## MINING.

### NOTES ON SAMPLING.

Written for the *Engineering and Mining Journal*, By H. R. Wood, M. A.

*Vein and Mine Sampling*:—Vein outcrops rarely assay up to the average value of the vein and it is therefore necessary to sample more than the outcrop, even at the first survey. A prospect, or first sampling, should be made from a series of pits, dug at intervals along the vein, to a depth of 10 to 12 ft. If the vein is much decomposed on the surface, however, the samples obtained in this way cannot be taken as characteristic of the lower parts of the vein. The depth to which the pits need be made varies also with the nature of the ore. If the surface croppings consist of iron oxides and carbonates of low assay yield the ore body in the form of sulphides will be reached at a less distance than 10 feet. Gold bearing veins are frequently richer near the surface, and the gold is apt to appear here in the form of large agglutinations, though at the immediate outcrop the gold may be entirely removed. When gold accompanies iron pyrites, the ferrous sulphate formed by the oxidation of the iron pyrites acts as a slight solvent of the gold, and removes it or washes it out, or deposits it in nugget like masses.

The sampling of a mine for buying or selling purposes should be done at all the levels and in the shaft as well. When the ledge is exposed at the end of the tunnel, or at the bottom of the shaft, it should be sampled all over the face; when the tunnel follows the ledge, the vein should be sampled from wall to wall, across the roof and the floor, every ten or twenty feet; in the shaft the vein should be sampled from wall to wall on both sides, every fifty feet. Pay streaks when distinctly marked from the rest of the vein might be separately sampled. When the ledge is decomposed on the surface, careful sampling should be made from wall to wall as usual, and marked variations in ledge matter should be kept separate.

*Dump Sampling*.—The sampler may be blindfolded while he picks up from the pile of fragments of vein and ore with which his hand comes in contact; or the pile may be sampled by a careful selection from its surface. Car samples may be taken in the same way. None of these methods is very accurate and the only satisfactory way is to ship 5-10 tons of ore to a mill or smelter, where a good commercial average assay can be obtained. Such a car load should be taken from all portions of the vein.

*Sampling Slags*.—It is better to sample slags while they are hot and fluid. A slender iron rod, a portion of which is bent at one end to serve as a handle, is thrust into a red hot slag and quickly withdrawn, and instantly placed in a bucket of water. The thin scale of slag coating the end of the rod falls into the water. Where the slag is run in pigs on the ground as from matte reverbatory furnaces, the slag must be broken before too cool, and the rod thrust into its center. When the slag is run into pots a small iron cup with a long handle may be used instead of the rod; the surface of the slag in the pot is broken and the cup thrust into the molten fluid, care being taken that all the particles of matte suspended in the slag be first allowed to settle. The slag in the cup should be cooled slowly, and on breaking should present a glassy appearance. Slag may be sampled when cool, several pieces being broken off from it, but this method is more inconvenient, and is not so representative of the quality of the slag. Surface samples should not be taken, as bits of coke or flux are apt to adhere.

*Matte*.—In sampling matte the cup should be used; the slight crust which has formed on the pot should be broken and the cup thrust well in, as there is frequently some slag on the surface. If, however, the pot is full of matte, it is not advisable to thrust the cup to the bottom, as spoils is very apt to be present. The sample is cooled by dropping it into a bucket of water. Where the matte is run into a mold as in copper reverbatories, the matte is sampled by breaking small chips from the center and one end of the pig.

*Zinc Pots*.—The following is the method of sampling the zinc pots in the desilverization process: After the final zincing and the last alloy of zinc, a rich silver-lead is skimmed from the surface of the pot; and a long-handled pair of tongs having a cavity in each tong, which when closed resembles a bullet mold, is thrust into the pot by the workman, worked back and forward until heated, then suddenly closed, drawn up and opened on a clean board or flagstone. This is the method of sampling the bottom of the pot, and two bullets are usually taken. The upper portion of the pot is sampled by quickly thrusting in and quickly withdrawing a thin short bar of steel, rounded at one end; a thin coating of lead will adhere which can be readily removed by slitting one side. These samples will vary slightly ·10, ·08. The lower portion of the pot usually runs a trifle higher than the surface sample, though the workman can usually tell by the nature of the last alloy removed, its crystalline structure, etc., whether the silver is all taken out.

*Bullion*.—The bullion direct from the blast furnaces is sampled with a punch hammer, which removes a core from each bar. These cores may be duplicated by one from the middle of the bar and one from the end. When pure refined or test lead is manufactured, the desilverizing process is continued till the lead assays .005 or less silver to the assay ton. This requires a repetition of the zincing process, and a re-sampling after each removal of the zinc alloys. The sampling is performed in the same way, however, but the assayer uses two assay tons from the top and bottom of the pot, which he first scorifies and then cupels. These should be taken, melted down in a pot by a moderate heat in a wind furnace and the contents poured into a mold. This may be done at the close of a month's run. The bar has a piece chiseled from the end and across the middle. This is rolled out with a hand roller to a ribbon the thickness of sheet lead, and with shears, cut across into the strips, then again cut across into small squares. These squares are mixed up, and two assay tons weighed out and scorified and cupelled.