

Gold Mining and the Creeks



Cover photo showing shafts, dumps, sluices, flumes, boiler plants and miners' cabins. Wealth was purchased at a tremendous cost to the landscape.

National Historic Parks and Sites photograph.

Introduction

Almost four generations have passed since one writer described the Klondike creeks as "an inferno of a world defacing God's fair country." Today, there is virtually nothing left to suggest that thousands of people once roamed these creeks in a quest for gold, wealth and happiness.

Mining Before the Gold Rush

The discovery of gold on Bonanza Creek and the subsequent stampede of 1897-98 marked the culmination of some 20 years of prospecting for gold in the valley of the Yukon River. The first significant report of gold in the region was made in 1863 by the Reverend Robert McDonald, a Church of England missionary (Robert Campbell, a Hudson's Bay Company trader, had noted gold colours along the Pelly River 21 years before). Because the Yukon Valley, insofar as the whiteman was then concerned, was the private preserve of the fur trader and the missionary, and because the fur traders and missionaries regarded the exploitation of gold as inimicable to their interests, neither report was followed up.

Beginning in the 1870s small parties of prospectors began to trickle into the area, borne north by the northward extension of the western mining frontier. During the '70s auriferous colours were noted on the Porcupine and Yukon rivers and some mining was done on the Sixty Mile, a tributary of the latter stream. It was not until 1883, however, when fine gold was discovered on the Stewart River that mining was undertaken on any scale. The discovery of coarse gold on the Forty Mile in 1886 and later on the headwaters of the Sixty Mile led to the virtual abandonment of the Stewart River diggings and resulted in the establishment of the first "permanent" mining camp in the Yukon at Forty Mile. Birch Creek, on the American side of the boundary, was opened up in 1893-94 with Circle City, Alaska as its base camp. During the 1890s the Big and Little Salmon rivers were prospected, as was the McQuesten, but the absence of supply facilities



Thawing with wood and by steam. The wood was so cold that the miners set their fires with candles instead of matches.

Photo courtesy of Yukon Archives.



The photograph (showing pipes) was taken 88 feet below the surface.

Photo courtesy of Yukon Archives.

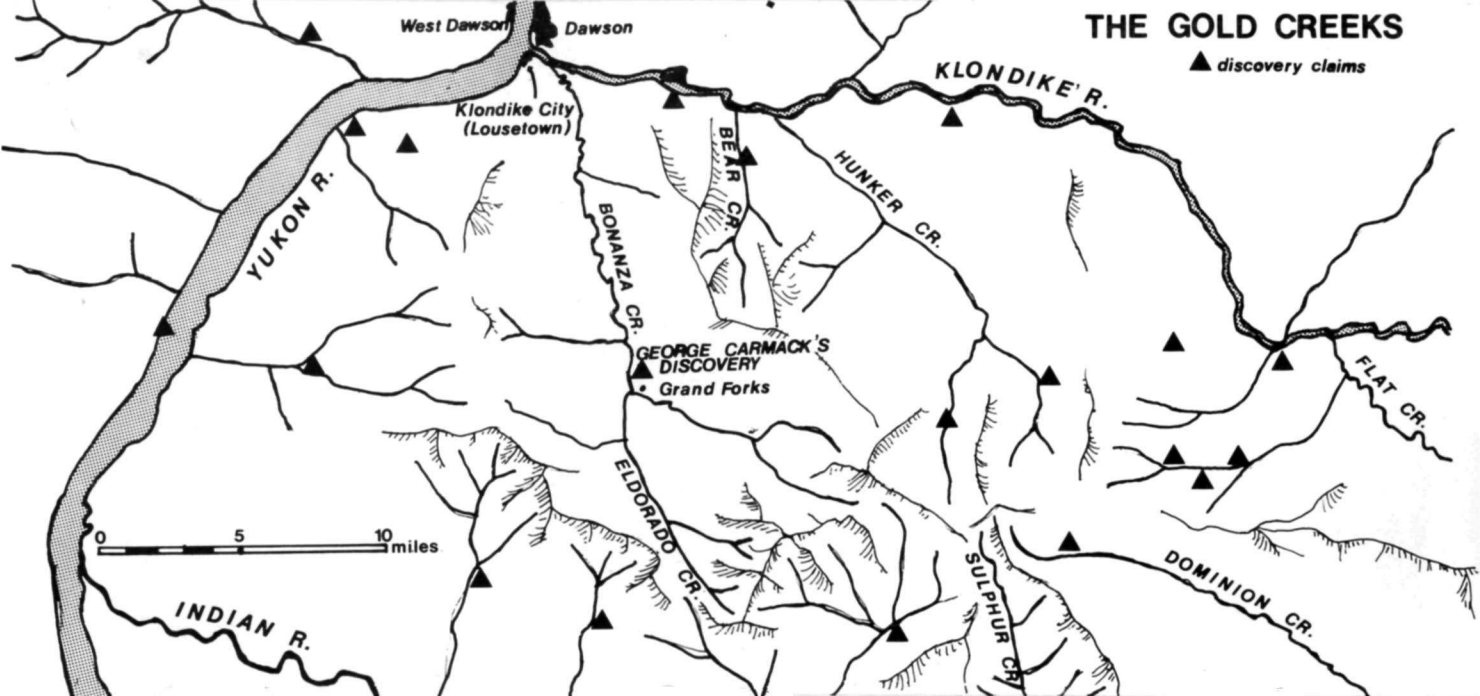
in these areas — a pre-requisite for mining — postponed their development.

Discovery of Gold on Bonanza Creek: The Klondike Gold Rush

Robert Henderson, a native of Nova Scotia, was the first individual to systematically prospect and undertake operations on some of the Klondike creeks. But fate, in a particularly capricious gesture, was to deny Henderson the luck of making the big discovery, as indeed it was to deny the man who made it, Skookum Jim, credit for doing so. It is George Washington Carmack's name which appears

THE GOLD CREEKS

▲ discovery claims



West Dawson Dawson

Klondike City (Lousetown)

KLONDIKE R.

YUKON R.

BEAR CR.

HUNKER CR.

BONANZA CR.

GEORGE CARMACK'S DISCOVERY
• Grand Forks

FLAT CR.

0 5 10 miles

INDIAN R.

ELDORADO CR.

SULPHUR CR.

DOMINION CR.

on the application for discovery on Bonanza (originally Rabbit) Creek — a discovery that set in motion a train of events that was to culminate in the Klondike stampede.

The rush to the Klondike occurred in three stages. The first consisted of prospectors, miners and traders already in the area. Within a month of the discovery 200 claims had been staked on Bonanza and its tributaries and rich prospects had been turned up in the Indian River region. By November prospectors were working on Bear and Hunker creeks. In fact claims outside the district that had been worked profitably before the Bonanza Creek discovery were unceremoniously abandoned and the town of Forty Mile was virtually deserted. There were sound reasons for this which went beyond the obvious one of miners not wishing to miss out on a potential discovery. Hitherto most of the miners in the Yukon had only made enough to carry them over from one year to the next. Wages and mining regulations reflected these conditions. In the wake of the opening up of the Klondike wages rose rapidly and fees for renewing working claims showed a commensurate increase. This made it extremely difficult to continue work on claims, the yields from which were much smaller than their Klondike cousins.

The second stage of the gold rush occurred in early 1897. It was composed for the most part of miners and would-be miners on the west coast who



Shaft and Drift work on Sulphur Creek.

National Historic Parks and Sites Branch photograph.

were the first outsiders to learn of the Klondike strike. Although there are no confirmed estimates as to the number who participated in this phase it would appear that as many as 3,000 people were involved. The landings in July 1897 of the *Portland* in Seattle and the *Excelsior* in San Francisco—each laden with what the newspapers of the time described as a ton of gold—provided the impetus for the final and most famous phase of the rush—the stampede of 1897-98. The great stampede of '97-'98 saw some 30,000 to 35,000 people converge on the Klondike goldfield.

Geology

The Klondike gold field forms an area roughly 800 square miles in size, extending from the Klondike River on the north to the Indian River on the south. Its east-west limits are Flat and Dominion creeks and the Yukon River.

One of the principal characteristics of Klondike gold is that it occurs in a free or placer state. Because of gold's high specific gravity it is found on or in bedrock. The gold bearing rocks of the region date from the Cambrian or Silurian age (400,000,000 B.C.) and are composed primarily of light coloured sericite schists of igneous origin. During the late Pliocene period (2,000,000 B.C.) these rocks were eroded into gold bearing gravels which settled in the beds of ancient streams. After these gravels were deposited there was an uplifting of the land from

north to south which accelerated the velocity of the streams flowing north into the Klondike River. These streams rapidly deepened their channels. This deepening, coupled with erosion, resulted in a concentration of gold bearing gravels on bedrock of the existing creek beds and valleys and explains why some creek claims on Bonanza and Eldorado creeks were such rich producers. The effects of this geological evolution were that gold was deposited and subsequently found at three distinct ground elevations: in the ancient stream beds or white channels, located 100 to 300 feet above the present creek beds; on benches, which were fragments of old valley bottoms formed at an intermediate stage of erosion, and in the beds of existing creeks.

The Klondike was one of the few areas of Canada that benefited from the ice age. Because it was located in a semi-arid zone the Klondike escaped the scourge of glaciation; hence the gold bearing gravels were not removed by glacial ice or buried under glacial accumulations. However, the region was subjected to extreme cold. This led to the formation of permafrost or permanently frozen ground. While permafrost added to the burden of mining it did have a singularly desirable result. By arresting weathering of the rock, it retarded the natural transportation of gold and its dispersal into quantities that would have precluded extraction. But geology and climate were important not only for the role they played in the formation and deposition of the gold bearing gravels—they also dictated the methods that would be required to extract them.

Techniques of Placer Mining

For many of us prospecting suggests an image of a person crouched by a stream, pan in hand, washing gravel in a vain or successful attempt to find gold. This picture has tended to leave the impression that gold is found in the stream itself or in the adjacent surface gravels. While this picture has a certain limited validity, it bears repeating that in the Yukon gold was primarily found on bedrock, overlain by a surface layer of decayed organic material called *muck*, and an intermediate layer of permanently frozen gravel. It was this fact that prevented the early miners from uncovering the rich paystreaks and explains why they confined themselves to working



Steam shovel.

Photo courtesy of Yukon Archives.

the surface gravels of bars and banks of various streams with primitive appliances such as the pan and rocker. Some method had to be devised to reach bedrock before mining *per se* could be established. This was accomplished at Forty Mile in 1887 with the introduction of wood burning, a technique that entailed thawing an area of frozen ground (six-by-four feet square) with wood fires, removing the thawed gravels, and repeating the process until bedrock had been reached. Once on bedrock, the miner(s) tunnelled laterally (drifting), all the while removing the pay gravels to a dump on the surface. The pay gravels thus removed were dumped in a location separate from the gravels removed in shafting because the latter contained little if any gold, and the object was to sluice only those gravels that were gold-bearing. While drifting, the miner would pan occasionally in order to ensure that his drift had bottomed in pay dirt. If it did not, he had the option of extending the drift, digging a new shaft, or, as a last resort, abandoning the claim. Whatever the outcome, the work was time-consuming, arduous and risky.

With the coming of spring, drift-work was discontinued. There were two reasons for this. Shafts and drifts were generally untimbered since permafrost, coupled with cold winter temperatures, eliminated the need for shoring. This was the prime reason for drifting in winter. Conversely, cave-ins were a real problem in warmer weather as the permafrost melted. Moreover, sluicing, the next stage in the process required water in quantity and this was available only during the spring run-off. The pay gravel accumulated during the winter was run through a sluice, a series of inclined boxes with riffles on the bottom, where water separated the gold from the gravel. The gold fell to the bottom because of its high specific gravity and was trapped by the riffles. The rest of the gravel was carried away by the water. Every so often, depending on the richness of the ground, the riffles were removed, the water shut off, and the pay dirt was panned. This was called the clean-up.

During the gold rush period (1897-1900) steam thawing and the self dumper were introduced. Steam thawing was far more efficient than wood burning, and more economical over the long-term as well



A portion of the Yukon Gold Company's 70 mile ditch.

Photo courtesy of Yukon Consolidated Gold Corporation.

although capital was required to buy boilers, pipe, hose and points. With this method the gravels were thawed by driving steel pipes called points into the frozen ground and forcing steam through them. The self-dumper was a great improvement over the old method of hauling dirt out of the shaft with a windlass and enabled the miners who used it to transport the pay dirt directly from the shaft to the sluice, thus eliminating the need to move the dump to the sluice by shovel or wheelbarrow.

The great attraction of shaft and drift mining, apart from steam thawing and the use of self-dumpers which were used on a small scale prior to 1900, was that it required relatively little capital. So long as a miner had a large enough grub-stake to sustain him until clean-up, and enough money to buy wood for thawing and sluice boxes where needed, all that was required was hard work, long hours and a willingness to accept harsh living conditions. This is why this method was so widely used during the gold rush. Unfortunately for the small operator the extensive application of shaft and drift mining during the rush, coupled with the high-grading principle on which it was based, resulted in the rapid depletion of the rich pay gravels on which shaft and drift mining depended for success. The problem was not that the gold field was exhausted; indeed, quite the opposite was true. What had happened was that ever-increasing amounts of low-grade gravel would have to be handled in order to yield an adequate

return. For this, machinery, and the capital to acquire and operate it—not hand labour—would be needed. As a consequence a variety of new techniques based on the open-cut method of mining were introduced.

Open-cut mining was initially confined to those areas where bedrock was less than 20 feet deep and where the depth of the muck and barren gravel was “inconsiderable.” However, the great virtue of this method was that its potential for development was practically unlimited: as machinery improved it could be used on almost any placer deposit—creek, bench or hill—regardless of depth. As originally practised on creek claims with little or no grade, the muck and barren gravels were removed by steam or horse-powered scrapers, thawing being done where necessary. The pay gravels were then thawed by steam or exposure to the sun and transported, either by shovel, wheelbarrow or self-dumper, to the sluice. Scrapers, and subsequently steam shovels, were used on some claims to remove not only the muck and non-paying gravel but the pay gravels as well. A later development which grew out of the wish of some creek operators to work their claims on the hydraulic principle was the mechanical elevator, a device which furnished sufficient grade for both sluicing and the disposal of tailings (waste material).

On creeks where adequate grade and sufficient water were available the muck and “barren” gravels could be stripped by water under pressure. This was later extended to include the removal of all material between the surface and bedrock with jets of water under pressure (ground sluicing), the tailings being disposed in one dump, the pay gravels in another. Hydraulicking, which also required water under pressure, was employed on the bench and hill claims. Technically, the only difference between ground sluicing and hydraulicking was that the pay gravels uncovered by the former had to be transported to a sluice whereas the latter not only disintegrated but delivered the pay gravels to the sluice boxes.

Until 1905 most observers believed that the Klondike’s low grade gravels could best be worked by the hydraulic system. After that date it became apparent that another form of open-cut work, dredging, held the key to the future exploitation of the gold field. Dredges, although complex looking

behemoths to the untrained eye, operated on a relatively simple principle and consisted of four basic components: a barge for flotation; a series of steel buckets which excavated the gravel in front of the barge and delivered it to a housing built on the barge; the housing itself, where the gravels were disintegrated with water and the gold recovered; and finally, a conveyor or stacker which disgorged the barren gravels behind the barge.

As was the case with all but the earliest forms of open-cut mining, dredging required water. For this reason the dredges were shut down once the dredge ponds froze over. This limitation was more than offset, however, by keeping the dredges employed 24 hours a day during the dredging season. Stripping and thawing were required on the creeks but not on the river beds which had been naturally thawed by stream action. This is why the Klondike River proved to be such good dredging ground and explains why the Canadian Klondike Mining company, which operated there, was successful. Dredging was facilitated by the absence of large boulders in the Klondike and enjoyed a real advantage over hydraulicking since it required less water.

The introduction of keystone drills for prospecting early in the century and the discovery by 1920 that cold water was a more efficient thawing agent than steam completed the development of dredging technology. After that improvements were realized through organizational changes and modified operating procedures. A high level of operating efficiency was achieved by the Yukon Consolidated Gold Corporation after 1933 by phasing its operations so that ground that had shown good prospects was stripped in the first year by hydraulic monitors, thawed with cold water points in the second and dredged a year or two later.

Economic Development of the Gold Field

After 1900 a profound change in the manner of working the placer deposits of the Klondike took place. This change, occasioned by the depletion of the highest yielding ground, was not so much a change in technique, although that was an integral part of the process, as it was a basic change in the nature of working the deposits themselves. It manifested itself in the replacement of individual



A train owned by the Klondike Mines Railway Co. and Yukon Gold's dredge No. 1.

Photo courtesy of Yukon Archives.

labour by capital on an ever increasing scale and was based on the need to increase the area of ground to be worked in a single operation, the use of expensive machinery, and the need to solve the problems posed by a scarcity of water and fuel, both of which were needed in large and economical quantities to operate the new machines. One of the most pressing problems at the outset was land. Although many claims had been worked to the point where they no longer justified the use of old methods, they were too small to be worked efficiently and economically by large machines. This was exacerbated by the fact that there were too many individual operators to permit systematic, large-scale operations. As a result, a number of claim owners bought up neighbouring claims or joined together to "group" their claims and work them in common. This was the first step in the process of consolidation. Consolidation did not occur on all creeks simultaneously, but represents a general pattern of development. It culminated in the emergence of two dominant concerns after 1905, the Yukon Gold Company and a combination of the Canadian Klondike Mining, and the Granville Mining Companies, each of which had the capital to organize single claims into vast land holdings called concessions, to build hydro plants to power the dredges and other machinery, and in the case of Yukon Gold, to build a 70 mile ditch to supply water

for hydraulic operations. The fruits of consolidation are to be seen in the fact that from 1908 to 1913 gold production was moderately but steadily increased after a dramatic fall from \$22,275,000 in 1900 to \$3,150,000 in 1907.

The years between 1914 and 1932 were difficult ones for the industry as it was plagued, first by rising costs, and then by a series of corporate upheavals. Both the Yukon Gold Company and the Canadian Klondike Mining Company shut down during this period. The industry recovered during the 1930s as a result of favourable conditions created for gold mining by the depression, a substantial increase in the price of gold, and the re-organization of the Yukon Consolidated Gold Corporation which had been formed in 1923. Between 1933 and 1966, when the company stopped operating, it exercised a virtual monopoly over the gold field.

Quartz Mining

Quartz or lode mining (gold) was never very important in the Klondike district. The belief in the existence of a motherlode and the existence of a few outcroppings created much optimism and some development in the first decade of the century and led to the construction of the Munger and Ladue stamp mills in Dawson as well as one on Victoria Gulch, a tributary of Bonanza Creek. However, the veins were generally small and non-persistent and were worked with only "indifferent results."



Hydraulic monitor.

Photo courtesy of Yukon Consolidated Gold Corporation.

Gold Mining In Other Regions

While the Klondike was by far the most important centre of Yukon placer operations other areas contributed in a small way at different points in time to the territory's annual output of gold. It is interesting to note that many of these areas were opened up by prospectors who failed to stake or staked poor claims in the Klondike. In this respect the Klondike gold rush helped to open up some of the then outlying regions of the territory. Among the more important deposits worked outside the Klondike were the Forty Mile and Sixty Mile diggings, many of the creeks between Mayo and the upper McQuesten River, and the Livingstone Creek and Klwane Lake areas in the southern part of the territory.

Significance of the Klondike Gold Field

Few, if any, facets of territorial life were left untouched by the exploitation of the Klondike gold field. Martha Black, a major figure in the Yukon's history, put the matter succinctly when she wrote: "Like a stone thrown into a pool, the circle of success widens and broadens, until the final ripple touches the outermost edge of the shore of every life in the North." Industry, commerce, settlement and transportation—each felt the impact of Klondike gold. Gold mining in the Klondike gave birth to an important timber industry, created the need for better transportation links with the "outside" and within the territory itself and provided the impetus, both directly and indirectly, for the development of the Yukon's hydro and fossil fuel resources. In turn, these developments, particularly improved transportation facilities and electric power, reduced the costs of mining to such an extent that they made possible large-scale operations and extended the life of the diggings. Few placer camps enjoyed the permanency (60 years) of the Klondike gold field. Gold mining provided employment, again directly and indirectly, on the diggings themselves and in a variety of subsidiary and service industries, both public and private. It gave birth to the town of Dawson and a host of smaller communities on the creeks. In short, gold mining in the Klondike was the foundation of the territorial economy, almost exclusively until the 1920s and in good measure thereafter until base metal mining superseded it in the 1950s.



A dredge and thawing plant.

Photograph courtesy of
Yukon Archives.

The Gold Fields Today

The closing down of the Yukon Consolidated Gold Corporation in 1966 brought to an end the last chapter in the history of the Klondike gold field. Today there are a few small operators but their activities constitute an epilogue and as such represent the final stage in the life of most placer camps. What is now epilogue may in truth be only a beginning, however. In 1967 the Historic Sites and Monuments Board of Canada recognized the "national historic importance" of dredging in the Yukon and recommended that a display of mining equipment reflecting the evolution of mining methods be established on the gold field. Plans are now being made by Parks Canada to implement this recommendation and it is hoped that the results of this endeavour may attract, as once did gold, thousands of people to the Klondike.



Indian and
Northern Affairs

Affaires indiennes
et du Nord

Parks Canada

Parcs Canada

Published by Parks Canada under authority of
the Hon. Warren Allmand,
Minister of Indian and Northern Affairs.
Ottawa, 1977

INA Publication No. QS-R041-000-EE-A1

Printed on recycled post-consumer waste paper

