

METHODS AND COSTS OF PLACER MINING IN YUKON*

Prospecting.—The first work the prospector does on a new creek is to pan wherever the bedrock is exposed by the action of water. (Bonanza creek was accidentally discovered by Carmack, who panned in this way, and staked without further prospecting.) If, after panning, favorable prospects are found, a small space of ground is cleared and a shaft, usually 3 feet by 5 feet, is sunk to bedrock.

It is not necessary to thaw the frozen muck, which can be broken with a pick, but when the gravel is reached it is necessary to make a fire on the bottom of the shaft and thaw downwards until bedrock is reached. Another method of thawing the gravel is by boulders which have been heated in a fire. The warm boulders are dropped on the bottom of the shaft and covered with moss or bush. Either process thaws from one to two feet of gravel in about five or six hours. Dirt can be thrown out of the shaft to a depth of about ten feet, and then it is necessary to use a windlass to hoist. The gravel removed from the shaft is also panned at frequent intervals. The general rule is that if there is pay at all in the gravels, it is richest on or in bedrock. Paradise Hill, on Hunker creek, however, has furnished an exception to this rule. The main gold zone here in many places is found not in bedrock, but at elevations of from three to twelve feet or more above it.

To drift or tunnel, a fire is built against the side of the shaft, and the necessary amount of gravel is excavated. To prospect on creeks where a small boiler can be used, the procedure is somewhat different. A small Porcupine boiler of 3 h.p., which furnishes steam to three points is generally utilized. A half-inch pipe can be driven through 10 feet of muck in about five hours. To sink a shaft of 20 feet in this way requires about one cord of wood for thawing, and two men will remove the dirt from the shaft in two days.

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

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

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

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

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

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

An area of about 50 feet square was stripped of ice, and a portion of this area, 20 feet in length by 6 feet in width was thawed by one fire, this being the quantity one man could excavate before the thawed ground was again affected by the frost. A row of kindling, two feet in width was placed along the whole length of the twenty feet, and covered with dry spruce. A second and third row of wood was placed on top and sheet iron or tin was used as a complete cover, so that the wood could smoulder and the heat be retained or concentrated within the area to be thawed. The quantity of wood necessary to thaw an area of ground 20 feet long by 6 feet wide and 1½ feet deep, was estimated at 1½ cords.

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

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