

the gold by the wet-crushing process, it cannot be expected that an inferior appliance can obtain a higher percentage; but, until someone by actual demonstration shows the claimholders that a large percentage of gold can be extracted from the ore, they will go on in the old way, crushing the quartz and extracting the gold in the ordinary manner. If one of their neighbours erected machinery capable of extracting a few pennyweights more per ton than by the method now in use others will imitate the example, with the belief that they are using the most perfect appliances that can be obtained. This has recently been fully demonstrated on this field by the use of the different pans for treating the tailings. One of the patentees of these pans assured me that he was extracting 96 per cent. of the gold with his pan-amalgamation process. Such statements fill people with false hopes that they have arrived at the consummation of their efforts to extract the highest percentage of the gold from their ore; but by carefully sampling the ore and making regular assays they will soon find out that they have been deceiving themselves.

By any system of wet-crushing, in the Kuaotunu field, where the gold is disseminated through the quartz in particles much finer than the finest silk-dressed flour, a large portion must be carried away as float-gold in the water. Indeed, this can easily be ascertained by pounding a small piece of stone in a mortar, washing the pulverised ore in a tin dish, and panning it off into another vessel filled with water; it will be found that there is as much gold held in suspension in the water as was amongst the ore, and, after repeating the operation in clean water for two or three times, gold will still be found in a state of suspension. This experiment was made by myself on some of the Try Fluke ore, by panning it off into a second tin dish filled with clean water, then pouring off the water into another tin dish, and repeating the operation several times, when a fine rim of gold was always found after any panning-off. Mr. Richards, on my recent visit to this field, stated that he had made experiments with tailings, and also with slimes, by treating them in a berdan, and while the tailings gave a value of about £2 5s. a ton, the slimes gave a value of £3 2s. 6d. per ton. The loss of gold on this field can easily be conceived, when the gold is in many instances so fine that it cannot be distinguished without the aid of a powerful microscope, and on its immersion in water it will not precipitate for a great length of time; the muddy water flowing over the tables, and running into the creeks, must carry off a very large percentage of gold with it. The question for consideration is how is this to be prevented, and what other appliances can be used to prevent this loss.

The question of the best method for the extraction of gold entirely depends on the character of the ore. Some classes of ore may be successfully treated by amalgamation, while other classes are better suited for chlorination, leaching, or smelting. A person having charge of a crushing-battery requires to have a knowledge of the chemical properties of the ore that he has to deal with, and to adopt the most effective and economical system of extracting the metals. The Kuaotunu ore seems to be particularly adapted to chlorination, or to be treated by either the Cassell or Bohm cyanogen process, the gold being in a tolerably free state, and in such fine particles, that it should be easily extracted by either process. The question to consider is, Whether the extra expense of treatment would be justified by the larger percentage of gold obtained? In order to show this: The average yield of the ore treated last year was 15½dwt. per ton, or an average value of about £2 4s. per ton; and, admitting that 50 per cent. of the gold at the present time is saved, this would make the ore have an assay-value of £4 8s. per ton. The Cassell process is said to extract from 85 per cent. to 98 per cent. of the gold; but allowing it to save 85 per cent., then the value per ton saved would be about £3 14s. 9d., as against £2 4s. by the present method. The cost of actually pulverising the ore will be the same in both cases. Therefore it is only the extra cost of leaching with the cyanogen solution and precipitation, together with the royalty charged for the use of Cassell's process, that have to be taken into consideration, this would be about 12s. 6d. per ton for treatment, and 6s. per ton royalty, making a total of 18s. 6d. per ton, which would still leave the value of gold extracted to be £2 16s. 3d., as against £2 4s. by the present method; or, taking the number of tons crushed last year, namely, 11,228, the extra value of the gold obtained would amount to £6,877 6s., which would have gone into the pockets of the shareholders, instead of being wasted. Bohm's process is likely to be less costly than Cassell's, and, although it has never yet been actually in operation in the colony, it is likely to save as high a percentage of gold as the other, the principal re-agent being the same in both processes, only in Bohm's plant the filtration of the solution is more perfect. Mr. Bohm is now engaged in erecting a plant at Waihi, and the actual results of working the ore on a large scale will soon be known. He has also designs of a chlorinating plant, which would be applicable to the Kuaotunu ore; but it is questionable whether the expense of chlorination can be kept within either of the other processes; but, if so, a good chlorination plant would be certain of extracting about 90 per cent. of the gold.

*Permanency of the Field.*—On this field, the gold seems to follow down the lodes as far as they have been tested, and the character of the country rock would lead to the inference that the lodes will prove payable for working at a much greater depth; but until further prospecting has been carried on, and the lodes properly tested, no one can rely on how far they may carry gold down, *i.e.*, the soft tufaceous sandstone may be replaced at the deeper levels with a hard blue rock, which may cause the lodes to pinch out. However, there is a large amount of ore in sight which will pay for working, and the field presents a more permanent appearance than it did on my previous visit.

The following detailed statement of returns from the mines in the Coromandel District for the year ending the 31st March, 1892, shows that the total quantity of quartz crushed last year in the Coromandel County was 12,559 tons, which yielded, exclusive of gold produced from tailings, 11,557oz., giving about 18dwt. 11gr. of gold per ton, or an average of 41oz. 17dwt. of gold for every man employed in connection with mining claims. Comparing the return of the last year with the previous one, it shows that last year there was an increase of 5,944 tons of stone crushed, and 1,754oz. of gold, while the number of men employed was 63 less last year than in the previous one:—