

sent to the assay office. The rejects of the later samplings are mixed in with the main body of ore from the first sampler. The samples sent to the assay office are dried, ground to 120 or 150 mesh and assayed and analyzed. The office is said to be the best equipped commercial laboratory on the continent. There are about fifty charge bins for the furnaces with a capacity of from two to eight cars apiece. All different ores, fluxes and coke are brought to these bins and as required are drawn off from them on the level of the charge floor by the charge wheelers and taken directly to the furnaces. Each furnace is supplied with a seven-beam, automatic weigh scales, so that all the different ingredients of the charge are weighed on the same scales. The charging is done by dumping cars into sides of furnace, spreading being accomplished by use of baffle-plate and pulling cars alongside of the furnace while being dumped. The copper furnaces are all supplied with trap spouts and therefore have a continuous flow of slag and matte. The stream runs into large water-jacketed receivers, where matte settles to the bottom and slag overflows into settlers and from them into launders, where it is granulated by a jet of water and by it carried out on the dump. The matte is tapped intermittently from the receiver, granulated, roasted and resmelted with a certain amount of ore, into matte of sufficiently high grade to ship to a converter plant. It is necessary to make this double concentration on ores of the Rossland camp owing to the fact that they are low in copper and high in sulphur. This accounts to a great extent for the big difference in cost of smelting Rossland and Boundary

ores, the remainder of the difference being due to the fact that Rossland ores are not self fluxing and need a large addition of lime rock. The blast pressure is supplied by Connellsville and Root blowers of rotary type.

The lead ores, generally speaking, are roasted before being furnaced. The main differences between lead and copper smelting are that copper is run in shallow water-jacketed furnaces with wrought iron water jackets to charging floor with powerful oxidizing blast, the coke being reduced to lowest practical limit to obtain great oxidation as well as for fuel economy, while lead ores are smelted in high shaft furnaces with cast iron jackets and brick shafts, generally with lower blasts under reducing conditions.

The products from lead smelting are lead bullion, containing by far the greater part of the lead, gold and silver in the ore, matte containing copper and remainder of the gold, lead and silver, and a slag which is valueless or approximately so. These furnaces are intermittent tapping. The slag and matte goes into a receiver and are separated as in copper smelting, while the bullion is drawn from the side of the furnace by an inverted syphon into the lead well from which it overflows into a cooler where the dross comes to the top and is skimmed off, after which the bullion is cast into bars and is shipped to the refinery. The matte is crushed, roasted and resmelted and the slag granulated and discarded.

The lead refinery is the only one at present using the Bett's electrolytic process, which consists of depositing pure metallic lead from a solution of lead fluo-silicate in hydrofluo-silicic acid, leaving the gold, silver, copper