

vance of any on this continent and will certainly enable it to undertake the heaviest work of this class which the growing demands of the Dominion will call for in a number of years.

Within a short time all the ingots produced at the company's open hearth plant will be rolled on the new 34-inch blooming mill now being installed. This mill, which was built by Lamberton and Company, Catebridge, Scotland, is complete with all the latest electric and hydraulic equipment and will add very materially to the efficiency of the plant. To drive it, a new engine of 4,000 horse power has been erected.

During the year there was completed the installation of an exhaust steam turbine electric plant. This consists of two units of 500 k.w. each operated by exhaust steam from the blooming and bar mill engines. The power thus generated will be used in all the various departments of the plant. Space is provided for a third unit which will be installed as soon as the electrification of the various departments has been completed.

The 800-foot shipping building erected in 1910 was completed during the year and has greatly increased the efficiency of this department. It is equipped with a 50-ton electric travelling crane having a span of 75 feet. The new manufacturing building in which will be housed the spike, rivet, bolt and nut, machinery steel, polished shafting and other smaller finishing departments has been largely equipped. A new department here is a pick-making plant which will produce all kinds of clay and miners' picks. Ample space for further extensions has been left in this department.

All the equipment in the new engineering shop will be motor driven and the entire building is designed along the lines of the greatest possible efficiency and economy. Among the machinery installed here will be one high speed 20 ft. by 6 ft. by 6 ft. Loudon planer; one Smith and Coventry 10-ft. boring mill; one 30-in. and one 21-in. Hulse lathe, two Bertram horizontal boring and drilling machines and one Dallett portable drill and shaft center.

THE INFLUENCE OF OXYGEN ON COPPER CONTAINING ARSENIC OR ANTIMONY.

The experiments described in this paper, by Mr. R. H. Greaves, B.Sc., were made to determine the influence of oxygen on certain mechanical and physical properties of copper containing either arsenic or antimony in quantities up to 0.5 per cent. A number of comparative tests in which the metals were cold-rolled down to 0.02 in., or drawn into fine wire, showed that with increasing arsenic, the metal may take up more and more oxygen without suffering deterioration in its capacity for rolling. This quantity of oxygen increases from about 0.05 to 0.2 per cent. as the arsenic increases from 0 to 0.2 per cent., then more slowly to about 0.28 per cent., with 0.05 per cent. arsenic. Above this point the malleability falls off, and with still more oxygen the metal becomes "cold-short." The action of oxygen on copper containing antimony is similar, but in this case a small quantity (about 0.1 per cent.) effects a distinct improvement in the malleability of the metal. The ductility was similarly affected by oxygen. Tensile tests on the case metals showed that increase in oxygen from 0.15 to 0.4 per cent. caused a rapid diminution in elongation; the effect on the maximum stress was not marked. Oxygen has little effect on the hardness (measured by the Shore scleroscope)

*Abstract of a paper read before the Institute of Metals.

until a limit is passed, depending on the arsenic or antimony present; above this, the hardness increases rapidly. This limit is at about 0.3 per cent. with 0.4 per cent. arsenic, but is less in presence of antimony. The first addition of arsenic or antimony decreases the hardness of copper containing oxygen. Measurements of electrical resistance show that oxygen diminishes the conductivity of copper containing arsenic, but increases that of copper containing antimony; the quantitative effect of the oxygen has not yet been determined. In an appendix, methods of determining oxygen in copper are discussed. Without denying the accuracy of other standard processes, the author suggests that oxygen may conveniently, and with a high degree of accuracy, be determined by reducing in hydrogen, and weighing the water formed.

STASSANO ELECTRIC STEEL FURNACES.

In connection with the industrial development of the Stassano furnace, the following is of interest:

Since 1909 Major Stassano has been the sole owner of the patents and since then up to the present time he has made the following installations:

For the Societa Elba one 250-kw. Stassano furnace is in operation at Porto Ferrario and an 800-kw. Stassano furnace is to be installed in one of its works in Liguria.

For the Milan steel foundry, Fonderia Milanese d'Acciaio, one 250-kw. and two 100-kw. Stassano furnaces have been installed; for the J. J. Hoehn concern two 250-kw. furnaces, this plant being located at Odessa; for the Electro-Flex Steel Co., Ltd., of Newcastle-on-the-Tyne, three 250-kw. furnaces. A steel works is also being installed in Dunston-on-the-Tyne exclusively with Stassano furnaces.

After several years ago the Italian War Department had adopted the Stassano furnace for their Artillery Construction Shop. The Italian Navy Department will shortly likewise adopt it for the Navy Yards.

UNITED STATES GOVERNMENT REPORT ON THE COST OF STEEL.

The investigation shows that, as would be expected, the large companies have lower costs, partly due to superior efficiency, but also to monopolistic control, especially in ore.

Below are given some average unrevised book costs, which in several cases include transfer costs:

Open hearth billets	\$20.87
Universal plates	21.82
Structural shapes	26.52
Merchant bars	28.12
Wire rods	27.21
Black sheets	39.37
Tin and terne plate	71.23

NEWS ITEMS.

The Steel Company of Canada has let the contract for plant extension at Hamilton to the Hamilton Bridge Co.

Marsh and Henthorne purpose erecting a new foundry at Belleville, Ont.

NEW ELECTRIC PUMPS.

One or two of the five hundred horse-power electric motors for Toronto's high level pumping station have been in operation for a few hours each day during the past week.