

SILLIMAN ON ARSENICAL PYRITES.—HUNT.—  
ROASTING ARSENICAL ORES.

Prof. Silliman, in his Report on the Tangier district, in 1864, found the pyrites extracted by washing from the tailings of three lodes at Tangier to yield respectively \$93, \$125, and \$180 of gold to the ton; while a mass of the pyrites, of several pounds weight, from Montague, according to the same authority, yielded at the rate of \$276 of gold to the ton, of which about two-thirds only were coarse gold. These facts are cited by Dr. Hunt in his Report already referred to (page 20), and he there adds,—  
“Notwithstanding these results, the tailings are generally entirely neglected in the Nova Scotia mines, and with them no doubt large quantities of gold are lost which might be advantageously extracted by concentration and roasting, followed by amalgamation, either in the Chilian mill, the Wheeler, or Heppurn pan, or perhaps, better still, by the use of Plattner's process, in which the gold is dissolved out of the roasted ore by chlorine. Prof. Silliman has suggested that the arsenic may be profitably extracted from the arsenical pyrites by roasting in properly constructed furnaces. By this means it might be made to yield half its weight of white arsenic, which has a considerable commercial value, and would probably pay the expense of roasting the ore. By thus condensing the arsenic, the injurious effects which would otherwise result from the escape of the poisonous arsenical vapours into the air during roasting would be prevented.”

WORKING OF STAMP MILLS.

Reverting to the wasteful multiplication of plants of machinery in the various districts of Nova Scotia, above alluded to, this will perhaps be best appreciated by a comparison of the number of stamps, and the quantity of quartz crushed in Nova Scotia with similar work in Australia. According to the tables in the Report for 1869, by the Commissioner of Mines in Nova Scotia, the total quantity of quartz crushed that year in all the districts was 38,424 tons. The number of mills employed was fifty-four. The number of stamps is not given; but if we allow an average of twelve for each mill (which is probably an under-estimate),\* we have 648 stamps. They weigh generally from 550 to 600 lbs. each, and are worked at an average speed of 65 to 70 blows per minute, with a nine-inch lift.

The quantity crushed per stamp-head in twenty-four hours is stated to be one ton; the average in Australia and California is from one and one-quarter to two tons; there seems no good reason why it should not be as large in Nova Scotia. However, taking it at one ton, and allowing 250 working days, the 648 stamps ought to crush 162,000 tons, or more than four times the work actually done, which amounts to less than sixty tons per stamp-head per annum.

VICTORIA, AUSTRALIA.

At the Port Philip Company's mine, at Clunes, in Australia, there were crushed in 1870, in fifty-two weeks, 55,240 tons; and in the same time in

\* In sixteen mills, of which particulars are given in an Appendix to "Heatherington's Guide," there are 199 stamps.

1869, 64,273 tons. This work is performed by eighty stamps; (twenty-four of 800 lbs., and fifty-six of 600 lbs. each;) worked at a speed of seventy-five blows per minute; and they each crush from two to two and a quarter tons per day of twenty-four hours. The quartz is as hard as any I have seen in Nova Scotia.

At the Black Hill mine, at Ballarat, which commenced working in January, 1862, 250,575 tons of quartz had been crushed up to December 31st, 1869; being an annual average of 31,321 tons. This is done by sixty stamps, of 700 lbs. each, worked at a speed of seventy-five blows per minute, with a lift of about nine inches.

Thus, in Australia, we find two mills with 140 stamps, crushing 86,561 tons of quartz in the year; or considerably more than twice as much as is crushed in Nova Scotia, in fifty-four mills, with more than four times the number of stamps. The fineness to which the quartz is reduced is about the same as in Nova Scotia.

COMPARATIVE YIELD OF GOLD.—PRICE OF LABOR.

If we compare the average yield of the quartz in Nova Scotia with that in Australia, both of which are given in Heatherington's "Practical Guide to the Gold-Fields of Nova Scotia," we find the former is 1 oz. 3 dwts. 5·8 grs.\* and the latter 11 dwts. 17·4 grs. If we also consider the relative prices of mining-labor in the two countries, (averaging in Victoria \$2.00 to \$3.50, and in Nova Scotia only \$1.25 to \$1.50, per diem,) the reason why two-thirds of the crushing-power in the latter is standing idle seems at first sight somewhat inexplicable. It is evidently not the poverty of the quartz; neither is it, as I can vouch from personal observation, owing to any deficiency in the quantity which the veins, if properly worked, are calculated to produce; and we are therefore forced to conclude that it arises from the causes above enumerated, and from the unskillful, wasteful, and improvident manner in which the business has ordinarily been conducted, creating general apathy, and utterly destroying the confidence of investors.

VICTORIA.—PROFITS OF MINING.

In the two mines in Australia above cited, the average yield of gold to the ton of rock, of late years, has never exceeded 10 dwts. At the Black Hill mine it is stated to have been only 2 dwts. 21 <sup>3</sup>/<sub>16</sub> grs. per ton; but even this low yield has proved sufficient to pay the proprietors ten per cent. on the capital invested; the amount paid in dividends in eight years being £21,730 sterling, or \$108,50. At Clunes, the average yield in 1869 was 7 dwts. 8 grs., and in 1870, 4 dwts. 20 <sup>3</sup>/<sub>4</sub> grs. Many more instances could be given of yields far less per ton than the quantity now lost at every mill in Nova Scotia, having sufficed, under careful management, to give a fair profit to the adventurers. These results are due to the practical and intelligent application of the lessons taught by experience; and if this experience is utilized, and as intelligently applied

\* This yield for Nova Scotia is considerably greater than that which is given as the average by Mr. Hind, page 57 of his Report on the Sherbrooke District, viz., 15 dwts. 16 grs.