

JORDAN'S CENTRIFUGAL GOLD-EXTRACTING PROCESS.

One of the newest, and certainly by far the most important, of recent innovations in reducing machinery is the centrifugal mill introduced by Rowland Jordan, Esq., C.E., and made by T. B. Jordan and Son, 15, George Street, Mansion House, London. The plant is especially designed for dealing with gold-ores, and consists of two distinct portions—the reducer and the amalgamator. The reducer is shown in Fig. 1, the amalgamator in Figs. 2 and 3, and the general arrangement of the whole in Fig. 4.

The following reports, made on trial-runs of machinery by the present author and other practical goldminers, are reproduced below, with permission. The author's report says,—

"The plant employed is remarkable for its simplicity, and but little description is necessary. The usual stonebreaker begins the process. This is followed by a revolving-pan, set at an angle, and carrying three massive balls of white iron, which work in a suitably-shaped bed, also of white iron, round the greatest circumference of the pan. The ore and water are fed automatically into the bed of the pan, and by the rotary motion of the latter are conveyed under the rapidly-revolving balls, whereby the comminution of the ore is effected. The inner half of the floor of the pan rises as a shallow dome surrounding the central shafts, and is fitted with movable frames carrying wire screens of any required mesh. The feeds of ore and water and the inclination of the screens are so adjusted that as the ore is reduced to a sufficient degree of fineness it is washed over the screens, and passed away into a launder for conveyance to the amalgamator.

"A comparison of this machine with the most approved form of stamp-battery reveals some highly important facts which may be summarised thus:—

"*Cost.*—A patent pan, equal in efficiency to a ten-stamp battery, is considerably less in first cost. To this saving must be added the greatly-reduced cost of transport to the mine, as the pan weighs less than half a battery. A third economy effected is in the erection—eminently simple and expeditious in the case of the pan, but a long and expensive operation with stamps. Generally, it may be stated that the total cost of the patent plant erected at the mines will not exceed one-half that of a stamp-battery.

"*Efficiency.*—The simple principle of the stamp-battery (that of a falling hammer), which proves such an attraction to its advocates, carries with it several disadvantages. Not the least is its intermittent action. The time during which actual work is being done bears but a small proportion to the time the battery is in motion. Each hammer must be lifted to a greater or less height, and, though the fall produces an effective blow, it is only at the moment of impact between stamp and ore that work is really done, and then the work is not of the most useful kind, as part of the blow always falls upon material which is already in a sufficiently-fine state, but has been unable to escape. The patent pan, on the other hand, has a continuous action on an evenly-distributed and constantly-changing layer of ore, and thus accomplishes a greater amount of work. In fact, it disposes of a rapid feed at an astonishing rate.

"Trials with various ores showed a power of reducing 20 to 25 tons per twenty-four hours to a size that would pass an eighty-mesh screen. Now, few ten-stamp batteries can do more than 15 to 20 tons, even when the mesh of the screens is as low as thirty. This is one of the great faults of the stamp-battery—fine grinding is impossible at anything like a reasonable rate and cost. The outlet for the stamped stuff is so limited and so ill-adapted that it takes almost as long to pass pulp through a battery as to crush coarse stuff and pass it through. With a patent pan this drawback is obviated. The screen-area is much greater in proportion, and the screens are set at a very low angle (almost horizontal). These features, combined with the wash produced by the rotation of the mill and inclination of the jet of feed-water, increase the facilities of outlet in a most remarkable degree. Another advantage, which in many cases would be of primary importance, is that the consumption of water is only about half the amount required by a battery. In a crushing of 'Edwin Bray' ore which I witnessed the water-feed was only a 1in. pipe—where a ten-stamp battery would have had a 3in.—and the ore, fed from a stone-breaker, was passed through an eighty-mesh screen at a surprising rate, not less than 20 tons per twenty-four hours. Such a result speaks for itself. Moreover, the power used to effect this is about half that needed with stamps, while the labour is virtually nil. With automatic feeds one man could watch a dozen pans, and the prodigal use of mercury, so common with stamp-batteries, is dispensed with.

"*Wear and Repairs.*—Here, again, the patent pan has advantages over the stamp-battery. There are only two wearing-parts in the pan—i.e., the balls and their bed. An examination of the latter, after six months' intermittent use, shows that the two surfaces wear in such a way as to maintain their proper relation to each other. When worn too thin, the bed can be removed and replaced by a new one with very little trouble. The screens are much less exposed to injury and wear, and are readily detached and renewed, any desired mesh being adopted. The frequent minor stoppages inherent to stamps, with their numerous working-parts, are quite avoided.

"The only other apparatus employed in the process is a novel form of amalgamator. The stream of pulp, without any addition of water, flows into the hopper of this amalgamator. This machine consists of a series of shallow dishes, attached one below another to a central revolving shaft, and enclosed in a fixed circular casing, which is kept under lock and key. Secured to the inner side of the casing, and alternating with the dishes, are slightly-inclined shelves, also amalgamated. The pulp fed into the amalgamator enters the first dish, in which it is revolved until impelled by the centrifugal motion over the edge of the dish. It then falls on one of the shelves, and is thus conveyed to the centre of the second dish, there to undergo similar treatment. This is repeated to the end of the series, where the tailings escape. The free gold and silver contained in the pulp are completely arrested by the amalgamated dishes and shelves.

"The very high efficiency of this patent amalgamator is apparently due to several causes. In the first place the ore is reduced in the pan to such a degree of fineness that all precious metal not actually in chemical combination is set free. Then, the shape of the dishes and the manner and