

hoisted, the claim is ready for the advent of the water season.

Breasting.—The method at present followed for breasting, commences work immediately at the shaft, which to say the least is in every way objectionable. Were the deposits covered by a greater depth of material and the channel wider, a modified form of "long-wall system of mining" could be worked to advantage, but the short-water season, narrow channels, liability to trouble from infiltrating waters, and excessive costs in everything, make it desirable to mine out the ground as rapidly as possible, avoiding all use of timbers, leaving the falling waste to take care of itself, keeping the drainage open and the shafts at all times secure and intact.

To accomplish this purpose, breasting with thawers should commence at the intersection of the main drift and with the crosscuts. The corners are first thawed off, and gradually the largest and most convenient faces are afforded for the work. As mining progresses the work nears the pits, the gravel as excavated being transported on trucks to the nearest respective shafts, making the longest haul say 50 feet in main drift. The handling of waste is avoided and the "muck" settles down on the bed rock as the men recede from the worked out breasts, the track being *pari passu* withdrawn, and the turntables retired. Finally all that remains to be excavated is the gravel immediately around the shafts, which can be handled without danger when required. This method insures absolute security to all employed and can be expeditiously and economically carried out.

Cost.—On the basis suggested the following tables give an estimate of the cost of working a gravel claim in the Klondike district with a properly equipped steam-thawing plant, when installed and well managed:

Estimated cost of working claim with one 35-h. p. boiler plant, ten points, 15-h. p. hoist. Labour rate 80 cents per hour; fuel \$20 per cord; two 10-hour shifts:

Labour	\$9,480 00
Fuel	1,800 00
Shafts	3,160 00
Drifts	2,667 00
Sluicing	1,700 00
Management	3,000 00
	\$20,807 00

Amount of gravel hoisted and sluiced, 60,000 buckets or 1,000 buckets daily = 3,000 cubic feet = per 60-day season 6,667 cubic yards = cost of \$3.12 per cubic yd. or 162 pans per cubic yard = cost .0192 cents per pan.

Estimate of cost of working claim with two 35-h.p. plants, two 35-h.p. boilers, two 15-h.p. hoists and 20 points, two 10-hour shifts, labour and fuel rates at above prices:

Labour	\$18,960 00
Fuel	3,600 00
Shafts	2,160 00
Drifts	2,667 00
Sluicing	3,400 00
Management	3,000 00
	\$33,787 00

The output of this plant should be 360,000 cubic ft. of gravel during a 60-days season = 13,334 yards, which would make the cost of mining \$2.53 per cubic yard, or .0156 cents per pan of 20 lb. of gravel. The estimate of the cost of sinking and drifting is based on the known work which can be done with the points per diem. The sinking and opening up of the claims can be readily accomplished in 60 days making, say, a total season of four months. The estimated cost of two such plants as referred to is placed at \$15,000. The plant could not be purchased in Dawson and placed in the mine for that figure. When the claim is worked out

the plant can always be used on other claims, or sold. Their value would certainly be 50 per cent. of the original cost if sold off.

Output of Klondike.—Through the courtesy of Chas. G. Yale, statistician of the United States mint, at San Francisco, I am enabled to give the figures of production of the Klondike district, and show the increased yield each year since the discovery.

In 1897 the shipments of gold coming down the Yukon from the Klondike were not carefully segregated from the camps on the American side of the boundary line, and for this reason there is no exact data at hand. The Department of the Interior, at Ottawa, estimated the yield of the Klondike for that year at \$2,500,000. At the United States mint at San Francisco, the product was estimated at \$2,000,000 which is the same figure stated by the United States Consul, at Ottawa, who considered the estimate of the Department of the Interior as too high.

It will be well, therefore, to consider the lower estimate as correct and place the yield of '97 at \$2,000,000.

Since that year more exact statistics have been kept. The method employed is to obtain from all United States mints and assay offices and private refineries and smelters, the amounts received by them from the Northwest Territory. Depositors are all asked for the source of gold so that this record may be kept, and care is taken to avoid duplication of statements. The following record may therefore be considered reasonably correct.

1897		\$2,000,000
1898.	Standard Oz.	Coining Value.
Gold	595,318.214	\$11,038,478 00
Silver	160,996.14	187,341 00
Total		\$11,225,819 00
1899.	Standard Oz.	Coining Value.
Gold	859,281.228	\$15,986,627 50
Silver	229,788.95	267,399 77
Total		\$16,254,018 27
1900.	Standard Oz.	Coining Value.
Gold	1,197,608.099	\$22,275,510 64
Silver	290,920.35	337,467 60
Total		\$22,612,878 24

The total output of the Klondike district, Yukon Territory for the four years of its history is thus seen to have been \$52,092,815.51.

SOLUTIONS.

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WHEN we put a piece of sugar in water, what becomes of it? It dissolves. But what is solution? It is not a mere mixture of fine particles, for if we take a microscope and examine a drop of the solution of sugar we do not see any small particles of sugar. So far as can be seen the water is as clear as before, yet we know by the sweet taste of the liquid that the sugar is there. It is in solution. What the condition of solution is has not even yet been placed beyond dispute, but the theory which has obtained the greatest amount of credence is that the particles of a solid, when placed in a liquid in which it is soluble, keep getting smaller and smaller until at last they are separated into their molecules. These molecules in solution are then in the same condition as the molecules of a gas. They are separated from each other, they influence the vapour pressure of the liquid they are dissolved in, and they ex-