

"I forward a table showing the efficiency of the apparatus by comparing assays of material filtered and washed by its means with assays of the same material washed with a very much greater quantity of water in the laboratory. Up to date 341 tons of concentrates have been passed through the cyanide-extraction plant, to which the various qualities contributed as follows: Jigger concentrates, 138 tons, value £2,688; first-class slime concentrates, 111 tons, value £5,326; second-class slime concentrates, 71 tons, value £1,427; buddle concentrates, 19 tons, value £637; lead-ore, 18cwt., value £84. The results of extraction have varied in accordance with the quality of the material, the slimes generally giving better results than the other products, and the (richer) first-class slimes returned a higher percentage of gold and silver than the lower-grade materials. Eminently satisfactory results have been obtained from the first-class slimes, from which as high as 96.45 per cent. of the assay gold, and 94.59 per cent. of the assay silver value were extracted. The average of extraction from 110 tons of first-class slime concentrates amounted to 86.11 per cent. of the gold value, and 67 per cent. of the silver, or 85.22 per cent. of the assay-value. The average extraction from 71 tons of second-class slimes returned 85.34 per cent. of the gold, 68.7 per cent. of the silver, or 82.62 per cent. of the total value. The average extraction of 64 tons jigger concentrates amounted to 80.32 per cent. of the gold, 50 per cent. of the silver, and 75.37 per cent. of the total value. The average extraction from 19 tons of buddle concentrates amounted to 77.9 per cent. of the gold, 54.45 per cent. of the silver, and 74 per cent. of the total value. The average extraction from 341 tons of concentrates amounted to 82.67 per cent. of assay-value. The total value of bullion extracted amounted to £7,916. There is still a large stock of concentrates on hand, which is at present undergoing treatment. The tailings are stacked for a possible future re-treatment, as it may be possible in future to turn the lead and copper contained in the concentrate tailings to account.

"I attach further tables showing the results of extraction of a large tonnage of each class of concentrates. The time of agitation and the strength of solution applied varied in accordance with the quality of the material. The quantity of cyanide used for the highest grade of ore amounted to less than 1 per cent., and for low-grade material considerably under 0.5 per cent. The time of agitation varied between five and twenty-four hours. The use of cyanide solution, so eminently successful with our concentrates, will very likely be successful with other classes of ores as a re-agent for extraction of gold and silver. The process is patented in New Zealand by the Cassell Company, and in Glasgow, under the name of the McArthur-Forrest process. The Sylvia Company acquired the right of using the re-agent on payment of a royalty of 7½ per cent. on the bullion extracted. The patentees did not interfere with the construction of the plant, which was left in my hands.

"The company's mine has supplied the works during the year with the required amount of crushing-dirt without difficulty. A low level is now being put in, which will give between 240ft. and 680ft. of backs.

"Last summer's exceptionally dry weather interfered to some extent with the working of the concentrating plant. Although droughts of a similar character are fortunately extremely rare in the Thames District, interruptions of operations may in future be prevented by constructing a second water-race about 150ft. above the present one, which will vastly increase the motive-power from about the same quantity of water.

"The results of the Sylvia works, both concentrating and extracting, have been, as detailed above, successful. The plant for crushing, concentrating, and extracting is one of the most complete and effective for gold-saving, and it is to be hoped that the pioneer work thus done by the Sylvia Company may prove beneficial to New Zealand's mining industry."

TABLE showing efficiency of Dr. A. Scheidel's Patent Vacuum Filter for separating Gold and Silver Solutions from Ore, Tailings, and other materials.

Assays of Discharge-Samples washed in Laboratory with Water (150 times weight of sample).			Assays of Filter-Residue after washing Tailings with two-thirds of their weight in Water, on Dr. A. Scheidel's Patent Vacuum Filter.		
Gold.	Silver.	Value.	Gold.	Silver.	Value.
Oz. dwt. gr.	Oz. dwt. gr.	£ s. d.	Oz. dwt. gr.	Oz. dwt. gr.	£ s. d.
0 6 13	14 14 0	3 10 3	0 6 13	14 0 22	3 9 3
0 16 8	21 4 16	6 9 1	0 16 8	20 14 21	6 7 5
0 9 19	8 0 2	3 3 2	0 9 19	7 13 13	3 2 0
0 6 13	13 1 8	3 5 2	0 6 13	12 8 6	3 3 3
0 9 19	15 7 2	4 5 3	0 9 19	15 0 13	4 4 2
0 9 19	10 2 13	3 9 6	0 9 19	10 2 13	3 9 6
0 9 19	11 11 22	3 14 0	0 9 19	8 9 21	3 4 8
0 9 19	9 16 0	3 8 3	0 9 19	9 16 0	3 8 3
0 9 19	6 0 21	2 17 2	0 9 19	5 11 2	2 15 8
0 6 13	6 4 3	2 4 11	0 6 13	4 18 0	2 0 7
0 6 13	3 11 21	1 17 0	0 6 13	3 11 21	1 17 0
0 6 13	4 11 11	1 19 8	0 6 13	3 18 10	1 17 7
0 9 19	5 14 8	2 16 3	0 8 4	4 9 20	2 6 2
0 9 19	4 18 0	2 13 7	0 9 19	3 15 3	2 10 3
0 13 2	7 3 18	3 13 8	0 13 2	8 3 8	3 16 8
0 13 2	8 0 2	3 16 4	0 13 2	8 0 2	3 16 4
0 16 8	11 8 16	4 19 5	0 16 8	11 5 10	4 19 1
0 13 10	5 19 5	3 3 8	0 13 10	5 19 5	3 3 8
0 9 19	7 7 0	3 1 3	0 9 19	6 13 22	2 19 1
0 3 6	3 8 14	1 3 1	0 3 6	3 15 3	1 4 1
0 8 4	8 18 0	2 19 1	0 8 4	8 11 12	2 18 6
0 8 4	11 0 12	3 5 8	0 8 4	10 0 12	3 2 8
0 5 12	10 10 0	1 4 6	0 5 12	10 0 0	1 3 0