

the passageway between two others which have been almost burnt out, the latter plan adding very materially to the capacity of the roast yard. After this operation the ore is invariably so thoroughly roasted that it is necessary to add from 10 to 25% of raw fine ore during the smelting to prevent the matte from being too rich. Each pile usually contains about 600 tons of ore, and requires 30 cords of wood to roast it. The roast yard at Copper Cliff is nearly half a mile long by 100 feet wide, while each pile occupies a space of 40 x 80 feet, room being left to get round them, and for drains. The present capacity is about 60,000 tons, which, with a little extra work, could be increased to 90,000 tons. Working full power each roast bed can be used four times a year, counting the time in making, roasting and clearing the beds. The yearly capacity would therefore be 240,000 tons, and by increasing the space, 360,000 tons. The unroasted ore contains from 35 to 40% sulphur, and assays of a large number of samples of the roast heaps have varied from 2½ to 8% of sulphur. One analysis taken at random which may be taken as a fair sample of all the rest, gave 5.40% copper, 2.43% nickel, 7.92% sulphur and 25% iron, lime, magnesia, etc., and the residue chiefly hornblende. Up to October 1st, 1890, 56,534 tons had been taken to the roast yard.

SMELTING OF THE ORE.

There are two smelting furnaces at Copper Cliff, and the building which contains these is 65 feet long by 40 feet wide. Thirty-five feet of this length is on a level with the ground, while the rest of the floor is 8½ feet higher, and it is on this upper flat that the ore and fuel bins are situated. The daily capacity of each of these furnaces is 125 tons, although one of the furnaces has reduced 187 tons of ore in one day, and the furnace manager says that 135 tons could be reduced without much forcing. The furnace itself is a steel plate water jacket of the Herreshof patent, made in Sherbrooke, P. Q., by the Jenckes Manufacturing Co'y. It is nearly oval in form, the longer diameter at the tuyères being 6 ft. 6 in., while the shorter one is 3 ft. 3 in. There are 11 2½ in. tuyères through which the blast enters from a Baker's rotary blower under a pressure of about 9 oz. per square inch. It is 9 feet high from these tuyères to the charging door, and is an unbroken water jacket from the cast iron bottom up. It is made of rolled steel with