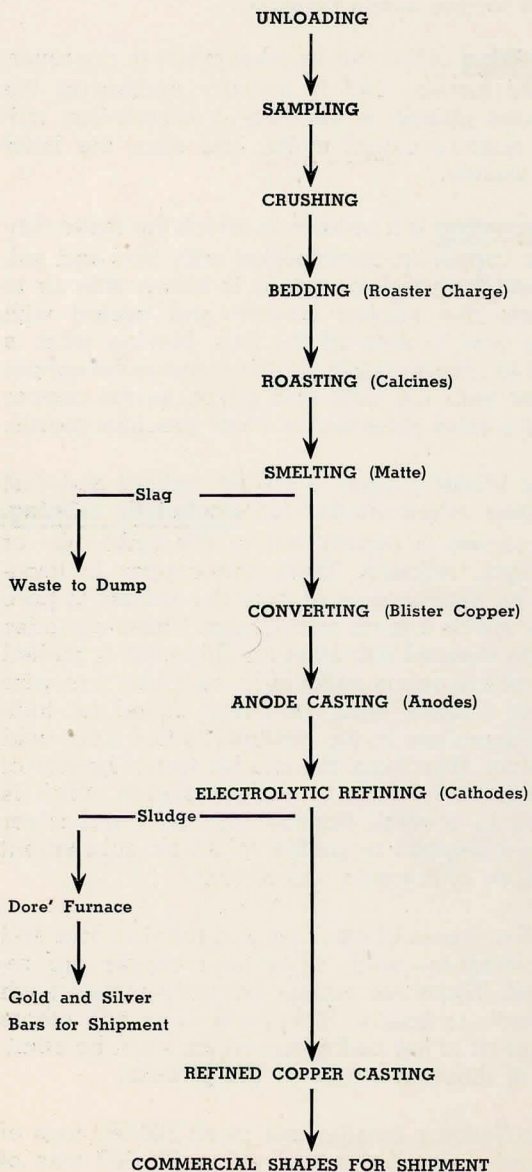
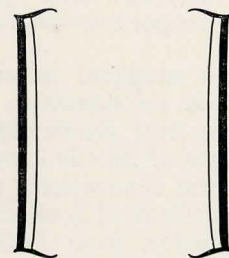


# FLOW SHEET



# THE TACOMA SMELTER



May, 1948

# The Tacoma Smelter

In 1887 a group of five Tacoma businessmen organized for the purpose of constructing a lead smelter of 200 tons per day capacity. Impetus was given such an enterprise by the discovery and subsequent development of many mines producing lead, gold and silver ores in the Northwest, the discovery of suitable coking coal and limestone deposits and by the completion of trans-continental railways for shipment of lead bullion to the East. The smelter was brought into successful operation when they secured the services of Mr. W. R. Rust to direct the enterprise in 1890. The first lead bullion was produced in September of that year. In 1905 the Tacoma Plant became a part of the American Smelting and Refining Company.

Many copper properties were discovered incident to the gold rush in Alaska at the beginning of the century and the company began to turn from lead to copper smelting. With the discovery of the Kennecott Mine on the Copper River in Alaska and the shipment of its ore to Tacoma for treatment, the company's lead operations practically ceased and copper became the main product.

The plant has excellent railway connections and, being located on tidewater, can and does handle shipments from practically every part of the world. Because of its advantageous situation, it receives ores and concentrates and other products from the West Coast of South America, Central America and Mexico, from Continental United States and Alaska, from British Columbia, from the Eastern part of Canada and from the Philippines.

The Tacoma Smelter is a customs plant, smelting ores and concentrates produced and owned by other companies. These ores and concentrates are purchased from them, based on the metal content of gold, silver and copper. Weighing, sampling and assaying are conducted according to standard practices. The ores are crushed and, together with the concentrates which do not need crushing because of previous grinding in milling processing, are then taken to storage.

The production of copper at the Tacoma Smelter involves five steps. To reduce the operations to the simplest terms possible and to list them in the order in which they occur, we find the first operation is that of bedding, which consists of mixing the proper proportion of the different types of con-

centrates and ores to produce a furnace charge that will smelt as easily as possible, and produce the desired matte and slag.

Roasting is a process during which the mixed ores and concentrates are subjected to heat for the purpose of reducing the sulphur content and pre-heating for the actual smelting.

Smelting of the charge takes place in the reverberatory furnace and is actually melting of the preheated charge to produce a copper-iron sulphide mixture called matte, and slag, the latter being wasted.

Converting is a process in which the matte containing copper in combination with iron and sulphur and the precious metals is blown with air to eliminate the sulphur content and treated with fluxing ores to slag off the iron, leaving what is known as blister copper, which contains the copper together with the gold and silver, as the copper acts as a good collector for these precious metals.

The blister copper is further refined and cast into slabs called anodes for electrolytic refining. This process is carried out in the tankhouse or electrolytic refinery. There the copper is transferred by electric current from the anodes to pure copper sheets known as cathodes. These cathodes are then sheared into sizes for shipment or melted and cast into forms suitable to be rolled into wire or other shapes, which are best suited for individual demands. In the electrolytic tanks the gold and silver drop from the anodes to the bottom of the tanks in the form of a black sludge which is smelted in a small furnace into gold and silver bars and shipped to another plant for subsequent separation of the gold and silver.

In the course of smelting and refining ores and concentrates, gold, silver and copper are recovered. There are certain impurity metals such as arsenic, antimony, nickel, selenium and others detrimental to the operations which must be eliminated at different stages of the process.

The Tacoma Smelter can smelt 500,000 tons of ores and concentrates and refine 125,000 tons of copper per annum. The plant, when running normally, employs 1,300 peoples, uses 400,000 barrels of fuel oil and 20,000 tons of limestone per year and uses about 8,800 horsepower in the form of purchased electrical energy.