

Drennan Brothers' farm, would pay to work by this method if the quantity of tailings that is now heaped on the surface, is not formidable to remove. A party of miners did erect a plant of this description here, but were not allowed an opportunity to test its value, owing to the ground being taken up as a tailing site. This is much to be regretted, inasmuch that, if the party had been successful, they would have been the means of the water being all utilized from the Nelson Creek water-race for several years.

OLD MAN RANGE.—White Reef.—This is a locality where there are good indications of a rich quartz-lode being found, but, up to the time of my visit in December last, there was nothing struck of sufficient importance to warrant the erection of crushing machinery. A tunnel has been driven from the face of the hill for a considerable distance, following in places a quartz leader from 6 to 10 inches wide, which contains a fair amount of gold; but the country is all very broken, and has the appearance of a slip, which I think it is, as the strata of the rock lies in every direction, with open seams and joints, having the same character as though it had at one time been a large moving mass, and crushed up the quartz leader to quartz-gravel. The appearance of the quartz resembles that in the Golden Crown Company's Mine at Terawhiti, with the exception that it is more of a ferruginous character. This is a locality well worth prospecting, but I am inclined to think that the reef, where this slip came from, is some distance back into the range. All its surroundings point in this direction, inasmuch, that there has been rich patches of alluvial gold got for a considerable distance down the face of the range, under the place where this quartz-leader has been found. After this slip had taken place, the action of the atmosphere would decompose the rock, and the rains and snow-water would wash it down the face of the hill, distributing the gold from the crushed quartz-leader all over the surface.

Carrick Range.—This is a locality where very rich quartz-lodes have worked on the surface, and I was informed that one of the companies (Royal Oak) had paid about £14,000 in dividends to the shareholders, but, after going down about 70 feet in the lode, it commenced to get too poor a nature to work. On the Royal Oak line of reefs shafts have been put down 150 feet, but at this depth the lode seemed to run out. This ground was abandoned for several years, when a company again took it up, and are at present driving a tunnel from the face of the hill at the head of Smith's Gully, to try and find the reef at a greater depth. This tunnel is now in for nearly 1,100 feet; but the present company have not yet been successful in finding any stone of a payable nature. There are several lines of reefs on this range, but none of them are being worked to any extent. The Star of the East Company have driven a tunnel, at a low level, for over 500 feet, to prospect the ground. All the work that is at present being done is of a prospecting nature. While in this district I inspected "Alves Patent Amalgamator" that was being erected at the Carrick Range to work the tailings that came from the Royal Oak Company's Battery during the time they were at work. Mr. Alves was present at the time of my visit, and stated that, from tests made by this amalgamator, it was found to extract all the free gold from the tailings, and to save the whole of the pyrites, which he proposes to treat separately. If Mr. Alves can accomplish this, which I question, he will have solved the problem of an easy method of extracting the ores from their matrix. However, his appliance is ingenious and simple, and can be erected at a comparatively small cost. A description of the method he adopts is as follows:—There is first a box about 14 feet long, 2 feet wide, and from 6 to 8 inches deep, set at an inclination of about 1 inch to the foot. The bottom of this box is covered with green baize, on the top of which a wire netting is placed, having about ten holes to the square inch. This netting is held down by two battens set on edge, one at each side of the box, and held in their places with a common wooden button. Two of these boxes are placed side by side, and at the head or upper end of them there is a hopper with screen fixed common to both. The object in this hopper is to carry the tailings and water on to a screen before they reach the box, so as to prevent any coarse material mixing amongst the stuff to be operated on. The tailings are sluiced down with a stream of water into this hopper, and, as they travel over the wire netting, each mesh forms a ripple, and by this means, Mr. Alves states, the pyrites are saved and collected. When there is a sufficient quantity of pyrites in the meshes of the netting, the water is turned off, the netting lifted, and the green baize taken up and washed in a tub placed alongside the boxes for the purpose of holding the material that collects on the baize. The hopper at the head of the boxes is so constructed that the water and tailings can be shut off either of the boxes at pleasure, so to admit of the baize being taken up, washed, and again replaced, without interfering with the working of the other. At the lower end of these boxes there is another hopper common to both, and the tailings are again screened before they are allowed to enter the amalgamator. The amalgamator is about 4 feet in width, and has a vertical box made perfectly watertight, at the upper end, into which all the water and tailings are discharged. This box is of sufficient height to have a head of water capable of balancing the mercury, which is placed in narrow gutters made of copper, and electro-plated. These gutters are about 1 inch in width, and from $2\frac{1}{2}$ to 3 inches in depth. The lower sides of the gutters close to the bottom are perforated with holes, and the water and sand have to pass through these perforations and mix with the mercury. The head of water being sufficient to keep the mercury in a partially revolving state which, Mr. Alves contends, prevents it from going through these perforations. After the water and sand have passed through two of those gutters containing mercury, they are forced down on the surface of a mercury-well by means of a balanced lever attached to a weighted bar, the bottom of which is covered with electro-plated copper, have recesses or grooves, so as to press down in amongst the mercury. The underside of this bar is the same width as the well where the mercury is placed, and its weight is sufficient to keep it down on the surface; but, being balanced by a weight on the lever, the pressure or head of water causes it to rise sufficiently to allow the sand and water to get away, and run down an inclined electro-plated copper sheet charged with mercury. This sheet is the width of the amalgamator, viz., 4 feet and 2 feet in length. At the bottom of this there is a small well for the quicksilver collecting; thence the tailings goes away as wash product. The cost of this appliance is about £50, and if it is successful in its operations it will be readily adopted by quartz companies, as the cost is but trifling. From the principle on which it is constructed there is little doubt but what it will save a certain percentage of the gold, but I have doubts about it not losing mercury, and, if so, it is certain to lose gold.

LAKE DISTRICT.—Invincible Company's Mine.—This mine is situated about fifteen miles up the Rees River at the head of Lake Wakatipu, about 1,400 feet above the level of the lake, and contains the