

During the latter part of the year a brick smoke-stack was built, to take the place of the steel plate stack that had been in use since the works were started in February, 1901. The new stack is 122 feet in height from its rock foundation (the level of which is about 80 feet higher than that of the feed floor of the furnaces) and 12 feet diameter inside measurement. It was built at the top of the dust chamber and connected up without any interruption whatever of the operation of the smelting works. Other building improvements were the erection of a brick sub-station for the Cascade Water Power & Light Company (with which arrangements have been made to supply electric current for power purposes, the intention being to substitute electricity for steam); the excavation of the site for a converter plant and the building of stone retaining walls, heavy masonry foundations for buildings and machinery, brick dust chamber, timber bins for re-lining materials, and other work preliminary to the raising of the steel-framed and iron-covered converter building and the converter power house. The sub-station or transformer house, which will be connected with the Cascade company's sub-station at Phoenix by a transmission pole line five miles in length and having two three-phase circuits of copper wire, is 30 feet by 40 feet and 20 feet high, the north end being closed in with wood so as to admit of extension of the building when required. The electrical equipment will have a capacity of 1,000 h.p. and will consist of oil-cooled Westinghouse step-down transformers to reduce the voltage from 20,000 to 2,000 volts, switchboard, lightning arresters, static interrupters and other necessary apparatus. The converter power house is 81 feet long by 40 feet wide, framed with wood and covered with corrugated iron. The machinery to be installed in this building includes a Nordberg blowing engine, arranged for running by either steam or electricity, steam cylinder 18 inches by 42 inches, air cylinder 40 inches by 42 inches, to deliver at an elevation of 2,500 feet 5,000 cubic feet of air per minute at 12 lbs. pressure through a blast pipe of 20 inches diameter with a branch to each converter; a 300-h.p. Canadian General Electric induction motor of variable speed (having rheostat for external resistance) 300 r.p.m., operating at 2,000 volts and connected to the 18-foot fly wheel of the blowing engine by an endless drive of 1¼ inch ropes running over a tension sheave (the other induction motors will operate at 550 volts); two sets of transformers for the step-down from 2,000 to 550 volts, and one set to reduce from 2,000 to 110 volts for lighting purposes; a 75-k.w. motor generator to convert direct current at 250 volts required for operating electric crane and trolley locomotive; a hydraulic accumulator, for tilting the converters, this having a ram of 24 inches diameter and 10-foot stroke, working at a pressure of 200 lbs. to the square inch, and fed by a Gould triplex pressure pump run by a 25-h.p. induction motor with automatic control.

In the converter room there will be two converter stands, each provided with a 2½-inch 4-way Critchlow controlling valve. For the present there will be five converter shells, 84 inch diameter and 126 inches

long, with cast steel heads, and the upper section furnished with pyramidal-shaped nose and removable cast iron tip. The riding rings are cast solid with the heads. Each shell has 14 tuyeres equipped with Dyblie ball valves. Over each converter is a movable bonnet connected with a steel dust chamber 9 feet by 12 feet by 9 feet and from these chambers a steel flue of 20 square feet cross section conducts the fumes to a brick dust chamber of 285 feet cross section and having a sloping floor, with a series of clean-out doors on the lower side. This directly connects to a steel stack of 6 feet 6 inches diameter and 90 feet height. The converter slag, after being poured in beds to cool and then broken up, is transferred to the blast furnace ore bins to be re-fed through the blast furnace.

A 40-ton 4-motor electric travelling crane handles the matte in 5-ton ladles connected by launders with the furnace forehearths. The crane is 40-foot span and has a 10-ton auxiliary hoist. The base of the runway rail is 26 feet above the floor of the converter building. The operator's cage is placed in the centre of the span.

The converter buildings are of steel resting on masonry piers and covered with corrugated iron. The main building is 45 feet wide, 90 feet long and 38 feet in clear height or 55 feet to the ridge of the ventilator which runs the full length of the building. An extension at one side is 30 feet wide and 60 feet long. The floor of the main building is closed in on two sides for a height of ten feet by the stone retaining walls.

The converter plant is so situated as to provide for a downward movement throughout of all material that has to pass through it. The silicious gold ores used for re-lining the shells are delivered into the upper ore bins of the smelter, passed down through the sampling mill, trammed directly thence and fed to a 7 by 10 inch Blake crusher and a set of 24-inch diameter rolls from which it drops into a 250-ton bin having a chute opening into the pan of a 6-foot Carlin mill. The clay for mixing is trammed from the lower ore bins to another bin also connected by a chute to the pan of the mill, whence it is taken to the shells in cars or barrows running above them.

A railroad spur has been constructed at a level 4 feet 6 inches below that of the floor of the converter building, so as to provide for the convenient loading of the blister copper turned out. Smelter supplies will be delivered from this track into a store to be built on the lower side and having its floor on a level with the floor of the railway freight cars.

Insufficient room for the granulation of the slag being continued having necessitated the substitution of hot dumping for granulation, a Baldwin steam locomotive and six side-dumping 5-ton slag cars, tilted by worby worm gearing, are now handling the slag.

BOUNDARY FALLS SMELTER.—A progressive policy was also followed during 1903 by the Montreal & Boston Copper Company, operating the smelter at Boundary Falls. At the commencement of the year only one furnace was in blast at these works. In the spring a second was blown in and later a third was obtained but this last has not yet been erected. The furnaces here are 40 inches by 176 inches inside the tuyere line