

the grizzly runs down to the rock-breaker, and is broken up to a maximum size of 2in. in diameter, and then falls into the same hopper where the fine material goes that passes through the bars of the grizzly. It then passes from this hopper into the drying-kilns, which are built of brick, the hot air being confined in a long flue, having a series of steps to prevent the ore from travelling down too fast before it gets thoroughly dried. There is a cast-iron plate at the bottom of this flue which can be turned, to allow of the dried ore to pass down into a large hopper, made of steel-plates $\frac{5}{16}$ in. thick, from which the Challenge ore-feeders are fed. These kilns are only for drying the ore, and not in any way to calcine it. There are two of these kilns built on a stone foundation, and placed about 6ft. apart; the foundation going all the way across. The kilns themselves stand about 30ft. in height, the step-flue being at an angle of about from 30° to 40° from the vertical. There is a furnace at the bottom, where either coal or firewood can be used to dry the ore.

Stamp-mortars.—There is first a concrete foundation put in for the stamps, and on the top of the concrete the stamp-mortars are each placed on the end of a log of kauri, each 18ft. in length, 4ft. 8in. one way, and 2ft. 2in. the other. These are firmly embedded in the concrete, and all bolted together so as to form a solid block of timber standing on end, having a length of 18ft. 8in. by a width of 2ft. 2in., and on this the four mortars are placed. They are fitted with screens, having the top standing outwards at a slight angle, and held to the face of the mortars by means of a long wedge, the gratings being 30-mesh, equal to 900 holes to the square inch.

Stamps.—The stamps are similar to those used by the Waihi Company, and are fitted with the latest appliances for raising and holding them up, the cams and tappets being all constructed on the American type by Price Brothers, of the Thames. They are intended to make about ninety-two blows per minute, having a drop of 6in. The guides and framing are made of wood, and the framing and erection reflects credit on the contractor. Each ten-head battery is driven by a separate belt, and there is further provision made so that twenty additional stamps can be erected should they at any time be required. The pulverised material from the stamps falls into a chute and is conveyed into another set of hoppers at a lower level than the stamp-mortars, and from these hoppers the pulverised dust is taken to the leaching-vats.

Cyanide Plant.—This consists of twenty-four wooden vats, each 11ft. long by 9ft. wide and 3ft. 9in. deep. In the bottom of these vats there is a false bottom, or grating, placed about 3in. above the ordinary bottom, and on this false bottom a filter-bed is placed, about 4in. in thickness, the bottom layer being of coarse quartz-gravel, and gradually getting finer up to the top, the last coating being fine sand, having a coarse cloth placed over the top of the filter-bed to prevent the sand from being disturbed as the vats get cleaned out after every charge of pulverised ore. There are also fourteen agitators, eight of which are 5ft. deep by 4ft. 9in. in diameter, and six of them 6ft. deep, and 5ft. 6in. in diameter. The agitators and vats are all made of kauri timber, the staves of the agitators being 3in. in thickness, and the vats being made of partly 3in. and partly 4in. timber, and all bolted together. Into each of these vats are placed three pipes, under the false bottom, so that the first, second, and third solutions can be drawn off into separate channels. On one side of each vat there is a door, which can be opened to admit of the material being sluiced out after the whole of the cyanide solution is completely washed out of the ore, the solution passing through a long series of boxes filled with zinc-shavings, which precipitates both the gold and silver in the form of a blackish powder. There are also three concrete sumps, each 15ft. by 12ft. and 6ft. deep, capable of holding about thirty tons of the cyanide solution; this is pumped up to the vats on the floor above as required. It is in these concrete sumps where the solution is always made up to the proper strength before being used.

It is also proposed to use a vacuum pump to assist the filtration of the solution through the pulverised material in the vats, and by this means Mr. McConnell hopes to be able to leach the ore in about half the time he was able to do so at the old plant. However, this has yet to be tried. Where there are a great deal of slimes in the ore, it is very difficult to filter even with a vacuum pump. This proved to be the case at the Sylvia Company's plant at Tararu Creek, where Dr. Scheidel adopted this method to assist the leaching.

Annexed are plans of the company's plant, to which the following description or reference applies. The explanation of the plans was handed me by Mr. McConnell, the manager:—

"At point *A* the ore is delivered at the battery, and tipped on to grizzly, *B*; the fines pass through and are conveyed to hopper, *D*; the roughs pass over the grizzly on to the stone-breaker floor, and are passed through stone-breaker, *C*, and fall into hopper underneath, marked *D*; the drying-kiln *E* is charged from this hopper. The ore, after passing through the kiln, being perfectly dry, is run into an iron hopper *G*, from where it is automatically fed into stampers *I*, by self-feeders, *H*; the ore, after passing through the stampers, is received in hoppers *J*, and then conveyed by means of revolving tube *K*, either into truck for conveying ore to agitation-cylinders for treatment, or, if the ore can be better treated by percolation, to store-hopper, *R*, in connection with percolation plant, from where it is trucked along the top of and tipped into percolation tanks, *S*, for treatment.

"The plant is so arranged that the ore, after it is delivered above the stone-breaker, falls from the stage by gravitation, requiring the least possible handling, and thereby reducing the cost of labour to a minimum.

"Water-power: By means of a 4in. by 2in. fluming the water is taken from a point in the Ohinemuri River above Karangahake, and conveyed to the battery a distance of 85 chains, giving a fall there of 70ft., which, with three Pelton wheels, 140-horse power can be obtained. The diameter of the water column is 44in.

"Crushing Machinery: One Lamberton stone-breaker, capable of reducing 70 tons of ore per day fine enough to feed into stamps; and twenty heads of 9cwt. dry stamps, erected by A. and G. Price, which are guaranteed to crush 30 tons of ore per day sufficiently fine to pass through a 30-mesh screen.