by 3ft. 10in. wide, sloping towards each other on an inclination of 3 to 1, and having a recess between the two hearths for the purpose of holding a bath of molten lead to absorb the metals from the melted ore, the quantity of lead required being about 3in. deep across the bath. The furnace is constructed of fire-bricks, having the sides 14in. thick, and the roof or arch constructed with 9in. birch-wood, and 22in. high above the floor of the furnace. At the one end there is a fire-box, with iron gratings underneath, and between the fire and the hearth of the furnace there is a low bridge built of fire-bricks. At the other end there is a short flue, 20ft. in length, leading to a brick chimney. In this flue, near its junction with the chimney, there is a damper, made of fire-brick and bound together with iron, to regulate the draught. The furnace is bound together by heavy cast-iron plates on the sides, and bolted together.

This furnace has been constructed by Mr. H. Johnson, who is very sanguine as to its success. He intends to smelt the quartz in charges of about 6cwt., which he states takes about two hours to complete, his object being to allow the molten mass to stand in that condition, so that the gold and silver in the ore gets time to settle down in the lead-bath.

There had been no real trial made with this furnace at the time of my visit: some quartz containing a large percentage of iron only had been operated on. Mr. Johnson states that it requires one ton of ironsand and from half a ton to one ton of lime for every ton of quartz. With the experiments he has already made, he thinks that he can smelt the quartz-ore at £3 per ton. The difference between the La Monte smelter and this is, that Mr. Johnson smelts in small charges; then runs off the slag before charging the furnace again, leaving about 1in. deep of slag on the top of the lead to protect it from the flames.

I fear this will not be a success: even if the smelting is easily done, and the metals are readily absorbed by the lead, a portion of the metals will volatilize, and, the flue being straight and short, and no provision made for condensing the fumes, they will go up the chimney. Mr. Johnson has made no arrangement yet for refining the bullion after it is collected in the lead-bath.

Te Aroha.

New Era Company.—This company commenced operations to erect a public crushing-plant up Waiorongomai Creek, near the upper quartz-workings, in August, 1884, and completed their plant, roads, and tramways in April, 1886. The unusual difficulties there were to contend with in getting their machinery on the ground and connecting their battery with the mines were far more formidable than they ever anticipated. The tramway to connect the mines with the battery was estimated to cost £1,500, of which amount they were subsidized by Government to the extent of £1,000. The amount estimated would have been sufficient if the tramway had been properly laid out; but they, like many more companies with limited means, did not pay the attention to survey and plans that they deserved, which resulted in increasing the cost from £1,500 to £2,400. They had also to widen the horse-track from Waiorongomai up to their works into a dray-road, to enable their machinery to be brought on the ground. The Government also subsidized this work to the extent of £333 6s. 8d.

Their plant consists of a calcining-kiln, a stone-breaker, a large revolving-pan, with two heavy rollers each two and a half tons in weight, eight Mackay pans, and four amalgamating-pans. The quartz is delivered from the mines by an inclined tramway into a large hopper, from which the quartz goes down a chute and goes through the stone-breaker, thence passes through the calcining-kiln, after which the calcined ore passes through a second stone-breaker before going into the large pan to be ground by the rollers. These rollers and pan are similar to a large Chilian mill, only there is a grating on the outer diameter of the pan, which does not allow the ground material to pass through until it is in the consistency of coarsely-ground oatmeal. Up to this stage the grinding is done in a dry state.

The ground material is now fed into the Mackay pans in charges of 15cwt., each charge taking from four to five hours to reduce the ore to the consistency of a fine pulp. During the latter portion of the grinding quicksilver, chemicals, and hot water are added. The heating is done by a jet of steam from a boiler which is expressly erected for this purpose. When the amalgamation is deemed to be complete the pulp is drawn off into the settler, which has revolving-arms fitted with shoes, and these keep rubbing over the bottom surface of the settler at a speed of twelve revolutions per minute. A good supply of clean water is let into each settler after they have been working for about an hour, and the process is continued for about an hour and a half longer, when the amalgamation is deemed to be complete, and the fine particles of quicksilver which were formed by the grinding are again collected into a body at the bottom of the settler along with the amalgam. The tailings are kept in suspense until they are washed out of the settler into a concentrator with a continuous stream of clean water. This concentrator is intended to catch any of the particles of quicksilver that may escape from the settler. The amalgam and quicksilver are drawn off from the settler in the usual manner into buckets, after which the bullion is retorted. This plant is driven by a Pelton hurdy-gurdy wheel under a 300ft. head of water.

So far this plant has not proved a success. Since they commenced grinding only 140 tons of ore have been treated, which yielded 87oz. of bullion. The refractory nature of the ore in this district, which contains, as well as gold, sulphide and tellurium of silver combined with arsenic, necessitates a different process of treatment from that hitherto adopted by this company. One of the proprietors of this plant—Mr. Fraser, of Fraser and Sons' foundry, Auckland—erected a small plant in Auckland, and has been for some time past conducting experiments on the treatment of this class of ores. He finds that the ore must be first ground and then chlorinized in a furnace before it can be treated properly, in order to get clear of the sulphur and arsenic; and they now propose to alter their plant to treat the ore in this manner, which they can do at a small outlay. After the ground ore is properly roasted and chlorinized, the latter being accomplished by means of adding a small quantity of salt to the ore in the last stage of roasting, in the manner