

ing to the muck, necessitating the handling of tons of waste, and later, with the advent of mild weather, the destruction of the pit.

Handling of Gravel.—The gravel as thawed in the breast, is handled immediately to prevent its freezing back. It is shoveled into wooden buckets holding about 120 pounds each, skidded or dragged to the shaft and windlassed to the surface, where it is dumped alongside of the shaft and freezes over again. There it remains to be thawed out by Nature or otherwise till sliced in summer.

Work Shut Down.—Breasting and drifting cease with mild weather on account of the water in the drifts, caving of the ground, and dangers from asphyxiation. The gravel being mined and piled in dumps around the shafts, with the advent of the water season, sluicing commences, the necessary preparations for same being made already.

Impounding Waters.—The light grades in the creeks necessitate the impounding of waters to enable the miner to sluice the dirt, and also occasion frequent handling of the tailings. As the claims vary from 250 to 500 feet in length, it is patent how aggravated the situation becomes.

Dams.—It is estimated that an ordinary temporary dam costs per claim \$1,000, and structures are known to have required as much as \$8,000 to erect. Most all of the dams, such as they are, are sooner or later in the season swept away by flood.

Centrifugal Pumps.—Centrifugal pumps in instances are found to be convenient and economical for supplying water for sluicing and have been found very efficient for draining underground works. In many instances old works have been used as storage reservoirs, and the water subsequently pumped from them and used for sluicing purposes over and over again.

Canvas Hose.—Canvas hose is an excellent substitute for flumes, where the price of labour and material is so high, and as the quantity of water run per sluice head, here called 60 miners' inches (Canadian measurement), is so small, it can be used to great advantage if one be permitted to take the water out sufficiently high on the creek, above the claim upon which it is to be employed.

Waste Ditches.—The cost of the waste ditches to carry off surplus waters of the creeks depends on their length, which vary with attendant circumstances.

Sluices.—Sluices, so-called, are built of one-inch pine lumber, 12-ft. lengths. They are 11 inches at top, 10 inches deep, bottoms 13 inches wide, 10 inches deep. These boxes are nailed together and made in 12-ft. lengths, and strengthened with strips for small posts, and sills are required. The boxes are set one in the other by dropping the narrow end of the box into the flared upper end; the edges and leaks being stopped with rags. This style of sluice, as set, is well calculated to afford the smallest discharge for the material used in its construction, as well as to entail a continuous loss of grade.

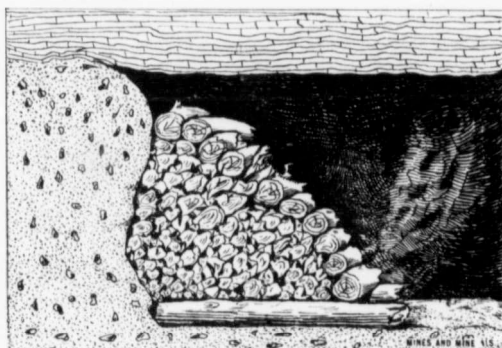
Riffles.—Pole riffles are in general use. The boxes are cleaned up daily after sluicing. No quicksilver is used, the bulk of the gold being caught in the boxes into which the dirt is shoveled. The gold obtained is taken in pans or kettles, panned out, dried and cleaned of sand and iron and ready for the market.

Sluice Grade.—The grade of the sluices is apparently regulated by the idea of the person running the claim. The sluices are placed as close as they can be conveniently to the dumps. When the water season arrives and the gravel is sufficiently thawed, it is shoveled by

hand into them. The men along the sluice throw out all the rocks which the water will not carry off. Large rocks are taken by hand and cleaned in the sluices. The attendant expenses of this method of sluicing are considerable.

Economical Question.—The workings of these placers as described brings one face to face with the study of the economical question involved in order to establish a basis for their valuation. It is a well-authenticated fact that ground in several of the claims in the Klondike gold fields have yielded \$35 per cubic yard, but neither the extent of the areas nor the cost of working them has ever been stated. Auriferous deposits with a high yield per cubic yard, and a large available area do not alone constitute a rich mine, as the commercial value of a mine is determined by the relation of the yield per cubic yard to the cost of obtaining its corresponding yield in precious metal, or, in a word, the difference between the money yield of the bullion and its cost of production.

Official Data.—Official data on file in the offices of the Canadian government give "the cost of handling dirt (summer work) from ground sluicing to clean-up averaged (labour bills) \$5 per cubic yard on the entire quan-



SKETCH OF WOOD PILED FOR DRIFT FIRING.

tity moved," and "the cost of handling dirt from shaft sinking to clean-up (winter work) averaged \$12 per cubic yard." These are results of workings done on Eldorado creek and Bonanza creek in 1897-8, ordinary labour being \$1.50 per hour, and provisions correspondingly high.

In 1898-9 ordinary labour on Dominion creek ranged from 80 cents to \$1 per hour, the expenses of living being the same as that of previous years. The annexed tabulated statement prepared by Douglas Waterman, Esq., shows in detail the exact cost of the working by the firing system on claim No. 13 above Lower Discovery on Dominion creek, after the ground had been thoroughly opened and all attendant preliminary work completed.

	1899.	Feb.	March.	April.
Number of shafts from which dirt was hoisted	4	5	4	
Number of buckets hoisted	10,872	13,186	11,910	
Cubic yards	400	490	442	
Number of men employed	12	12	8	
Number cords wood burned	25	25	15	
Labour expense	\$1,991 25	\$2,445 75	\$1,625 50	
Wood expense	375 00	375 00	225 00	
Total expense	2,366 25	2,820 75	1,850 50	
Cost per cubic yard	5 91	5 75	4 20	

The months of Feb., March and April were the most