The blast for the furnace is supplied by a Baker's No. 4½ blower, having six air-pipes, into the side of the furnace, driven by a Pelton water-wheel of about fifteen-horse power. The ore passing in through the smelter is subjected to a heat of about 4,000° Fahr., which reduces the whole of the contents of the furnace to a thin fluid. By the action of this intense heat the gold, silver, and lead are completely liberated from the ore, and, from chemical affinity and by their specific gravity, combine together and sink down through the molten liquid into the bottom of the furnace, known as the lead-well. The contents of the well are dipped out at intervals by means of ladles. The well here referred to is outside the furnace, and connected with the bath in the bottom of the furnace, and shows the height of the molten metal. The metal is taken from this well and poured into moulds, from which it is subsequently turned out in the form of bar-bullion, and stacked ready for shipment to the refineries. There is an opening in the water-jacket above the lead-well, which is stopped up, but is tapped at intervals to allow the residue or waste substance to run into slag-pots, where it is allowed to cool before being turned out.

It is not essential that all ores should be concentrated prior to smelting, as there are raw ores that are suitable to be mixed with the necessary fluxes and fed direct into the furnace, just in the same way that concentrates are, and smelted. It has been clearly demonstrated, however, with regard to the general run of ore mined at Waiorongomai, that it is suitable for concentration, and more cheaply treated by this method; whilst ores from other portions of the goldfield—Karangahake—have been found unsuitable for concentration owing to the low specific gravity of the sulphides contained therein—namely, that portion which covers the precious metals.

The water-jacket furnace is capable of smelting from 20 to 30 tons per day, exclusive of fuel and fluxes, the quantity varying according to the character of the ore under treatment. The general value of the bullion obtained has been about £60 per ton.

For the treatment of ores which cannot be satisfactorily dealt with by means of crushing and concentration, &c., the "Boss" plant is used. This plant consists of three grinding-pans, six amalgamating-pans, and two settlers, which are driven by a Pelton water-wheel, and are capable of treating about 30 tons of ore per day. The precious metals saved by this plant are found in the form of amalgam. The ore, previous to being treated in the plant, is crushed, and, if found necessary after assay, chloridized in the White-Howell revolving furnace, which is capable of roasting and chloridizing about 30 tons of ore per day. When the ore requires roasting after crushing, it is crushed in a dry state.

The present plant erected by this company is capable of treating about 100 tons of ore per day of twenty-four hours, and the cost of crushing and concentrating is said by Mr. Adams, the present manager, to be 3s. per ton. In connection with the works there is a very complete laboratory, fitted up with all the necessary appliances for making elaborate assays of the ore.

The following tables, supplied by Mr. Adams to the proprietor of the *Te Aroha and Ohinemuri News* of 30th November, 1889, show the cost of treatment of the ore at this company's works:—

Treatment of Siliceous Custom-ores and Company's Concentrates.

	£ s. d.		£. s. d.
To Labour	643 0 11	By Value of 155¼ tons concentrates produced from 4,536½ tons ore—assay-value	3,221 14 10
Four flasks quicksilver	40 0 10		
Freight on supplies	16 6 9		
Miscellaneous supplies	42 5 5		
Blacksmith's slack	6 9 11		
Oil, screens, &c.	43 8 0		
	791 11 10		
Less charges for treating custom-ores £28 12 7			
Supplies on hand 60 0 0			
	88 12 7		
	£702 19 3		£3,221 14 10

This shows the cost of crushing and concentrating to be about 3s. 1d. per ton of crude ore, or, the cost of producing the concentrates was £4 9s. 2d. per ton.

Roasting and desulphurising the concentrates in the Howell revolving furnace:—

	£ s. d.	
Labour	11 16 11	
44 tons of firewood	12 2 0	
Total	23 18 11	= to about 3s. per ton of concentrates.

Cindering of concentrates, lead, and siliceous custom-ores in the reverberatory furnace:—

	£ s. d.
Labour	252 5 7
Furnace-tools	1 15 9
15 tons fine coal	18 10 2
89 tons ordinary coal	86 15 9
245½ tons firewood	81 12 0
Total	440 19 3