

per cent. of the gold, 72·2 per cent. of the silver, or 90 per cent. of the original value had been recovered.

“With a rich ore of this description each additional unit of percentage saved represents about £1 sterling. Three units would cover the cost of roasting, and the subsequent pan-amalgamation would result in an additional saving of from 10 per cent. to 15 per cent., thus leaving an additional profit ranging from £7 to £12 for every ton of roasted ore.

“No. 2, *Refractory Ore*.—This ore was very similar in general physical appearance to the free-milling ore. It was somewhat darker in colour, due to the presence of a larger percentage of accompanying iron disulphide. This ore was supposed to contain tellurium in combination with the gold and silver, but a most careful and exhaustive analysis failed to detect that substance. The ore was dried, pulverised, sampled, and assayed, showing the following assay-value per ton :—

| | | | | | | | |
|-----------------|-----|-----|-----|-----|-----|-----|--------------|
| “Bullion | ... | ... | ... | ... | ... | ... | Oz. dwt. gr. |
| | | | | | | | 91 17 5 |
| Gold | ... | ... | ... | ... | ... | ... | 16 17 18 |
| Silver | ... | ... | ... | ... | ... | ... | 74 19 11 |
| Value, £78 16s. | | | | | | | |

“It was then subjected to a thorough oxidizing roasting at a dull-red heat. It showed no loss due to the roasting. It was then hot pan-amalgamated for three hours, with the result that 73·3 per cent. of the gold, 70·9 per cent. of the silver, and 72·2 per cent. of the value was recovered. At the present time this ore is shipped to Freiberg, in Saxony, to be treated; but I think some experiments should be made on a working scale to determine the best method of extracting the bullion at the mine. Even an extraction of 72 per cent. of the value should leave as large a margin of profit as now obtained by shipping this ore to Germany.

“SAVING OF BULLION EFFECTED AT THAMES BATTERIES.

“During the past two months I have made a number of experiments at several of the batteries at the Thames, in order to definitely determine the percentage of value of the ore recovered and lost by the process at present in use on this field. The assay samples were taken with great care, while all the assays were determined and verified by check assays. As the results are of great importance, and have a wider application than the Thames, I give below some of the principal reports furnished to the mine-managers and directors of the companies interested in the experiments.

“Report on Treatment of Parcel of Alburnia Ore at the Cambria Battery during March.

“The general dirt treated amounted to eighteen loads, representing approximately 27 tons, and the picked stone 565lb. The total amalgam from all sources weighed 1,549oz., and yielded 595oz. 15dwt. of melted bullion, valued at £2 12s. per ounce, equal to a total value of £1,548 19s.

| | | | | Amalgam. | | Bullion. | | Value. | | |
|--------------------|-----|-----|-----|----------|----------|----------|----------|--------|----|----|
| | | | | Oz. | dwt. gr. | Oz. | dwt. gr. | £ | s. | d. |
| “Picked stone | ... | ... | ... | 949 | 10 0 | 417 | 15 0 | 1,086 | 3 | 0 |
| Amalgamated plates | ... | ... | ... | 39 | 0 0 | 11 | 11 0 | 30 | 0 | 7 |
| Berdans | ... | ... | ... | 560 | 10 0 | 166 | 9 0 | 432 | 15 | 5 |
| Totals | ... | ... | ... | 1,549 | 0 0 | 595 | 15 0 | £1,548 | 19 | 0 |

“The ratios of bullion to amalgam in the picked stone and general dirt were 1 to 2·27 and 1 to 3·37 respectively.

“Value of Ore.—The assay-value of the general dirt, as taken from the gratings at regular intervals every fifteen minutes during the period of crushing, was as follows :—

| | | | | | | |
|---------------------|-----|-----|-----|-----|-----|--------------|
| “Bullion, per ton | ... | ... | ... | ... | ... | Oz. dwt. gr. |
| | | | | | | 17 12 21 |
| Gold | ... | ... | ... | ... | ... | 7 18 19 |
| Silver | ... | ... | ... | ... | ... | 9 14 2 |
| Value, £33 14s. 2d. | | | | | | |

| | | | | | | |
|--------------------------------------|-----|-----|-----|-------|----|----|
| General dirt, 27 tons at £33 4s. 6d. | ... | ... | ... | £ | s. | d. |
| Picked stone, bullion recovered | ... | ... | ... | 1,086 | 3 | 0 |
| Tailings from picked stone and loss | ... | ... | ... | 4 | 15 | 6 |

Total approximate value of ore as won from mine £1,988 0 0

“Calculated from this basis the total percentage of saving from all sources was 76·7 per cent. of the original value of the ore. It should, however, be noted that the picked stone alone represented 70 per cent. of the total value of saving, and as practically the whole value of this stone was recovered, and that by special treatment, its inclusion has the effect of greatly increasing the average percentage of recovery. In order, therefore, to get a fair idea of the recovery from the general dirt by the ordinary battery process, it will be necessary to exclude the value of the picked stone, both from the total value of the ore and total saving. From this new basis of calculation the following results are obtained :—

| | | | | |
|--|-----|-----|-----|---------------|
| “General dirt, 27 tons, at £33 4s. 6d. | ... | ... | ... | £897 1s. 6d. |
| | | | | Recovered. |
| | | | | £ s. d. |
| From plates | ... | ... | ... | 30 0 7 |
| From berdans | ... | ... | ... | 432 15 5 |
| Totals | ... | ... | ... | £462 16 0 |
| | | | | Percentage. |
| | | | | 3·3 per cent. |
| | | | | 48·2 |
| | | | | “ |
| | | | | “ |