

which is 36 in. wide and 151 ft. long; a 20 horsepower slip-ring motor is used to operate the feeders under the ore bins.

The pumping unit in the power plant has a capacity of 2500 gal. per minute against a head of 250 ft., and is carried to the mill through a 16 in. main where it discharges into a storage tank having a capacity of 25,000 gal. This water is distributed within the mill at 40 lb. pressure.

The principal machinery in both of these plants and in the power plant as well, is the product of Allis-Chalmers Manufacturing Company. In the case of the Oliver Company, the generating unit is an engine driven alternator of 1200 K. W. capacity, supplying power in the mill at 3-phase, 60-cycles, 440-volts. In the case of the Wisconsin Steel Company, the power unit is a steam turbine driven alternator with a capacity of 500 K. W. at 80 per cent. power factor, running at 3600 R. P. M. generating a 3-phase, 60-cycle, 2300-volt current, which is transformed down to 440 volts at the mill.

THE MASSEY COPPER MINE AREA*

By A. P. Coleman.

Copper ores have been found in many parts of Northern Ontario, partly in association with nickel, and partly as independent deposits; but at present the only copper mined in the Province comes from the nickel-copper deposits of Sudbury, in which nickel is the more important metal. Of mines opened for copper alone within recent years the Massey and Hermina mines in Salter Township are those on which most work has been done.

The Massey mine, or Massey Station mine, has been known for about thirteen years, and the history of its development may be found in several reports of the Bureau of Mines from 1901 to 1907.

As stated by the Inspector of Mines, Mr. C. De Kalb, in 1900, the copper-bearing deposits were first traced on the surface by test pits for a mile east and west a little south of the contact of granite with green schist, and a shaft was sunk 80 ft. on the main deposit. In later years the shaft was deepened to 550 ft. and on seven levels more or less stoping was carried on, furnishing some thousands of tons of ore. Part of this was shipped to Copper Cliff and to Victoria mines for use in connection with the smelting of the nickel ores, but apparently was not entirely suitable as a fluxing mixture. A plant was then erected in 1904 for treating the ore by the Elmore oil concentrating process, but this proved unsuccessful, and in 1907 the mine was closed down.

The Hermina mine was opened in 1903, and a shaft was sunk to a depth of 500 ft. In 1908 a smelter was constructed at Thessalon, partly to treat the Hermina ores and partly for custom work, but both mine and smelter have been closed down for some years. Both the Massey and the Hermina mines are connected by short railways with the Sault branch of the Canadian Pacific, the Massey mine branch ending at the station of the same name 3 miles southeast, and the Hermina branch $4\frac{1}{2}$ miles long, ending a little east of Walford, the next station beyond Massey.

Massey Copper Mine.

A railway three miles long connects Massey on the Sault branch with the Massey mine, running first north

and then bending toward the northwest, the workings of the mine being in the southwestern quarter of section No. 15. The railway runs over old lake deposits except for half a mile of mica schist, where the line bends northwest. Beyond this no solid rock shows itself until the mine itself is reached, where a low mound rises above the drift for 180 yards, consisting of quartzite toward the southeast and green schist to the northwest, both more or less brecciated and crossed by quartz veins. The bedding of the quartzite has a strike of 60 degrees east of north. The rock dump consists mainly of green schist with a good deal of reddish-gray quartzite and some massive vein quartz. A hundred yards to the east there is another patch of quartzite and crush conglomerate, but otherwise the surface in all directions is drift-covered. Say 200 or 300 yards northwest at the outlet of a pond which was dammed for a water supply, a glaciated surface of greenstone shows itself; and a quarter of a mile through the woods to the northeast there is green schist with a little slate and quartzite on the flanks of a hill whose top consists of red granite. The greenstone and granite are the nearest eruptive rocks to be seen, but the covering of drift may hide granite or greenstone in the immediate vicinity of the mine.

There is little ore on the dump, chalcopryite being the only visible copper-bearing mineral, and it seems to be associated with the green schist rather than the quartzite.

The rockhouse is connected by tramway with the concentrating plant a short distance to the west, but at the time of my visit the caretaker was away, and the buildings were locked up.

Reports of the Mine Inspectors during the years when the mine was in operation give brief accounts of the results of mining. The ore was reported to run from $3\frac{1}{2}$ to 6 per cent. of copper with traces of gold in 1901, when the mine was first opened; but in 1902, when the shaft had been sunk to 230 feet, 3,000 tons of ore are said to average $3\frac{1}{2}$ per cent.; and in 1906, a year or two after the Elmore plant had been installed, it had fallen to 2.7 per cent. In 1904, the shaft is reported to have reached a depth of 550 feet with drifts from seven levels. It had an inclination of 87 degrees to the north, and the ore bodies are said to be overlapping lenses in slate.

Stripping is said to have shown the vein to extend for a mile; but only one of the other workings appears to have been of much importance. Half a mile west of the main shaft and 230 paces west of the line between sections 15 and 16, some stripping was done about 200 paces north of the road to Hermina mine. The rocks exposed on successive east and west ridges are alternating slate and quartzite with a nearly vertical dip. The stripping, which is extensive, shows from 4 to 6 ft. of ore, containing small quantities of chalcopryite. Two hundred or 300 paces north, after an interruption of drift, the east and west range of granite hills rise much as was described near the main shaft.

A quarter of a mile west of this stripping, where the Hermina road touches a hill of rock to the north, a large amount of work was done, including the driving of a tunnel 120 ft. into the hill side. The hill consists mainly of quartzite, but with interbanded green schist, and quartzite extends north for 250 paces, beyond which there is drift. The rock dump at the tunnel shows mainly green schist with vein quartz enclosing some chalcopryite.

*From Extracts 22nd Annual Report of the Bureau, 1913.