The crushing capacity of the stamps is said to be about $1\frac{1}{2}$ tons to each stamp with ordinary quartz every twenty-four hours.

Bull's Battery.—This crushing-battery consists of twenty-three heads of stamps, but only thirteen stamps were used at the time of my visit. This battery is unique on the field. It was arranged as follows: Three mortars having four stamps, three having three stamps each, one having two stamps; and one having a single stamp for crushing specimens. The weight of the stamps working at the time of my visit was as follows:—

Seven stamps of 538lb. each	= 3,766lb.
Six " 448lb. "	= 2,688lb.
	6,454lb.

The seven stamps were, when newly shod, 598lb. each; six stamps, 508lb. each, but, as the shoes were about half-worn, about 60lb. per stamp has to be deducted—viz., 780lb. These stamps are lifted seventy-three times a minute, with a drop of 10in. each time. The power absorbed would therefore be $\frac{6,454 \times 60 \cdot 8}{33,000} = 11 \cdot 90$ horse-power. There are also ten berdans, 3ft. 6in. in diameter, making twenty-eight revolutions per minute. The same Pelton wheel that drives the stamps works the berdans. Thus, the power that these berdans use could not be accurately ascertained. But assuming that they require the same power to work them as those at the Moanataiari Battery—namely, 0·4-horse power for each berdan, this would be 4-horse power required for them, which, added to 11·9, makes the total power required to work the battery 15·9-horse. The Pelton wheel used for driving this battery is 6ft. in diameter, and has a water-jet of $1\frac{1}{16}$in. in diameter under a pressure of 52lb. per square inch, which is equal to a hydrostatic head of 120ft. The quantity of water discharged, therefore, from this jet would be 1·512 cubic feet per second, and $\frac{1 \cdot 512 \times 60 \times 62 \cdot 5 \times 120}{33,000} = 20 \cdot 62$ theoretical horse-power. The percentage, therefore, that this Pelton is giving of the power of the water is $\frac{15 \cdot 9}{20 \cdot 62} = 77 \cdot 1$ per cent., which seems high. Nevertheless, the weight of stamps, drop, and number of drops per minute were taken as accurately as possible.

The gratings used have 195 holes to the square inch, and the bottom of the screens or gratings stands 4in. above the top of the dies in the mortar. The quicksilver tables have first a strip of copper-plate, 7in. wide, coated with mercury, at the bottom of the first drop, and afterwards there are two plates, 2ft. in width each. The pulp after passing over these plates goes through what is termed a "save-all," and finally over blanket-tables.

In connection with this battery there is a small dynamo driven by a Pelton wheel 2ft. in diameter, having a water-jet of $\frac{1}{2}$in. in diameter, under a pressure of 42lb. per square inch. The discharge of water would therefore be 0·103 of a cubic foot per second, and $\frac{0 \cdot 103 \times 60 \times 62 \cdot 5 \times 96 \cdot 7}{33,000} = 1 \cdot 13$ theoretical horse-power, which generates sufficient electricity for eight incandescent lamps.

In regard to the expense of wear and tear in this crushing-battery, Mr. Bull supplied me with the following particulars: During the year ending the 31st December last he crushed 3,872 tons of quartz, and the expenditure on heads and shoes for the battery was £30 1s. 1d.; but during the same period he received £7 1s. 1d. for old iron. Therefore the net cost of shoes and dies was £23, or about 1·42d. per ton of quartz crushed. The expenditure on berdans for the same period was £35 18s. 3d, less amount received for old iron, £8 2s. 8d., which leaves the net expenditure £27 15s. 7d. or 1·72d. per ton of ore treated.

Hansen's Battery.—This crushing-battery consists of twenty head of stamps and ten berdans. The stamps have an average weight of about 600lb. each, and they have a drop of 8in., making seventy-five blows per minute. Therefore the force required to work these is $\frac{600 \times 20 \times 50}{33,000} = 18 \cdot 18$-horse power. The stamps are driven by a Pelton water-wheel 6ft. in diameter, having a jet of $1\frac{1}{16}$in., under a pressure of 60lb. per square inch; this is capable of discharging about 1·6 cubic feet of water per second, and, as the pressure is equal to a hydrostatic head of 138ft., this would be $\frac{1 \cdot 6 \times 60 \times 62 \cdot 5 \times 138}{33,000}$ $= 25 \cdot 1$ theoretical horse-power, and $\frac{18 \cdot 18}{25 \cdot 1} = 72 \cdot 4$ per cent. that the Pelton wheel gives of the theoretical power of the water.

The berdans are driven by a small Pelton wheel 3ft. 6in. in diameter, having a water-jet of $\frac{7}{8}$in. in diameter, under the same pressure as the former jet; therefore the theoretical power of the water would be as follows: The discharge from this jet is about 0·377 of a cubic foot per second; then, $\frac{0 \cdot 377 \times 60 \times 62 \cdot 5 \times 138}{33,000} = 5 \cdot 9$ theoretical horse-power, which is equal to 0·59-horse power to each berdan.

The grating used in this battery has 225 holes to the square inch, and the bottom of these stand 4in. above the top of the dies. The splash-board in front of the grating is covered with a muntz-metal plate, and coated with quicksilver. There are two strips of silver plates on each table, 12in. and 9in. respectively in width; and thence the pulverised material passes over the blanket-tables.

This battery has been crushing surface mullock for several years, and Mr. Hansen informed me that he can make 1s. 6d. per ton pay all expenses of getting the material and treating it at this battery. He carries on all his operations by tribute: some are on the surface mullock, and some of the tributers are working the old ground, by taking about 2ft. off each side of the walls where the lode has been stoped out. In the latter working it takes from 3dwt. to 4dwt. to pay all expenses—that is, from 8s. 3d. to 11s. per ton. The place where Mr. Hansen is working is in the ground formerly held by the prospectors of the Thames Goldfield, and was known as the Shotover Claim, from which a large quantity of gold was obtained.