per square inch, which is equal to a hydrostatic head of 138ft., which would discharge about one cubic foot per second; therefore, $\frac{60 \times 62 \cdot 5 \times 138}{33,000} = \frac{517,500}{33,000} = 15 \cdot 68$ theoretical horse-power, being equal to each pan requiring 3·92 theoretical horse-power to work them. It may be mentioned that the manager, Mr. George Clark, went to considerable trouble to obtain all the information respecting this battery, and wherever he was not certain of the measurements he made them, so as to get at accurate results. The speed that the berdans was travelling at was twenty-four revolutions per minute, and the pans forty revolutions.

In respect to the size of the mortar, it was about 11½in. wide, and the dies and shoes had a face of 9in. in diameter; therefore, there was a space of 2½in. in the mortar in width more than was taken up by the dies. The gratings used are of charcoal-iron, having 175 holes to the square inch, and the bottom side of the grating is 4in. above the top of the dies when the latter are new, and 6in. when the dies get worn; the total depth of the grating being 10½in. by 4ft.—that is, there are two gratings in each mortar 2ft. x 10½in. The tables are 5ft. in width, and have one muntz-metal quicksilvered plate, 20½in. wide, at the upper end of each table, and thence pulverised material passes down over the blanket-tables 18ft. in length.

In regard to the crushing capacity of the battery, 434 tons of quartz was crushed in twenty-eight days, with five heads of stamps, which is equal to $\frac{434}{140} = 3 \cdot 1$ tons per head per day; and in crushing surface-material, twenty heads in eleven days crushed 816 tons, which would be $\frac{816}{220} = 3 \cdot 7$ tons per day. The manager could not give me more data than this as to the capacity of the mill, as it is kept crushing small parcels for the public, in addition to the quartz from their own mine. He, however, gave me interesting details in reference to the expense of working the mullock from the surface, on the same principle as that on which Messrs. Hansen and Comer have been working for the last two years.

The result of excavating the mullock on the surface, hauling it 1,250ft. to the crushing-battery, and crushing it, for four months ending the 31st of March last, was as follows:—

Month.	Tons.	Value of Gold obtained.			Total Cost of Getting and Treatment.		
		£	s.	d.	£	s.	d.
December	1,190	148	4	0	113	12	0
January	970	142	15	3	124	11	9
February	1,583	251	12	4	164	5	2
March	1,224	196	1	1	183	0	5
Total	4,967	£738	12	8	£585	9	4

This shows that the actual cost of working this mullock was 2s. 4¼d. per ton, and the profit in working this material in four months was £153 3s. 4d. The profit is not great, but it shows that there is a possibility of a great deal of the surface ground being yet worked, and afford profitable employment to those who are willing to carry on surface operations.

Saxon Battery.—This battery consists of thirty-three stamps—that is, two batteries of six stamps each, two batteries of ten stamps, and one stamp for crushing specimen-stone. Twelve of the stamps are 650lb. each, ten stamps 500lb. each, and ten stamps 700lb. each, with one stamp for crushing specimens. These have a drop of 7in., and make from seventy-five to eighty blows per minute. There are eight berdans, 4ft. 6in. in diameter, making twenty-three revolutions per minute, having two drags; there are also two of Watson-Denny pans, and one of Price Bros.' pans, which travel at the rate of forty-five revolutions per minute. There is a Pelton wheel, 6ft. in diameter, for driving the stamps, having a water-jet of 2¼in. in diameter, under a pressure of 60lb. to the square inch, which is equal to a hydrostatic head of 138ft. The theoretical power of the water under this head, taking the discharge from the jet as being 2·4 cubic feet per second, is as follows: $\frac{2 \cdot 4 \times 60 \times 62 \cdot 5 \times 138}{33,000} = 37 \cdot 63$-horse power; and the power required to work the stamps with eighty blows per minute, having a drop of 7in. is $\frac{(650 \times 12 \times 46\frac{2}{3}) + (500 \times 10 \times 46\frac{2}{3}) + (700 \times 10 \times 46\frac{2}{3})}{33,000}$ $= 28 \cdot 00$-horse power, and $\frac{28 \cdot 00}{37 \cdot 63} = 74 \cdot 4$ per cent. the Pelton wheel gives of the theoretical power of the water. The single stamp is only used when specimens have to be crushed.

The eight berdans and three pans are driven by a Pelton wheel, 3ft. 6in. in diameter, having a water-jet of 1¾in. diameter, under a pressure of 52lb. to the square inch, which is equal to a hydrostatic head of 120ft. The discharge from a 1¾in. jet, under this head, is 1·39 cubic feet per second; the theoretical horse-power is, therefore, $\frac{1 \cdot 39 \times 60 \times 62 \cdot 5 \times 120 \cdot 0}{33,000} = 18 \cdot 9$. Taking then the ratio found in working the berdans at the Moanataiari Battery, it would show that the berdans used 4·06 of the theoretical horse-power, and the three pans 14·89, which is equal to 0·5 of a horse-power for each berdan, and 4·96 horse-power for each pan. The gratings used are of charcoal-iron, having about 200 holes to the square inch, and are set so that the bottom of them are 4in. above the top of the dies in the mortar when the latter are new, and 1½in. space between the edge of the die and the side of the mortar where the grating is placed. The quicksilver tables are covered with silvered muntz-metal at the bottom of the first drop for a length of 10in., and at the bottom of the two other drops for a length of 4ft. each; afterwards there are blanket tables 12ft. in length.

In regard to the work done by the pans, those who have had a long experience in working them find that they get a higher percentage of the gold from the pulverised material if the heavy concentrates are taken out of the pans, say every twenty-four hours, and again treated in the berdans.