

to last over the period of closed navigation; coal being received by boat at a near-by port on Georgian Bay, as well as coke, ore, silica and clay. On the lower level are located the power-house, 156 by 102 feet; the blast-furnace building, 84 by 283 feet; the foundations for the trestle carrying the electric tramway, connecting the storage pockets with the feed-floor; the coal-bins of the boiler-room; the dust-chamber, 16 feet wide, 18 feet high and 444 feet long; the stack, 15 feet inside diameter, 210 feet high; together with the neces-

in. and air cylinders 40 in. and 40 in. by 42 in. will deliver 10,000 cub. ft. of free air per minute against a pressure of 15 lbs. for use in the converters. Two 13 in. by 26 in. by 20 in. horizontal compound condensing engines built by the Robb Engineering Company, of Amherst, N.S., to each of which is directly connected one 200-K.W., 600-volt, three-phase alternating current generator built by the Canadian General Electric Company, each generator having its own exciter of 11-K.W. capacity belt driven from generator shaft. The electrical energy thus generated is used for hoisting and pumping the mines, operating the electric tramway for charging cars, turning the converters, and operating the travelling crane in furnace building. The station is also equipped with one 25-K.W. motor driven generator set, for furnishing direct current to the electric locomotives. A travelling crane of ample capacity is installed in the engine room for handling all this apparatus. A gravity oiling and filtration system is installed on all engines.

Coal is brought to the power plant by the electric locomotive train above referred to and dumped into bins built in trestle along the west side of building. Then it runs through coal chutes to one-half-ton coal cars in boiler room, from which cars it is shovelled into boiler furnaces. The only available water for boiler use contains considerable sulphuric acid and scale-forming elements, and, to eliminate these, the water is subjected to a chemical treatment and precipitation in a water purifying system. In this way the acid is neutralized and the scale-forming material is removed before the water enters the boilers.

The blast furnace building contains two Holthoff copper blast furnaces; three stands for Holthoff converters; one 40-ton electric crane; the necessary matte-settlers, clay drills, silica and clay storage bins, etc. Room is provided for expansion.

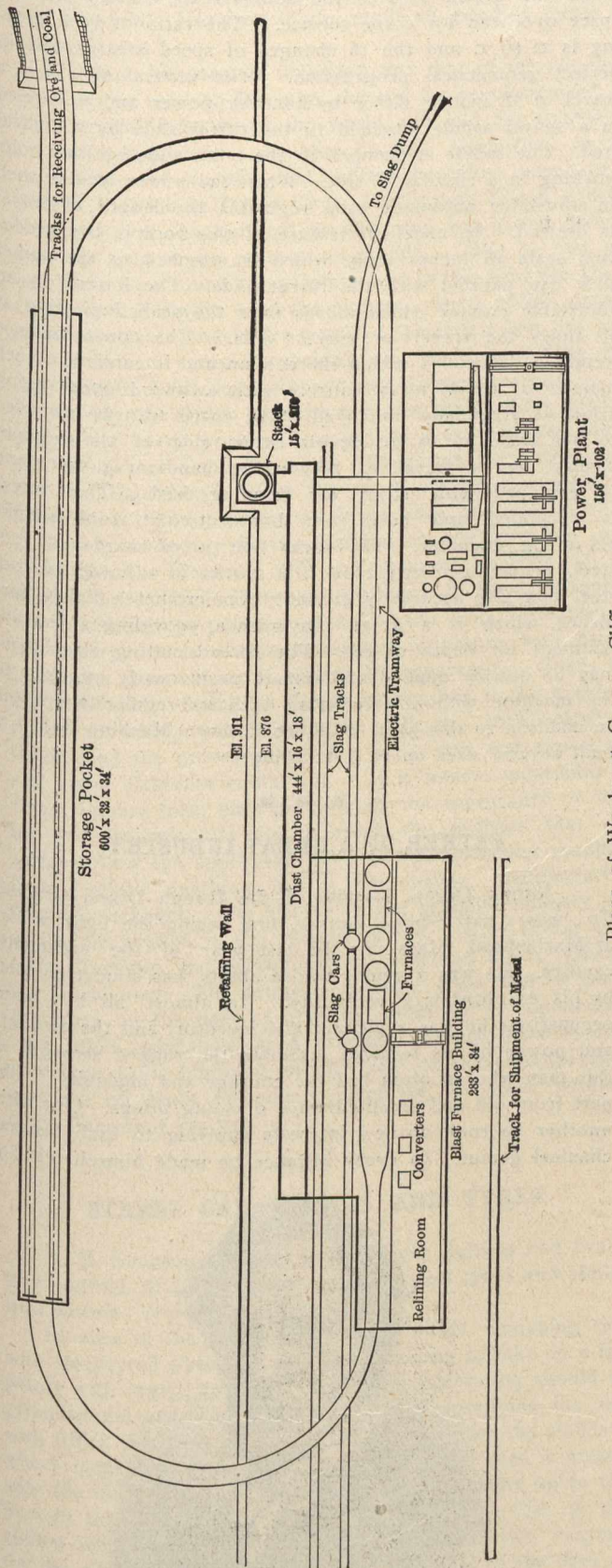
In operation the ore, coke and flux for blast furnaces, silica, and clay for lining converters and coal for boilers is delivered into the top of the trestle pockets by standard gauge cars—Ingoldsby side-dumping in the case of ore—and drawn from the bottom of the pockets into trains of six 2-ton, 36-in. gauge, side-dump cars, made by Arthur Koppel, New York, which are hauled to the blast furnace, silica and clay storage bins or coal bins by 25-h.p. Canadian General Electric Company electric locomotives. When feeding the blast furnaces, a train of six cars will be made up of four cars containing two tons of smelting mixture and two cars each containing the proper amount of coke to go with four tons of charge.

The slag and matte runs from the blast furnace into 16-in. settlers, the slag overflowing into 225 cub. ft. capacity Pollock cinder cars, which are hauled to the dump by standard gauge locomotives. The matte is tapped into 10-ton cast steel ladles and taken to the converter by a 40-ton Case Manufacturing Company's electric crane. The same crane removes the converter shells for relining, and takes care of the converter slag and white metal, pouring them into molds for return into the pocket trestle, or for shipment to the refinery. The coal bins at the boilers and the silica and clay bins at the clay mills are kept full by six-car train-loads of material.

The flue dust is drawn from the dust chamber into a standard gauge, bottom-dump gondola especially fitted for the service, and this car is hauled to the top of the pocket trestle on the upper level and the dust drawn into a pocket fitted for that purpose, whence it is drawn to a briquetting machine, pressed into briquettes and added to the charge.

The electric tramway consists of two parallel 36-in. gauge tracks running under two lines of grates under the pocket trestle, then over suspension scales to opposite sides of the furnaces on the feed floor level, passing over the top of the boiler room coal bins and converter lining house, silica and clay bins. The two tracks have cross-over connections, but under normal working conditions each track carries a train entirely independent of the other.

The blast furnaces are 50 in. by 204 in. at the tuyeres; 14 feet 9 in. from centre of tuyeres to the feed floor, and have on each side four lower jackets each 51 in. wide and 8 ft. 6 in. high, and two upper jackets 8 ft. 6 in. wide and 6 ft. high. Each lower side jacket carries four 6-in. tuyeres.



Plans of Works at Copper Cliff.

sary slag tracks, sunken track for loading metal for shipment, tracks to storehouse, etc.

The power-house is equipped with two horizontal, cross-compound, condensing blowing engines with steam cylinders 13 in. and 24 in. by 42 in. and air cylinders 57 in. and 57 in. by 42 in. When operating under usual working conditions these engines will deliver 20,000 cub. ft. of free air per minute against a pressure of 40 oz. for use in the blast furnaces. Another blowing engine, with steam cylinders 15 in. and 30 in. by 42