

No. 3.—Retreat Mine, Marototo.

This ore consisted of soft, friable, somewhat mullocky quartz, mixed with a very large proportion of manganese-oxide, which imparted a black colour to it. The whole parcel was dried and dry-crushed. A portion weighing 600lb., and showing an assay-value of—

Bullion	...	...	...	...	...	Oz. dwt. gr.	2	10	10	per ton
Gold	...	...	...	...	...	0	2	12	"	
Silver	...	...	...	...	...	2	7	22	"	

Value, 14s. 9d. per ton.

was subjected to a leaching by percolation with 0·5 per cent. solution of potassium-cyanide, which extracted 13dwt. of bullion, valued at 8s. per ounce, representing a saving of 95 per cent. of the gold, 63·3 per cent. of the silver, and 89 per cent. of the value.

The remaining portion, weighing 2,400lb., on account of the difficulties attending the percolation, due to the large proportion of slimes formed by the manganese-oxides, was submitted to raw pan-amalgamation, which extracted 1oz. of bullion, 0·1457 fine in gold, 0·883 fine in silver, valued at 13s. per ounce, representing a recovery of 93 per cent. of the gold, 14 per cent. of the silver, and 73 per cent. of the value, calculated from the assay-value, which was 14s. 9d. per ton—that is, the same as the value of the portion treated by the cyanide process.

The comparative results obtained by each process were as follows :—

					Cyanide Process.	Washoe Process.
Gold	...	...	...	...	95 per cent.	94 per cent.
Silver	...	...	...	...	93·3 "	14 "
Value	...	...	...	...	88·0 "	73 "

These results, as well as my previous experiments, show that the extraction of the bullion contents of this ore can be most successfully effected by means of the cyanide process.

No. 4.—Hit or Miss, Puriri.

This ton of ore was dried, dry-crushed, and then subjected to hot pan-amalgamation, which recovered 23oz. 13dwt. of melted gold, 0·6150 fine in gold and 0·3010 fine in silver, equal to £2 9s. 7d. per ounce. The assay-value of the dry pulp, the quantity of bullion recovered from the stamper-box, the quantity of gold recovered, and the percentages of saving are shown in tabulated form below :—

	Assay of Pulp.	From Box.	Total Value of Ore.	Recovered.	Percentage of Recovery.
	Oz. dwt. gr.	Oz. dwt. gr.	Oz. dwt. gr.	Oz. dwt. gr.	
Bullion, per ton	21 0 22	7 15 0	28 15 22	23 13 0	...
Gold, per ton	10 14 5	4 8 6	15 2 11	14 10 0	96
Silver, per ton	10 6 17	3 6 18	13 13 11	6 12 0	46·4
Value per ton,	£43 17s. 5d.	£17 17s. 7d.	£61 15s.	£58 10s. 2d.	94·7

No. 5.—Norfolk Mine, Tararu.

This ore consisted of soft mullock clayey quartz, mixed with large masses of calcite (carbonate of lime). It was wet-crushed, and passed over amalgamated copper-plates, which saved 6dwt. 12gr. of bullion, 0·5326 fine in gold, 0·4250 in silver, worth 43s. 4d. per ounce, representing a saving of 24·8 per cent. of the gold, 38·2 per cent. of the silver, and 26 per cent. of the original assay-value, which was as follows :—

Bullion	...	...	...	...	...	Oz. dwt. gr.	1	1	14	per ton.
Gold	...	...	...	...	...	0	13	8	"	
Silver	...	...	...	...	...	0	8	6	"	

Value, £2 14s. 6d. per ton.

The tailings were collected in settling-pits, and weighed 1,910lb. net dry weight. They showed the following assay-value after being thoroughly sampled :—

Bullion	...	...	...	...	...	Oz. dwt. gr.	0	15	2	per ton.
Gold	...	...	...	...	...	0	10	0	"	
Silver	...	...	...	...	...	0	5	2	"	

Value, £2 0s. 6d. per ton.

They were then treated by the Cassel cyanide process by ordinary percolation with a 0·4-per-cent. solution of potassium-cyanide, which extracted the following proportions of gold, silver, and value :—

Gold	...	...	...	...	...	90·2	per cent.
Silver	...	...	...	...	...	88·0	"
Value	...	...	...	...	...	90·0	"

No. 1, gold from plates, and No. 2, bullion from tailings, are handed herewith.