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DESCRIPTION OF THE TREATMENT OF ORE AT THE WORKS OF THE TASMANIA GOLD MINING AND QUARTZ CRUSHING COMPANY, REGISTERED, AT BEACONSFIELD.

BY JOSEPH DAVIES, *General Manager.*

THE ore, after leaving the mouth of the shaft, is tipped into passes, and delivered as required, to trucks, in a tunnel below. The trucks of ore are taken from this tunnel by means of an electric motor, which conveys them to the reduction works about one mile away. Here the quartz is tipped into three hoppers, each of which is placed immediately over a Gates' rock-breaker. From these hoppers to the rock-breakers the quartz is automatically fed by means of a portable tray, which forms the bottom of the hopper. These trays are perforated, so that only ore requiring breaking goes through the crushers, whilst the fines go directly to a large storage hopper, extending the whole length of the battery. From this large storage-hopper the ore is allowed to fall through doors into automatic feeders, by means of which it is fed into the battery. There it is crushed through fairly fine screens, the pulp then passing over amalgamated copper plates, thence over blankets to the concentrating plant, which is built on the Luhrig system.

There are 65 heads of stamps running, which, for the purpose of classification of the crushed ore, may be considered to be divided into three systems, of 20, 20, and 25 heads of stamps each. There are two classifiers for each system. No. 1 is a box, triangular in cross-section, being shallow and narrow at the intake end, and wide and deep at the outlet. This shape gives a diminution of velocity as the pulp proceeds through the box, and allows the different grades of sand to settle into the inverted pyramidal-shaped compartments, into which the classifier is divided. From the apex of each so formed pyramid the graded sand is tapped. The finest pulp and slime passes from No. 1 to 2 box, which is a large Spitzkasten, also triangular in section, but the same depth and width throughout. The differences in grade are made by a regulation of the design of the compartments into which the box is divided. The first division of No. 1 classifier in each system divides its pulp to a small classifier, of two compartments, from which the pulp proceeds to jigs, of Luhrig design. These are of the plunger and screen type, and separate the mineral from the gangue in a very efficient manner. Besides these jigs, there are also 40 vanners, each of which takes its supply of graded pulp from an adjacent compartment in one of the classifiers.

The framework for supporting the working parts is of heavy timber, which is bolted to the foundation-logs. Between the uprights is an adjustable percussion frame, suspended in the frame by means of suspension-rods, to the ends of which are attached nuts for adjusting the degree of lateral inclination of the frames. On the upper side of the frame are two large rollers, the shaft of one of which has a small tooth-wheel, which is driven by chain-gearing from a small counter-shaft, while on the lower or under side are three smaller rollers. The percussion-table is arranged to have a lateral inclination, and the apron or belt thereon takes the same inclination. One rod passes through one of the uprights of the framework, on which is placed a percussion-block and plate, and a spiral form of spring attached to one end of the frame. Suitably attached to the end of the rod is a nut,

with a washer adapted to bear against the spring. A similar rod is attached to the other end of the frame, and to the upper end of a lever, which is pivoted at its lower end to one of the sills of the framework. Suitably arranged on one end of the frame is a cam, which receives its motion by means of a belt passing over a pulley, located on the cam shaft. The cam is preferably so formed that it shall have one or more projections thereon, which act, when brought into contact with the lever, to depress or push it back, and with it, the frame. This compresses the spring, which, when the lever is relieved by the cam, draws the percussion framework so as to strike the plate with a sharp blow or percussion. A distributor of convenient form is arranged to feed the pulp on the belt at the upper right-hand corner. Along and over the highest side of the belt or apron, extending some distance parallel with it, and then running diagonally across the lower left-hand corner, is a jet pipe full of clarifying water. This water, at or near the distributor, assists in the separation, and, at the lower left-hand corner, removes, or washes off the apron the heaviest and last concentrates. Under the lower edge of the apron is a plate, which delivers the concentrates and separated minerals into a correspondingly divided receiving-trough. In this receiving-box are slides which may be adjusted just as the minerals separate themselves on the belt, and thus direct each particular concentrate into its own division of the receiving-trough, from which it passes on to the collecting-pit.

The ore crushed in the mill, as a rule, contains about 17 per cent. of mineral, which is separated from the sand by either the jigs or vanners. The concentrates so formed are reserved for treatment in the chlorination works, which form an important part of the treatment plant. The purity of the concentrates is regulated at will, to suit the requirements of the roasting furnaces, which, it is found, do the best work when a certain amount of sulphur is present in the ore. The ore is roasted in mechanically-rabbed furnaces, with ordinary reverberatory hearths of rectilinear form. They are Edwards' patent, of a comparatively new design, and work with most economical results. The capacity of each furnace is 50 tons per week. The brickwork of the furnace is carried by means of two iron girders, which are supported near their centres, so that the whole can be placed with any inclination of the hearth required. A system of rabbles, driven by bevel-gearing, is provided, to stir the ore and bring it forward, those at the fire end running somewhat faster than the others to ensure a thorough roast. The rabbles are kept cool by means of a stream of water, which is passed through them continuously. As, to obtain best results from a furnace, it is necessary that the feeding of the ore should be positively uniform, automatic feeders are provided. The feeding is done by means of a pair of archimedian screws (one left-handed and the other right), working at the bottom of a hopper placed at the feed end of the furnace, and extending over the arch at the feed opening. Salt is used, and the ore roasted dead. On the efficiency of the roasting depends the success of the subsequent chlorination of the ore. The roasted ore is

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conveyed mechanically to a cooling floor, where it is allowed to take up a certain amount of moisture, and is trucked to the chlorination department. Chlorination takes place in vats 5 feet diameter and 4 ft. 6 in. deep, provided with a filter. The filter-bed is 6 in. deep, and is composed of coarse lumps of quartz, diminishing to fine stuff, and supported on a false bottom of wood, with half-inch perforations. The roasted and damped ore is sieved on to this false bottom until the vat is filled, Chlorine gas is then introduced at the bottom until the ore is impregnated, after which the vat is allowed to stand

under gas until the gold is dissolved. The ore is now leached, and the solution run into collecting tanks, from which it is pumped into receivers. The precipitation of the gold is effected by charcoal. The charcoal is prepared by sieving and washing, and is so arranged that the solution containing the gold passes down one column and up another before leaving the filter. Once a month the charcoal is burned, the resulting ash smelted in crucibles, and the gold run into bars.

Beaconsfield, 8th December, 1899.

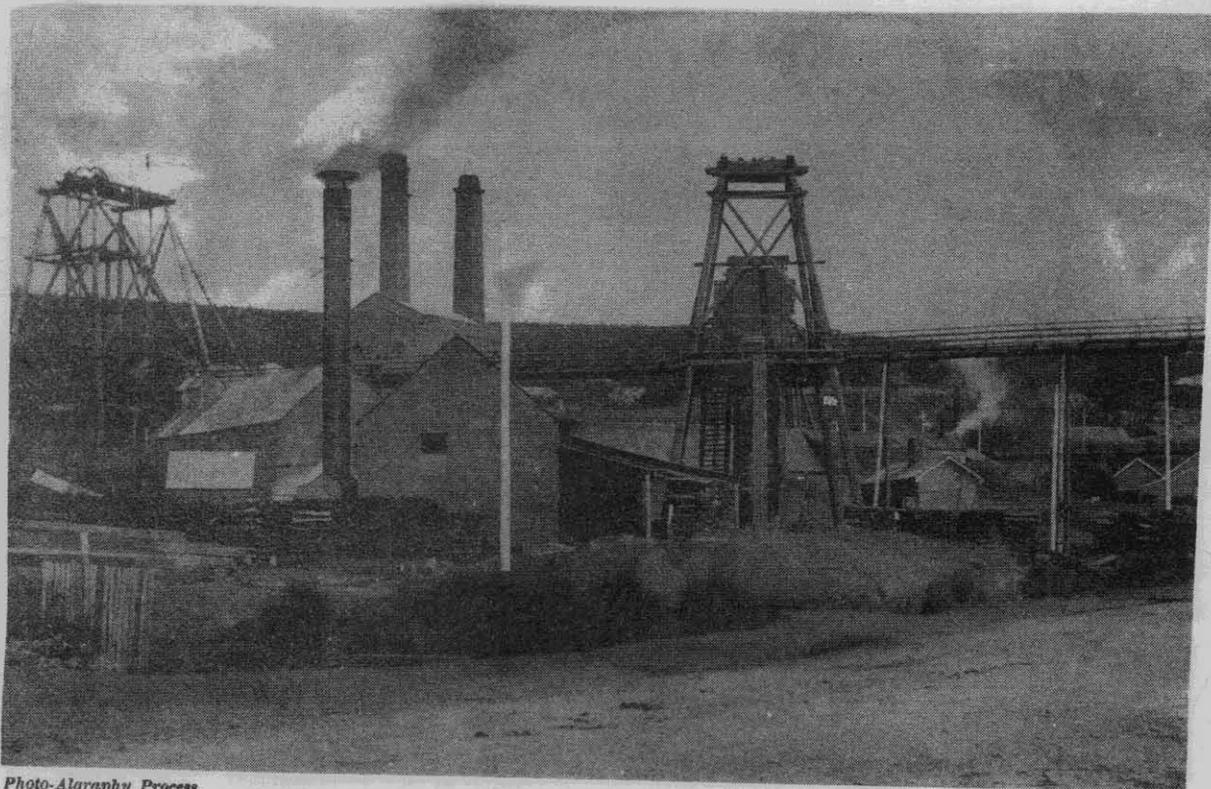


Photo-Algraphy Process.

TASMANIA MINE, BEACONSFIELD