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(No. 63.)

## A DESCRIPTION OF THE TASMANIAN SMELTING COMPANY'S WORKS AT ZEEHAN.

BY MAX HEBERLEIN, *General Manager.*

THE Works erected by this influential company are situate about two miles from the town of Zeehan along the Zeehan-Strahan line of railway. A parallel siding connects the smelters with the main line, thereby giving them an elevation of 90 feet above the line. On this siding a Howe's weighbridge receives the trucks of ore delivered to the company. The scales have a self-registering beam by which the gross and tare of each truck is recorded in duplicate on tickets. Errors in weight are thus avoided, and, as the shipper or his representative receives a ticket direct from the scales, disputes of weights are avoided at once. The tickets also form an evident proof if any question of past weights should arise. The track then forks, one line carrying ore to the sampling mill and sulphide ore-bins for the roasters, and the other and lower line passing between the roaster building and blast furnace bins. By this arrangement the fuel for the roaster furnaces is delivered directly at their fire-boxes, while the bins are easily accessible by rectangular tracks (overhead) to it. Good storage ground is thus provided between the upper and lower lines, and this is used for coke and other materials. On the upper line is the automatic sampling mill, a commanding building 60 feet high, by 74 feet long, by 36 feet wide. The operation of automatic sampling is here applied to all ore bought by the company, and the results have been perfectly satisfactory in point of accuracy, as has been verified over and over again, both by the company and the ore vendors. This mill automatically samples the ore and delivers it into hoppers. The sampling operation varies according to the ore treated. The sulphide ores, which need roasting before they are fit for charging into the blast furnaces, are first reduced to a proper size by crushing to  $\frac{1}{4}$ -in., and then pass through the Bridgmen sampler. The crushing is done by feeding the coarse material into a fifteen by nine Blake crusher, two sets of reliance rolls, the ore passing through two 72 in. by 30 in. screens. Two elevators of 40 by 60 ft. centre raise the material to such a height as to facilitate the final deposition in bins without labour. The ore passes through this mill in an uninterrupted flow, and the machinery can be adjusted so as to select either  $\frac{1}{32}$ ,  $\frac{1}{16}$ , or  $\frac{1}{8}$  part of the whole quantity passing. The quantity selected is discharged into iron buckets, and then goes to the drying room and sample grinder before being taken to the laboratory for assay. The remainder of the ore falls into the bins, whence it is trucked to the final bins for making the roasting mixture. For the ores which need no roasting there is a coarse 9 in. by 15 in. Blake crusher and a sampler. The  $\frac{1}{2}$  or  $\frac{1}{4}$  part can be withdrawn as a sample, and the remainder is taken by trucks to the bins for oxidised ores on the charging floors at the blast furnaces. The selected sample is crushed fine, and then quartered as usual. The E. P. Allis Co., Milwaukee, U.S.A., supplied the sampling plant, and are the manufacturers of the 75 h.p. Reynolds-Corliss engine which drives the mill. The spacious drying floor measures 250 square feet, and is heated by exhaust steam from the engine. The main boiler-house is 300 feet away, and the steam is taken through a pipe line, the expansion being regulated by a joint on the lower end. The condensing steam is withdrawn by an automatic trap, which also minimises the loss of steam.

The roaster-shed is a building measuring 280 ft. long, by 92 ft. wide, and is fitted with seven roasting furnaces 72 by 17 ft., taking a daily charge of twelve tons each. The ore is charged behind, near the main flue, and gradually worked to the front. In this process, with the aid of heat, and by the access of oxygen, the ore loses its sulphur. It is then conveyed to a cooling floor, weighed and sampled, and finally taken to the beds of ore which supply the smelting mixtures for the blast furnaces. The sulphide bins which supply the roasters are level with the feed-hoppers, and Fairbank scales are fixed at suitable distances to weigh the furnace charges in the most efficient and economic manner. The capacity of these bins is 3500 tons. There is a general flue along the back of roasting furnaces, and this connects with a roomy dust and condensing chamber, and then with a tall stack 125 ft. 10 in. high, and 8 ft. inside diameter. This height ensures a good draught, and carries off the noxious fumes at a good elevation above the summits of surrounding hills. The blast furnace bins cover an area of 350 ft. by 150 ft., and are each 125 ft. by 30 ft., and roofed over for protection from the weather. The middle bins are devoted to the bedding of different descriptions of ore in such a way as to form nearly self-fluxing mixtures. At one end flux is stored, and coke at the other. These bins are capable of accommodating 4000 tons of ore, 2000 tons of flux, and 1000 tons of coke. For fine ores and clayey gossans a briquetting plant, consisting of mixer, White's press, manufactured by H. S. Mould Co., of Pittsburg, U.S.A., and 40 h.p. vertical engine, has lately been installed, by which the detrimental influences of the fine material in blast furnaces are overcome. There are three blast furnaces erected, with a daily capacity of 250 tons of ore.

The two lead blast furnaces are of the newest American type, 3 ft. 6 in. by 10 ft., made by the Colorado Iron Works Co., Denver, U.S.A. They are unusually high, 25 ft., with a charge column up to 21 ft., and can treat 80 tons of ore per day each. The fumes from the lead furnaces are discharged above the charge floors by a down-take into the main blast furnace flue, but those from the one copper furnace are drawn underneath the charge floor. The main flue of the blast furnace is large enough to act as a condensing chamber for collecting volatilisation products. It is 200 feet long, and is connected with the blast furnace stack, 125 ft. high. The furnace products, that is to say—silver lead and copper matte—are carried on a 2 ft. tramway to the Austral siding, for consignment to the shipping port, Strahan. A slag dump is being formed on ground falling to 80 ft. below the furnaces, and there is ample room for very large accumulations of slag. The blast furnace building measures 108 ft. by 84 ft. 6 in., and extra furnaces can be added as required without causing any interruption to current work. The engine-room adjoining the blast furnace building is protected against fire by two end walls of brick, and measures 78 ft. in length, by 54 ft. in width. The engines are in duplicate, one being kept in reserve for emergencies. They are Reynolds-Corliss engines of 125 h.p. each, and are furnished with belted condensers. The engines can be driven together or separately. In this room are two No. 7½ Root's improved high-pressure blowers, with self-oiling bearings, and these supply the blast for the furnaces.

They furnish 87 cubic feet of air at each revolution, and are guaranteed to work up to 5 lbs. pressure. The whole is electrically lighted by 250 16-c.p. lamps. There is a fitting shop, with large American lathe and drilling machines. The boiler house, 55 ft. by 39 ft., contains three large multitubular boilers, 125 h.p., working up to a pressure of 100 lbs. The flux haulage line is worked from the level of the roaster building, and brings in limestone from the quarries near by, as well as firewood from the company's timber reserves. Near the quarries is a lime-kiln, with a capacity of 120 bushels a day. A Pennsylvania boiler provides the haulage power. The water necessary for the works is derived from a creek below the smelters, and is pumped by a Worthington pump of the plunger type, with compound double action. It is carried by 5-in. mains to the various departments and the two large tanks

made by Salisbury's Foundry Co., Launceston, with a total capacity of 70,000 gallons. These tanks form general reservoirs, and are available in the event of fire. A separate boiler supplies steam for the pump, as well as for the drills in the lime quarry. All roofs and buildings are protected with black acid-proof paint. The Assay office is built of brick, and has five rooms. The two muffle furnaces have muffles 19 inches long, 15 inches wide, and  $7\frac{3}{4}$  inches high. They permit the assayer to work very comfortably and economically. A bath-house has been erected for the men, fitted with shower and hip baths, with a view to promote and conserve the health of all employed at these works. Over 4000 tons of lead, and 500,000 ozs. of silver, have been produced by these works during the first year of their operations.





*Photo-Algraphy Process.*

SITE FOR TASMANIAN SMELTING CO.'S PLANT.

ZEEHAN, JUNE, 1896



*Photo-Algraphy Process.*

IN FULL BLAST !  
Tasmanian Smelting Co.'s Plant, Zeehan. June, 1899

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