When whaling ships are at Herschel Island they supply caribou and mountain sheep and other game to the ships.

In 1892 Right Reverend I. O. Stringer, D.D., the present Bishop of Yukon, visited the Arctic coast and began the first missionary work among the Eskimos. He found them degraded, dishonest and treacherous, crimes of various kinds including murder and infanticide being common among them. Although slow in giving up their old habits, they have now accepted Christianity and there is a wonderful improvement in their habits and mode of life.

When the missionaries began work among them they had no written language. Now practically every Eskimo above ten years of age can read and write in his own language and many of them in the English language as well.

They are entirely self supporting and self reliant, and many of them have acquired considerable property, chiefly in gasolene fishing schooners and equipment.

CHAPTER XIII

Churches and Hospitals

THE earliest white settlers in the Yukon Territory did not suffer through lack of spiritual comfort, thanks to the untiring religious zeal and disregard of self that characterized the missionaries of the various denominations who shared with them the vicissitudes of life in that north country.

The work of the Anglican church in the Yukon commenced in 1861 when the Reverend W. W. Kirby, stationed at Fort Simpson, visited Fort Yukon. The following year the Reverend Robert McDonald, from the Red River Settlement (Winnipeg), arrived and took charge of the field. This missionary played an important part in the discovery of gold in the territory. In the course of his travels in 1864, he found gold and it was mainly through information furnished by him in the "eighties" of the last century to McQuesten and others that miners were induced to prospect the Fortymile river, which prior to the Klondike discovery in 1896, was the largest mining camp in the north.

Originally the church work in the Yukon was connected with that of the Mackenzie river and Athabaska, but in 1891 the diocese of Selkirk was formed, with the Right Reverend W. C. Bompas, D.D., as its first Bishop. In 1907, the diocese was changed from Selkirk to Yukon, the boundaries of which are the same as the Yukon Territory. Kirby, McDonald, Bompas, Canham, Sim, Ellington, Bowen, Wallis, Hawksley and Stringer were pioneers of Anglicanism in the Yukon and their names will always be remembered in this connection. At present the church ministers to Indians and Eskimos at twelve different centres from Carcross to Herschel island, while a number of other places are regularly visited.

The first Roman Catholic missionaries in the Yukon were Bishop Clut, O.M.I., and Father Seguin, O.M.I., who were stationed in Mackenzie from 1850, and crossed the Rocky mountains to Porcupine, stopping at Fort Yukon, where they spent the year 1871 evangelizing the Indians and ministering to the whites in that vicinity. In the spring of the following year, after weeks of arduous work in ascending the Yukon river, they established themselves and for two years carried on their work on the site of what twenty-five years later was to be the most famous mining town of the continent. The real founder of the Roman Catholic church in Dawson, however, was Father Judge, who arrived in May, 1897. In a short time after his arrival St. Mary's church and St. Mary's hospital were erected. By his work for the sick Father Judge endeared himself to all classes in the community without regard to their religious faith and worn out by his strenuous labours for others he died in January, 1899, a victim of his heroism.

Other priests in the annals of the Roman Catholic church in the Yukon were Father Lefebvre, who arrived at Dawson June 10, 1898; Father Gendreau, O.M.I., and Father Desmarais, O.M.I., who arrived in July, 1898. It was under the administration of Father Gendreau that the Roman Catholic church reached the height of its activity. Father Lefebvre established a place of worship on Dominion creek in 1899, and at the same time Father Desmarais erected at

Bonanza creek a large tent, later replaced by St. Joseph's church. In the spring of 1900 Father Lefebvre went to Selkirk and erected St. John the Baptist church, and in 1902 built the Sacred Heart church in Whitehorse. During this period, places of worship were erected at Last Chance, Gold Bottom, Sulphur, Granville, and Quartz. In 1899, Father Gendreau financed the erection of the first school at Dawson with the Sisters of St. Ann as teachers. In June, 1912, Father Bunoz, O.M.I., D.D., the present head of the Roman Catholic church in the Yukon, arrived and in October, 1917, was elevated to the dignity of Bishop of Dawson and Prince Rupert. Altogether, seventeen missionaries have ministered to the needs of the Roman Catholics in the Yukon. Reverend Father Rivet, now Rector of St. Mary's church, Dawson, has such faith in the future of the Yukon and Dawson, that he is spending a relatively large amount on repairs to the church and rectory.

The founder of the Presbyterian church in Dawson was the Reverend S. Hall Young, D.D., who arrived in the fall of 1897. He was succeeded by the Reverend Andrew S. Grant, who arrived in 1898. The same season a log church, now known as St. Andrew's church hall, was built with a commodious room in the rear to serve as a manse. For a year the Reverend D. J. Wright ministered to the congregation, then in the summer of 1900 when Mr. Wright left, the Reverend A. S. Grant accepted a call to St. Andrew's church and continued to minister there until the summer of 1908. Under his leadership, a fine church was erected in 1901, capable of seating six hundred people, with a splendid pipe organ and the same year a comfortable ten-room manse was built. Thus Dawson attained the most commodious and comfortable Presbyterian church to be found in any frontier town in Canada.

Four other Presbyterian churches were built at different centres in the creeks tributary to Dawson and the brothers John and George Pringle did splendid work for a number of years in Dawson and vicinity. Dr. A. G. Sinclair succeeded Mr. Grant for a brief period, and then Reverend Arthur Ross for eight years carried on the work. Subsequently Reverend J. Y. McGookin ministered for two years and he was followed by the present pastor, the Reverend George H. Findlay.

The Methodist church at Dawson was organized in the autumn of 1898 by the Reverend James Turner, who was well qualified for his task. On arriving at Dawson he gathered together the members of his faith and began to erect a place of worship, a tent in the meantime being utilized as a chapel. Within a short time the new church, a log structure, was completed; at this time the parsonage consisted of a small room curtained off in the front part of the church. Here the pastor and his assistant, Reverend A. E. Hetherington, who had come in by way of St. Michael, lived for a time. In due course, a suitable parsonage was erected and an addition built to the church. The Reverend Mr. Turner was succeeded by the Reverends Hetherington, Seymour, Baraclough and Hibbard. In 1913 the Methodists amalgamated with the Presbyterians and the Methodist church was closed.

In 1898, the year of the stampede to the Yukon gold fields, Commissioner Eva Booth, daughter of the founder of the Salvation Army, who was in charge of the Canadian branch, recognized an opportunity to do something for the men who were flocking to the Yukon and sent six male and two female officers to Dawson. On their arrival they at once erected the necessary buildings in which to carry on their work, holding open air services in the evening, and preaching to the hundreds of miners who made up the congregation. In a short time, the small contingent had in operation a wood yard, a free labour bureau, and a barracks in which to conduct services. The two women who had had experience as nurses were untiring in their services to the sick. The Army kept on hand a supply of clothing which was given free of cost to all needy



1. St. Paul's Cathedral, Dawson

2. St. Mary's Church, Dawson

3. St. Andrew's Church, Dawson

persons irrespective of nationality or creed. The Salvation Army withdrew from the Yukon in 1911.

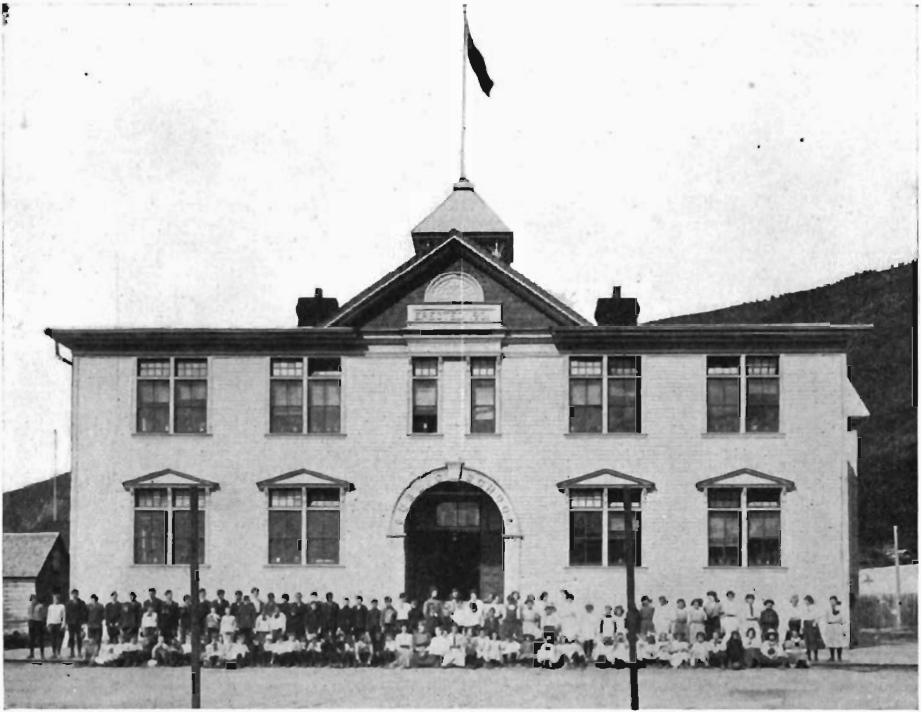
The Christian Science Society of Dawson was organized on October 1, 1912. A small building was rented and used for church services temporarily, but later a plot of five lots with an adequate building was purchased and remodelled. The society calls a member of the Board of Lectureship of the Mother church each year for the purpose of giving a lecture, and carries out the activities of Christian Science in the manner consistent with the practices of the larger churches through the more thickly populated districts of Canada. At Whitehorse, Mayo and Keno City, students meet and read the Bible lessons, although these centres are not as yet organized.



1. St. Mary's Hospital, Dawson

2. General Hospital, Whitehorse

3. General Hospital, Mayo



Public School, Dawson



Public School, Whitehorse

CHAPTER XIV

Education

EDUCATION in the Yukon Territory began with the early missionaries who established mission schools for the Indian children. For many years the efforts of the missionaries satisfied the needs of the territory, the only white inhabitants being a few fur traders and miners. For a few years after the gold discovery in 1896 schools were not necessary for although the population had increased greatly there were very few children.

In 1902 a superintendent of schools was appointed and a general system of education was inaugurated throughout the territory. A large well lighted and well equipped school building was erected in Dawson. Shortly afterwards a suitable school was opened at Whitehorse.

After some early changes, the public school system was modelled on the curriculum used in Alberta and Saskatchewan, from which provinces the majority of the public school teachers were secured. Since 1905 the high school course in the territory follows the Ontario curriculum and by special arrangement with the University of Toronto and the Department of Education of the province of Ontario, pupils at the completion of their course may present themselves for the Ontario matriculation examinations, held at Dawson and Whitehorse annually. Both the public and high schools of the territory are maintained at a high standard of efficiency.

There are at present seven schools in the territory: the Dawson public and high school, St. Mary's Roman Catholic school, the Whitehorse public and high school, the Mayo public school, and the Carcross, Carmacks and Keno assisted schools.

The Dawson school building consists of six class-rooms and a science laboratory, with an extra class-room not at present used for school purposes. The public school staff consists of three teachers, all with first-class certificates or their equivalent. The high school staff consists of three university graduates, each in charge of one of the following departments: Science and Mathematics; French and Latin; History and Literature.

In Whitehorse the school consists of three class-rooms. The course of studies leads up to matriculation. The public school is in charge of two fully qualified teachers and the high school is in the hands of the principal, a university graduate.

In Mayo, a public school of one room has so far met the requirements. Since 1923, partly through Government aid, a number of high school pupils have been organized into a high school class. As the Mayo district continues

to grow in importance as a silver camp, there is no doubt that further educational facilities will be provided, including a high school course at some central location.

Assisted schools may be established by the Commissioner where there are at least seven children of school age able to attend. The Church of England maintains a hostel in Dawson where children coming from a distance may obtain board at a nominal charge while attending the Dawson public school.

An automobile stage service maintained by the Territorial Government conveys the children residing within ten miles of Dawson, to the schools at that centre.



Robert Service cabin, corner Eighth avenue and Church street, Dawson

CHAPTER XV

Appendices

FEDERAL AND TERRITORIAL OFFICIALS

FEDERAL OFFICIALS

Percy Reid, Gold Commissioner and Registrar of Lands.
G. A. Jeckell, Comptroller, Inspector of Taxation and Acting Agent Department of Public Works.
H. W. Betts, Collector of Customs and Excise at Port of Dawson.
Samuel Coulter, Collector of Customs and Excise at Port of Whitehorse.
Reverend John Hawksley, Indian Superintendent.
P. M. Kelly, Mining Recorder, Dawson, Y.T.
F. G. Berton, Mining Recorder, Dawson, Y.T.
R. L. Gillespie, Mining Recorder, Mayo, Y.T.
Inspector W. M. Bruce, Mining Recorder, Whitehorse, Y.T.
R. L. Allen, Timber Inspector, Dawson, Y.T.
Lieut. H. E. Taber, Officer in Charge Government Radio Stations.
Alexander McCarter, Postmaster, Dawson, Y.T.
J. K. Johnston, Postmaster, Mayo, Y.T.
George Wilson, Postmaster, Whitehorse, Y.T.

ROYAL CANADIAN MOUNTED POLICE

Superintendent Alphonse Beddy Allard, Commanding R.C.M. Police, Yukon District.
Inspector W. M. Bruce, Whitehorse, Y.T.
Inspector Frederick Humby, Dawson, Y.T.

YUKON JUDICIAL DISTRICT

(Territorial Court)

Hon. C. D. Macaulay, Judge of the Territorial Court, Dawson, Y.T.
H. G. Blankman, Registrar and Reporter Territorial Court and Librarian Yukon Law Library, Dawson, Y.T.
_____, Sheriff, Yukon Territory, Dawson, Y.T.
C. E. McLeod, Crown Prosecutor, Dawson, Y.T.

COURT OF ADMIRALTY

Hon. C. D. Macaulay, Judge, Dawson, Y.T.
H. G. Blankman, Registrar, Dawson, Y.T.

MAGISTRATES

Alphonse Beddy Allard, Dawson, Y.T.
Inspector Frederick Humby, Dawson, Y.T.
Inspector W. M. Bruce, Whitehorse, Y.T.
W. J. D. Dempster, Mayo, Y.T.

YUKON COUNCIL

(Elected August, 1925—three-year term)

W. L. Phelps, K.C., Whitehorse District, Whitehorse, Y.T.
Charles Bossuyt, Dawson District, Dawson, Y.T.
Andrew Taddie, Klondike District, Mayo, Y.T.

TERRITORIAL OFFICIALS

G. A. Jeckell, Territorial Secretary and Treasurer.
J. H. McNeill, Superintendent of Works and Buildings.
S. R. Tompkins, M.A., Superintendent of Schools.
William Sime, Territorial Assayer, Keno City, Y.T.
W. E. Thompson, M.D., Medical Health Officer, Dawson, Y.T.
N. E. Culbertson, M.D., Medical Health Officer, Whitehorse, Y.T.
C. C. Ross, M.D., Medical Health Officer, Mayo, Y.T.
C. E. McLeod, Legal Adviser and Public Administrator, Dawson, Y.T.

MEMBER OF PARLIAMENT

(Elected September, 1926)

Capt. George Black.

SYNOPSIS OF MINING LAWS

Any person eighteen years of age or over has the right to enter, locate, prospect and mine upon any lands in the Yukon Territory, whether vested in the Crown or otherwise, for the minerals defined in the Quartz Mining Act and the Yukon Placer Mining Act, with certain reservations set out in the said Regulations and Act.

No person shall enter for mining purposes or shall mine upon lands owned or lawfully occupied by another until adequate security has been furnished to the satisfaction of the Mining Recorder for any loss or damage which may be thereby caused.

Where claims are being located which are situated more than one hundred miles from the Mining Recorder's office, the locators, not less than five in number, are authorized to meet and appoint one of their number an emergency recorder, who shall as soon as possible deliver the applications and fees received to the Mining Recorder for the district.

If two or more persons own a claim each such person shall contribute proportionately to his interest to the work required to be done thereon, and when proven to the Gold Commissioner that he has not done so his interest may be vested in the other co-owners.

The survey of a claim made by a duly qualified Dominion land surveyor shall be accepted as defining absolutely the boundaries of the claim surveyed, provided the survey is approved by the proper authority and remains unprotected during the period of advertisement.

A person about to undertake a bona fide prospecting trip may secure from the Mining Recorder written permission to record at his own risk a claim within six months.

A legal post must stand four feet above the ground, squared or faced for the upper eighteen inches and measuring four inches across the faced portion. The post must be firmly fixed in the ground.

Priority of location shall be deemed to convey priority of right. Certain disputes may be heard and determined by a board of arbitrators.

PLACER MINING

Creek means any natural watercourse having an average width of less than one hundred and fifty feet between its banks.

Creek claims shall not exceed five hundred feet in length measured along the base line or general direction of the creek, by one thousand feet on each side of the base line. Other claims shall not exceed five hundred feet in length by one thousand feet in depth. Claims shall be as nearly as possible rectangular in form and shall be marked by two legal posts, one at each end of the claim, numbered "1" and "2" respectively. Location posts of creek claims shall be placed on the base line and of all other claims parallel to the base line, and on the side of the claim nearest the creek or river towards which it fronts.

A discoverer shall be entitled to a claim 1,500 feet in length, and a party of two discoverers two claims, each 1,250 feet in length.

The boundaries of any claim may be enlarged to the size of a claim allowed by the Act, if the enlargement does not interfere with the rights of other persons or terms of any agreement with the Crown.

An application for a claim must be filed with the Mining Recorder within ten days after being located if within ten miles of Recorder's office. One extra day shall be allowed for every additional ten miles or fraction thereof. A claim may be located on Sunday or any public holiday.

Any person having recorded a claim shall not have the right to locate another claim in the valley or basin of same creek within sixty days of locating first claim.

TITLE

Any person having complied with the provisions of the Act with respect to locating and recording a claim shall be entitled to a grant for one year and shall have the absolute right of renewal from year to year thereafter, provided during each year he does or causes to be done \$200 worth of work on the claim, files with the Mining Recorder within fourteen days of the expiration of the claim an affidavit showing a detailed statement of the work and pays the required renewal fee.

GROUPING

Under certain conditions claims may be grouped and the work required to be performed to entitle the owner or owners to renewals of the several claims grouped may be performed on any one or more of the claims in the grouping. If the claims grouped are owned by more than one person a partnership agreement creating a joint and several liability on the part of all the owners for the joint working of the claims shall be executed and filed with the Mining Recorder. Grants of claims grouped or owned by one person may be made renewable on the same date.

TAXES AND FEES

Royalty at the rate of two and one-half per cent on the value of all gold shipped from the Yukon Territory shall be paid to the Comptroller.

For grant to a claim for one year.....	\$	10 00
For renewal of grant—		
If renewed within 14 days after expiry date.....		10 00
If after 14 days and within 3 months.....		30 00
If after 3 months and within 6 months.....		45 00
Recording an abandonment.....		2 00
Registration of any document.....		2 00
If it affects more than one claim:		
For each additional claim.....		1 00
Abstract of title—		
For first entry.....		2 00
Each additional entry.....		0 50
For copy of document—		
Up to 100 words.....		2 50
For each additional 100 words.....		0 50
For grant of water—		
For 50 inches or less.....		10 00
For 50 to 200 inches.....		25 00
For 200 to 1,000 inches.....		50 00
For each additional 1,000 inches or fraction thereof.....		50 00

QUARTZ MINING

Subject to the boundaries or other claims in good standing at the time of its location, a mining claim shall be rectangular in shape and shall not exceed 1,500 feet in length by 1,500 feet in width.

Every claim shall be marked on the ground by two legal posts, one at each extremity of the location line, numbered "1" and "2" respectively. On the side of No. 1 post facing No. 2 post shall be inscribed the name of the claim, a letter indicating the direction to No. 2 post, the number of feet, to the right or left of the location line, the date of location, and the name of the locator. On No. 2 post on the side facing No. 1 post shall be inscribed the name of the claim, the date of location, and the name of the locator.

The claim shall be recorded within fifteen days if located within ten miles of a Mining Recorder's office, one additional day shall be allowed for every additional ten miles or fraction thereof.

Adjoining claims not exceeding eight in number may be grouped, the necessary representation work for each claim may then be performed on any one or more of the claims in the group.

Every application for a full claim shall be made on Form "A" and for a fractional claim on Form "A-1."

No person is entitled to locate more than one claim in the same mining district within twenty days.

The timber on a mineral claim is reserved until the Mining Recorder certifies that the same is required for use in mining operations on the claim. The Commissioner, however, may issue a permit to holders of other claims to remove the timber for use in their mining operations where other timber is not readily available.*

TITLE

Any person having complied with the provisions of the Regulations with regard to locating and recording a claim shall be entitled to hold it for one year from the date of the record and thereafter from year to year, provided during each year he does or causes to be done work on the claim to the value of \$100, and shall, within fourteen days after the expiration of the year, satisfy the Mining Recorder that the work has been done, and pay the certificate of work fee. One hundred dollars may be paid in lieu of assessment work.

When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, obtain a lease for a term of twenty-one years, with the right of renewal for further terms of twenty-one years. Claims located prior to July 7, 1917, may, upon fulfilling similar requirements, be Crown granted.

SCHEDULE OF FEES

Recording every claim.....	\$ 10 00
For a substitutional record.....	10 00
Application for a lease.....	10 00
Recording every certificate of work.....	5 00
For a certificate of improvements.....	5 00
For a certificate of partnership.....	5 00
Recording any document.....	2 50
If document affects more than one claim, for each additional claim.....	1 00
For granting period of six months within which to record.....	4 00
For an abstract of the records of a claim—	
For the first entry.....	4 00
For each additional entry.....	0 50
For copy of documents up to 300 words.....	4 00
For each additional 100 words.....	0 30
For recording a power of attorney to stake, from one person.....	4 00
For recording a power of attorney to stake, from two persons.....	8 00

DREDGING

A lease may be issued for a period of fifteen years for a continuous stretch of river not exceeding ten miles in length giving the exclusive right to dredge for gold, silver and platinum. The lessee must have at least one dredge in operation on the leasehold within three years.

PETROLEUM AND NATURAL GAS

A lease may be issued for a period of twenty-one years for an area not to exceed 1,920 acres giving the right to the petroleum and natural gas on the area leased. A rental is charged of 50 cents per acre for the first year and \$1 per acre for each subsequent year.

ASSAY OFFICE

An Assay office is maintained by the Government at Vancouver, where gold exported from the territory will be purchased at its full value.

The following mining regulations and Acts of Parliament relating to mining apply to the Yukon Territory:—

Yukon Placer Mining Act.

Yukon Quartz Mining Act.

Regulations governing the leasing of coal mining rights.

Regulations governing the issue of permits to mine coal for domestic purposes.

Regulations governing the issue of leases for petroleum and natural gas purposes.

Regulations governing the leasing of potash rights.

Regulations governing the leasing of lands for alkali mining purposes.

Regulations governing the issue of leases to dredge for minerals in the submerged beds of rivers in the Yukon Territory.

GOLD PRODUCTION

The following table shows statistics of gold production in the Yukon since 1885. The figures given are those compiled by the Dominion Bureau of Statistics. In the years prior to 1906, which were the years of greatest production, admittedly much gold was mined and taken from the territory which was not officially reported. From records kept by the banks and other reliable sources there appears to be little doubt but that the actual production is well over \$200,000,000.

PRODUCTION OF GOLD IN THE YUKON, 1885-1924

Year	Fine Ounces*	Value	Year	Fine Ounces*	Value	Year	Fine Ounces*	Value
		\$			\$			\$
1885			1899	774,000	16,000,000	1913	282,838	5,846,780
1886	4,837	100,000	1900	1,077,553	22,275,000	1914	247,940	5,125,374
1887	3,386	70,000	1901	870,750	18,000,000	1915	230,173	4,758,098
1888	1,935	40,000	1902	701,437	14,500,000	1916	212,700	4,396,900
1889	8,466	175,000	1903	592,594	12,250,000	1917	177,667	3,672,703
1890	8,466	175,000	1904	507,938	10,500,000	1918	102,474	2,118,325
1891	1,953	40,000	1905	381,001	7,876,000	1919	90,705	1,875,039
1892	4,233	87,500	1906	270,900	5,600,000	1920	72,778	1,504,455
1893	8,514	176,000	1907	152,381	3,150,000	1921	65,994	1,364,217
1894	6,047	125,000	1908	174,160	3,600,000	1922	54,456	1,125,705
1895	12,094	250,000	1909	191,565	3,960,000	1923	60,144	1,243,286
1896	14,513	300,000	1910	221,091	4,570,362	1924	34,927	722,005
1897	120,937	2,500,000	1911	224,197	4,634,574			
1898	483,750	10,000,000	1912	268,447	5,549,296	Total...	8,719,913	180,256,619

*Calculated from the value: one dollar = 0.048375 oz.

xIncluding a small production from lode mines, from 1910 to 1922 inclusive.

TABLE SHOWING ROADS AND DISTANCES IN YUKON
TERRITORY

Road	Miles		Miles
	Summer and winter	Winter only	Distance from Dawson
HUNKER DOMINION—			
Bonanza Junction to Bear Creek.....	5		7
Bear Creek to Arlington.....	3		10
Arlington to Gold Bottom.....	8-9		18-9
Gold Bottom to 15 above Disc.....	4-6		23-5
15 above to Summit.....	3-6		27-1
Summit to Murray's.....	9-5		36-6
Murray's to Jensen.....	5-4		42
Jensen to Granville.....	10		52
HUNKER DOMINION BRANCHES—			
Bear Creek Road.....	4		11
Bear Creek to 12 Mile Power House.....	35		42
Power House to Spotted Fawn.....	P-9		51
Last Chance Road.....	1		14
Gold Bottom to Hartman's.....	9		27-9
Hunker to All Gold.....	6		24-9
Summit to Granville via Sulphur.....	25-3		52-4
Jensen to Gravel Lake.....	30		72
OVERLAND ROUTE—			
Dawson to Hollenbecke.....	26		26
Hollenbecke to Strickland Lake.....	20		46
Strickland Lake to Clear Creek.....	26		72
Clear Creek to Stewart Crossing.....	18		90
Stewart Crossing to Crooked Creek Jct.....	20		110
Crooked Creek Jct. to Summit.....	21		131
Summit to Pelly Crossing.....	20		151
Pelly Crossing to Minto.....	20		171
Minto to Yukon Crossing.....	23		194
Yukon Crossing to Carmacks.....	20		214
Carmacks Forks to Montague.....	24		238
Montague to Braeburn.....	22		260
Braeburn to Nordenskiold.....	21		281
Nordenskiold to Little River.....	19		300
Little River to Tankina.....	23		323
Tankina to Whitehorse.....	22-34		345
OLD OVERLAND ROUTE—			
Dawson to Bonanza Junction.....	2		2
Bonanza Junction to Indian.....	27-25		29-25
Indian to Stewart.....	50		79-25
Stewart to Pelly.....	61-75		141
Pelly to Minto Road House.....	25		166
KLONDIKE ROUTE BRANCHES—			
Glen Boyle to Intake.....	7		32
Loota to Hunker Summit.....		10	39
All Gold to canyon on Klondike.....		18	52
All Gold to Barlow.....		37	71
Barlow to Barlow Lake.....		3	
Barlow to Minto Br. via Clear Creek.....		74	145
Barlow via Moose Creek to Mayo.....		74	145
Barlow to Clear Creek Landing.....		10	81
Clear Creek Landing to McQuesten.....		10	91
BRANCH ROADS OFF OVERLAND ROAD—			
Bonanza Winter Trail.....		6-25	12-50
Bonanza Forks to Ridge Road.....		4	18
Bonanza Forks Ridge Road to McCarthy's.....		11	25
Radford to Ridge Road.....	6		
McKinnon Bridge to Conglomerate.....		2-5	32-75
Montana Creek to 113 Sulphur Creek.....		12	51-25
Montana Creek to Eureka.....	7		45-25
Black Hills to Henderson.....	P-10		65-25
Steel Fork to Eureka.....	P-5		51-25
Walhalls to Mariposa Creek.....	P-2	14	107-25
Pelly to Selkirk.....	3-5		145
Carmacks to Nansen.....		40	249

TABLE SHOWING ROADS AND DISTANCES IN YUKON
TERRITORY—Continued

Road	Miles		Miles Distance from Dawson
	Summer and winter	Winter only	
GLACIER ROAD—			
Dawson to Big Dome.....	37.5		37.5
Big Dome to Glacier Creek.....	21.17		58.67
Glacier to Miller Creek.....	3.25		61.92
BRANCHES—			
Big Gold Creek to Miller Creek.....	5		61.67
Sunnydale Road.....	6.5		7.75
Boucher Trail.....		20	44
Moose Creek Trail.....		5.5	54.5
GLACIER VIA SWEDE CREEK—			
Winter Route.....		69	75
WHITE RIVER TRAILS—			
Mouth of Coffey Creek to Beaver mouth.....	P-80		
Mouth of Beaver to Canyon City.....	P-40		
Mouth of Beaver to Boundary Crossing on Beaver.....	P-45		
DAWSON TO GOLD RUN RIDGE ROAD—			
Bonanza Junction to Hartman House.....	23		25
Hartman House to 12 Below Gold Run.....	20.5		45.5
BRANCHES—			
Hartman to Sulphur Junction at 36 Above.....	4		29
Hartman to Caribou Junction on Dominion.....	3.25		32.5
GENERAL ROADS—			
Dawson to Boundary at Eagle (Portion on ice).....		90	90
Mouth of Sixtymile To Tenmile Mines.....	P-16		64
Stewart City to Sixty Pup on Henderson.....	13		
Mouth of Moosehide Creek to Lepine Creek.....		14	17
12 Mile Power House to Powers Cabin.....		30	70
Powers Cabin to Calico Town.....		30	100
Calico Town to Mischell Creek.....		19	119
Mischell Creek to Hart Portage.....		27	146
Hart Portage to Waugh Creek.....		15	161
Waugh Creek to Waugh & Forrest Divide.....		20	181
W. & F. Divide to Little Wind River Portage.....		21	202
Little Wind to mouth of Big Wind.....		88	290
Mouth of Big Wind to Caribou Born River.....		47	337
Caribou River to Tynik Cabin.....		108	445
Tynik Cabin to Ft. McPherson.....		30	475
			Distance from Mayo
MAYO TO KENO ROAD—			
Mayo to Minto Bridge.....	10		10
Minto Bridge to Fields Creek.....	9		19
Fields Creek to Huffman's.....	7.75		26.75
Huffman's to Keno City.....	10.25		37
BRANCHES—			
Fields Creek Junction to Galena.....	11		30
Near Huffman's to Mayo Lake.....	5.5		31.5
Keno City to Wernecke Camp.....	3.5		40.5
Keno City up Lightning Creek.....	P-2	2	41
Keno City up Keno Hill.....	4		41
GALENA CREEK ROUTE—			
Junction Mayo to Keno to Galena.....		15.5	28
Galena Creek to Mt. Cameron.....	P-37		65
HAGGART ROUTE—			
Galena & Haggart Junction to Dublin Gulch.....		26	42
Haggart & Lookout Junction to Lookout Mine.....		7	28
Gordon Landing to Mayo River.....		13.5	
Fraser Falls to Mouth of No Gold Creek.....	P-6		
Barlow to Minto Bridge Junction.....	P-4	4	3
Barlow to Johnston Creek.....	P-5		

**TABLE SHOWING ROADS AND DISTANCES IN YUKON
TERRITORY—*Concluded***

Road	Miles		Miles
	Summer and winter	Winter only	Distance from Mayo
MAYO TO YUKON ROUTE—			
Mayo to 26 Mile.....		26	26
26 Mile to Dawson Junction.....		7	33
Dawson Junction to Summit Camp.....		17	50
Summit Camp to Pelly King.....		23	73
Pelly King to Minto Road House.....		19	92
Dawson Junction to Stewart Crossing.....		20	53
McQuesten post to Selkirk Indian Trail.....	60		
			Distance from Whitehorse
KLUANE ROUTE—			
Overland Junction to Champagne Landing.....	33		64
Champagne Landing to Bear Creek.....	53		117
Bear to Upper end Kluane Ldg.....	33		150
Kluane Lake to Jacquot's Roadhouse.....		47	197
Jacquot's to Canyon City.....	P-85		282
Canyon City to Beaver International Boundary.....	P-15		297
Pan Creek to Mouth of Beaver.....	P-42		
Kluane Junction at Bear to Ruby.....	15		132
WHEATON RIVER ROUTE—			
Whitehorse to Robinson.....	21		21
Robinson to Tally-Ho Creek.....	18		39
Tally-Ho to Carbon Hill.....	P-14		53
BRANCHES—			
Wheaton to Buffalo Hump.....	4		39
Near Robinson to Gold Hill.....	20		42
Robinson to Carcross.....	22		43
Canyon to Valarie Mine.....	6		9
GENERAL ROADS—			
Overland Junction to Pueblo Mine.....	2.5		4.5
Overland Junction to Graftier & Arctic Chief.....	6		8
Overland to War Eagle.....	4		9
Masons Landing, Hootalinqua to Livingstone Creek.....	16		
Livingstone to Quiet Lake.....		40	
Quiet Lake to Teslin Lake.....		120	
			Distance from Carcross
Carcross to Venue Mine.....	15		15
Carcross to Big Think Mine.....	7		7
Carcross to Tagish Post.....	P-24		24
LeBarge to Braeburn.....	50		
Williams Creek Road.....	2		
From Mouth of Thistle Creek to Barker.....	8	4	
Mouth of Kirkman to end of road.....	8		
Mouth of Barker to Thistle Trail.....	6	4	
Moosehide Creek to Dawson.....	P-3		
Yukon to Rude and Dip Creeks.....	P-22		

(P—Pack Trail).

PASSENGER RATES

Between	And	Passenger Northbound		Passenger Southbound	
		First	Second	First	Second
		\$ cts.	\$ cts.	\$ cts.	\$ cts.
Vancouver } Victoria } Seattle } Tacoma }	Skagway.....	45 00	26 00	45 00	26 00
Skagway.....	Whitehorse.....	20 00	20 00	20 00	20 00
Whitehorse.....	Dawson.....	35 00	25 00	55 00	40 00
Skagway.....	Dawson.....	55 00	45 00	75 00	60 00

There is a sailing about every four days from Vancouver during the height of the tourist season, and about three sailings per month in winter. The trip between Vancouver and Skagway is made in about four days.

For further information as to side trips, ticket extensions, etc., application should be made to any Steamship Railway Ticket Office.

FREIGHT RATES

Class rates from British Columbia and Puget Sound points, to Dawson, Y.T., in dollars per ton.

A.		B.		C.	
C.L.	L.C.L.	C.L.	L.C.L.	C.L.	L.C.L.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
68 00	74 00	80 00	90 00	92 00	105 00

Cattle—Skagway to Dawson—\$40.00 per head.

COMMODITY RATES

Straight carload lots per 20,000 pounds or over in dollars per ton

From British Columbia and Puget Sound points to	Whitehorse	Dawson
	\$ cts.	\$ cts.
.....	43 00	45 00
.....	50 00	52 00
Coal, blacksmith, C.L.....	43 00	45 00
Feed, chopped or ground, C.L.....	50 00	52 00
Flour, C.L.....	48 00	50 00
Hay, double comp. 14,000 pounds.....	52 00	53 00
Lumber, rough, etc.....	46 00	70 00
Lumber, dressed, etc.....	54 00	90 00
Sugar, C. L.....	48 00	50 00

Forgoing rates effective May 10 and expire August 5.

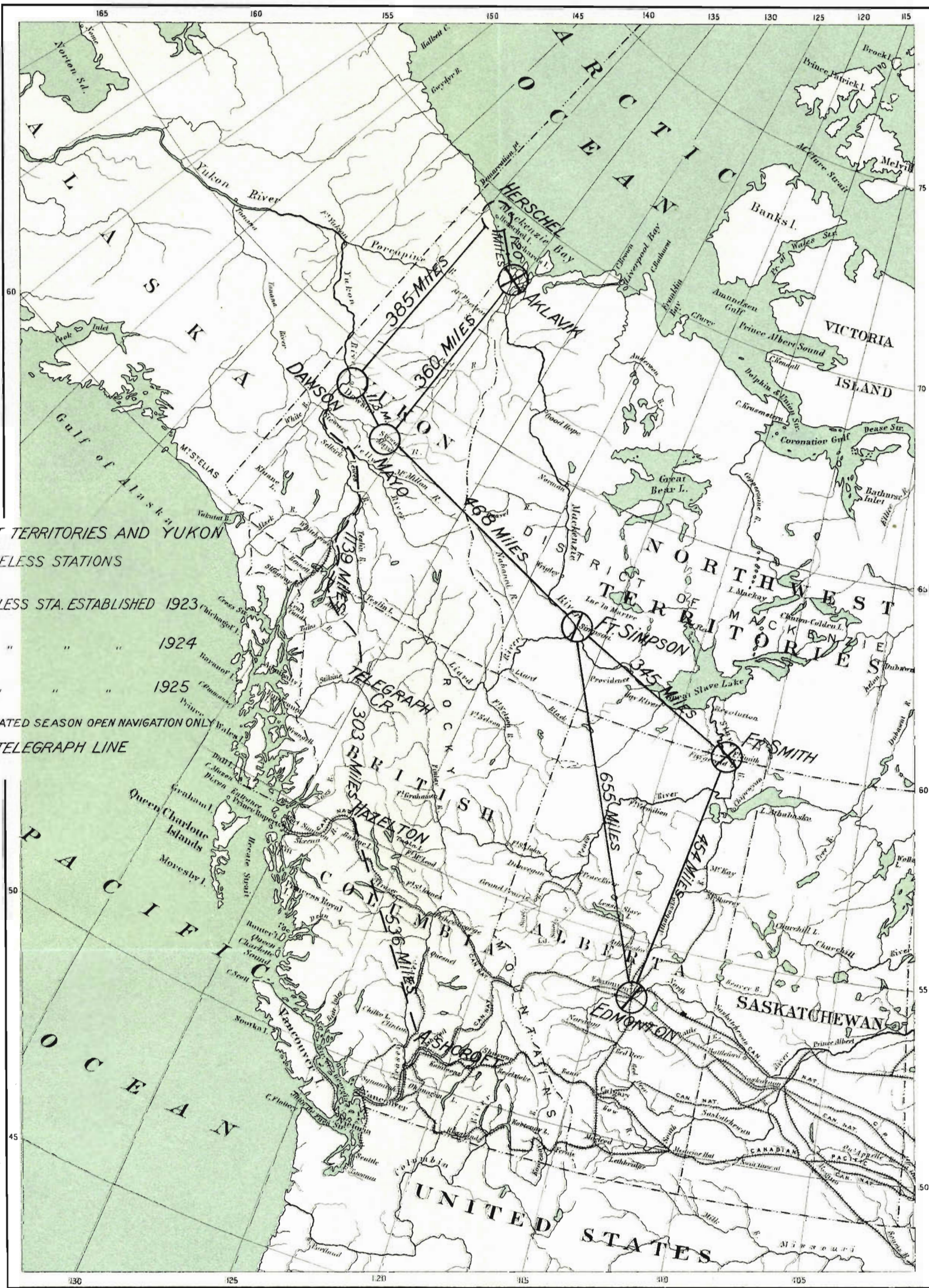
	Whitehorse	Dawson
	\$ cts.	\$ cts.
Potatoes.....	.....	70 00
Mining machinery, C.L.....	46 00	53 00
Mining machinery, L.C.L.....	56 00	58 00

POPULATION

	1921	1911	1901
Yukon Territory.....	4,157	8,512	27,219

POPULATION

Districts and Sub-Districts	1921
All Gold Creek.....	1
Bear Creek.....	104
Beaver River.....	1
Black Hills.....	138
Carmacks.....	32
Carcross.....	113
Cowley and Way Points.....	14
Dominion Creek.....	66
Duncan Creek.....	24
Flat Creek.....	11
Fort Selkirk and River Points.....	25
Forty-mile district.....	23
Fraser Falls.....	1
Galena Creek.....	2
Glacier.....	38
Gold Bottom Creek.....	10
Gold Run Creek.....	63
Granville.....	86
Haggart.....	12
Hight Creek.....	44
Hunker.....	54
Keno Hill.....	101
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Kluane.....	42
Lamin Creek.....	4
Last Chance Creek.....	20
Mayo Landing.....	124
McMillan River.....	23
Minto Bridge.....	8
Moose Hide Creek.....	7
Mount Cameron.....	1
North Fork Trail.....	27
Paradise Hill.....	13
Pelly P.O. Ft. Selkirk.....	3
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Cities—Dawson.....	975
Towns—Whitehorse.....	331
	4,157



NORTH WEST TERRITORIES AND YUKON

- WIRELESS STATIONS**
- WIRELESS STA. ESTABLISHED 1923
 - ◐ " " " 1924
 - ⊕ " " " 1925
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