

when, as in the case of some of the ores of Nevada, the gold is in a very finely divided state, and is associated with ores of silver and other sulphides, the results obtained are less satisfactory. The amalgam resulting from the treatment of such ores contains silver, and, in some cases, affords from 300 to 400 thousandths only of gold, often producing a spongy amalgam of dark colour, made up of an aggregation of numerous finely divided particles. * * * This amalgam is exceedingly light, and is therefore difficult to collect, either by riffles, copper plates, blankets, or any of the other appliances commonly employed for the purpose. When, therefore, ores contain much lead or antimony, amalgamation in the battery is not to be recommended, since this spongy amalgam is more difficult to retain than the most finely divided gold, and a larger proportion of it floats off over the blankets, riffles, or copper plates which may be arranged for the purpose of arresting it. There is, besides, no evidence that battery amalgamation possesses, under any circumstances, a decided advantage, for gold ores not associated with sulphide of silver, over stamping without the use of mercury; and in some of the most productive districts it is seldom resorted to.] (See Phillips, pages 177, 179.)

"The inclined tables, whether fixed or oscillating, which receive the pulverized mineral from the batteries, are lined throughout with plates of copper, which are amalgamated or covered with a film of mercury. At the head of the oscillating tables, at the DeWolf mill, are placed small concave transverse reservoirs, partially filled with mercury, with which the matters transported by the water are brought in contact, by means of convex cross-pieces fitting into the mercurial reservoirs. In other cases, the tables are furnished with a series of small transverse grooves or riffles, also holding mercury, and serving to arrest the particles of gold in their passage. The slope of these, according to Phillips, varies from three and a half to seven degrees. We have already seen, that from sixty to eighty per cent. of all the gold obtained, remains, under favorable circumstances, in the battery; of that which escapes with the liquid mud, the greater part collects on the first table or at the head of the second."

"When the working of a mine is properly conducted, and the supply of mineral is regular, the stamp mill should work day and night, except when stopped for repairs or for cleaning up, as the process of removing the amalgam from the boxes and tables is called. The frequency of this operation depends upon the richness of the mineral; but in many mills it takes place every week for the tables, and fortnightly for the battery. At the Ophir Mine, while the batteries are cleaned but once in two weeks, the amalgam from the tables is collected once in three or four days, and even daily, when the mineral is very rich in gold. This process, as I saw it at the mill of the Uniacke Company, is effected by a stream of water from a hose, which removes the sands from the tables and allows the amalgam to be gathered up from the plates. For the batteries, the stamps being raised, and the grating removed, a jet of water is employed to break up the compacted mass of partially stamped mineral, which fills the box; the larger fragments being removed by hand, until the amalgam accumulates at the bottom. The dies are then cleaned and taken up, and the washed amalgam gathered into a mass, and added to that already obtained from the tables. The excess of mercury is then removed from this by pressing it in chamois leather, or in a closely woven wet cloth; after which the amalgam is divided into balls of a proper size and heated in a cast iron retort, which is previously lined with a paste of clay and water, to prevent the adhesion of the gold. The portion of mercury which still remains with the gold being expelled by heat, its vapors are carried over and condensed in water, and at the end of the operation the gold remains in the retort in the form of spongy masses, which are melted in a crucible, and cast into ingots."

The pulverized mineral, from which the gold has been extracted by the process just described, is known by the name of waste or *tailings*, and still contains a portion of gold, which is often considerable in amount. This gold is, in part, in small particles adherent to, or imbedded in the grains of quartz; but, in part, also inclosed in the metallic sulphurets generally present, which, as already mentioned, are often rich in gold. Regular and careful assays of the tailings from the Nova Scotia mines are as yet wanting; but, according to Professor E. J. Liman, in the case of quartz from the Belt lode of Montague, treated in a mill at Waverley, the tailings contained, on an average, 16 pennyweights of gold to the ton. Assays of the waste from the barrel quartz of Waverley, treated in a

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