

the appearance more of a quarry than a quartz lode. The mines are situate about two miles from the Ohinemuri River, where a crushing battery of 30 head of stamps and 4 berdans are erected, driven by a turbine water-wheel, and the battery is connected with the mines by a horse-tramway. There are good roads, and every facility for working the mines, on this field. The manager informed me that quartz containing gold to the value of 10s. per ton pays all expenses for getting out and crushing.

WAITEKAURI.—There is very little doing on this field. Some patches of good stone are occasionally got, but not sufficient to keep the crushing battery fully employed. The principal workings are in the Waitekauri Company's mine. This company has a crushing battery of 30 heads of stamps and 12 berdans, situated about two miles from the mines, and is connected with a series of incline tramways, which at the present time are in a bad state of repair, and show that they are not much used. The County Council, being subsidized by the Mines Department, have improved the road from Katikati to Waitekauri, and made it passable for drays to get to the crushing battery, which is all that is required. The present prospects of this field do not warrant any large expenditure being made.

THAMES.—The quartz reefs on this field have far exceeded those in any other part of the colony for richness, when it is borne in mind that one of the mines a few years ago produced gold to that extent that the company declared over £600,000 in dividends. This, together with the numerous mines that have been and are now profitably worked, extending over a large tract of country, shows that it is a field deserving attention, and likewise one that may still be expected to be a large gold-producer. Among the mines that are at present working, the Prince Imperial may be said to take the lead as a dividend-paying mine. A little over two years ago this mine was supposed to be worked out, and when put up to auction was sold, with winding machinery, for about £250. The fortunate purchasers had scarcely concluded the bargain when they struck the reef at a few feet deeper level, and have since received £52,000 in dividends. This company has connected its workings by a winze from the tunnel, leading from the bottom of the big-pump shaft at the 640ft. level, and is still continuing to pay good dividends. How far the reef continues to go down and contains gold of a payable nature remains yet to be proved. On the 640ft. level, where the winze goes up from the tunnel, the reef is very narrow. It may only be termed a vein of quartz, which is not of a payable nature. Still, the reef may make again going down; but the expense of sinking the big-pump shaft, and opening out again at lower levels, will entail enormous outlay, and, unless rich stone is found going down below the present level of the tunnel, either by sinking a winze or by boring with the aid of a diamond drill, there is little chance of the company incurring so large an expenditure. The crushing machinery on this field is far more complete than it is on any field in the Middle Island, but the mining plants are greatly inferior. They have, however, recently commenced working with a rock drill in the Caledonian Low-level Mine, the use of which has enabled the company to drive their tunnel at the rate of 33 feet per week, at the cost of £1 13s. per foot, including rails, sleepers, and air-boxes; whereas the lowest contract that was ever carried out in similar ground at the low levels was £2 9s. 6d. per foot. This shows clearly that there is a great saving to be effected in driving tunnels with improved mining machinery. Not only is the rate per foot less, but it enables the tunnel to be constructed twice as fast as it could be done by hand labour; and to any company that has to contend with a large body of water or pay for drainage, the same as the Caledonian Low-level Company has, viz., £65 per month, it becomes a matter of great importance to get the work done as rapidly as possible. There is a new description of water-wheel, recently erected by G. W. Bull at Hape Creek, known as the Pelton water-wheel, which is causing quite a sensation as regards a motive-power for working machinery. It is termed "a hurdy-gurdy water-wheel," and is 6ft. in diameter over all, with 12½ in. breast. A wood-cut of this wheel appeared in the "Californian Scientific Press" at the beginning of September last, on account of it having given the highest tests at a public competition made by the Idaho Mining Company with the view of determining the best description and most effective motive-power, combining cheapness, simplicity, and economy. Mr. Bull was so thoroughly satisfied with the description of the experiments that were made with this wheel that he had one constructed, which now drives his crushing battery at Hape Creek, consisting of 13 heads of stamps, 500lb. each, and 6 berdans. The stamps make seventy blows per minute, and have 10 inches drop. The quantity of water used is 216 cubic feet per minute, and has a head of 34ft., therefore giving about 81 per cent. of the power of the water. In conjunction with Mr. Aitken, the County Engineer at the Thames, I conducted some experiments to get the power of the different water-wheels at the Thames, that being a place where the exact head of water is known at the various wheels, and where there is a gauge-box placed to measure the quantity of water they use; and the result was, that this wheel gave about 12 per cent. more power than the best constructed Leffel turbine, the tangent wheel giving the next highest percentage. The extreme simplicity of these, as well as the tangent wheels, together with their cheapness of construction, not being liable to go out of repair, and the high percentage that they give, will always recommend them in preference to overshot or turbine wheels, more especially as they do not cost more than one-third the cost of the latter. The only difference from the tangent wheel is, that the buckets are bolted on the outside of the rim, and throw the water on each side. The water coming from the nozzle strikes the bucket, which has a vein in the centre that divides the water, and, by means of a parabolic curve, turns it outwards on each side. The County Council, with subsidy from the Mines Department, has constructed and improved the road up Waiatohi Creek to the Bright Smile Mine, which enables the quartz to be brought down from all the mines in this neighbourhood to the crushing batteries on the flat at Grahamstown. The Council has likewise improved the road up Karaka Creek to Lucky-hit Company's mine, which enables all the companies in this locality to get ample communication with their mines. The road from the Otanui mines to the crushing battery at Mangakerikeri Creek is now in course of construction, and, when completed, will afford ample facility to get the quartz from all the mines in this neighbourhood to the battery. A subsidy has likewise been authorized to construct a track up Mangakerikeri Creek from the battery, to