THE SUPPLY OF SWEDISH IRON ORE TO WESTPHALIAN BLAST FURNACES.

In the year 1908 the output of pig-iron from 87 blast furnaces, owned by 17 companies, in Rhenish-Westphalia amount to 4,804,668 tons, and represented an average yield of 45.35 per cent. of iron from the ore smelted, the actual yield in different works ranging from 54.93 per cent. to 29.45 per cent. Of the above quantity of pig-iron, 67.65 per cent. was basic pig, 8.92 per cent. hematite, 7.10 per cent. foundry pig, 7.05 per cent. steel-making pig, 5.97 per cent. Bessemer pig, 1.23 per cent. forge pig, 1.16 per cent. spiegeleisen, 0.84 per cent. ferro-manganese, and 0.08 per cent. ferro-silicon. For the production of the hematite "steel-making" pig, Bessemer pig, spiegeleisen, ferro-manganese and ferro-silicon, which together constituted 24.02 per cent. of the output, ores low in, or free from, phosphorus (Spanish ores) were required, whereas the remaining 75.08 per cent., consisting of basic pig, foundry pig and puddling iron, are produced from phosphoric ores.

The iron ore raised in the Ruhr district does not amount to even ½ per cent. of the total ore consumed; but the Lahn, Sieg and Dill districts furnish about 10 per cent. to 11 per cent., and the German-Luxemburg minette district 21 per cent. The share of the ores won in other parts of Germany is insignificant, and diminishes year by year. The Westphalian district forms the chief consumer of Swedish iron ore, this being obtained principally from the well-known Kirunavara and Gellivara deposits. Next to Sweden, Spain supplies the largest quantity of ore to Westphalia, nearly the whole of the ore shipped from Spain to Germany being consumed in that district. From 1901 to 1908 Spain furnished between 7.56 and 21.67 per cent. of the total ore smelted.

NEWS ITEMS.

That Canadian steel concerns are being hurt by American competition is admitted. A steamer loaded with 2,000 tons of steel products is now on its way to Montreal, having come direct from the Gary plant at Indiana by the canal route. Owing to competition with the Uuited States firms the Canadian prices are away below a profitable selling basis. The importation of steel direct from Gary is entirely unprecedented. According to one authority "steel can be had to-day for almost anything one wants to bid." All of which is not exactly bullish in the various Canadian steel stocks.

In connection with their course in the metallurgy of iron and steel, the students of the third year in the Engineering Faculty of Toronto University paid a visit this week to the Lackawanna Steel Plant, of Buffalo, where a very enjoyable and instructive time was spent.

POWER FOR THE CITY OF WINNIPEG.

Within a few months the city of Winnipeg will be prepared to sell electrical energy. Its great plant at Point du Bois, costing $2,250,000, and capable of generating 100,000 horsepower, is rapidly nearing completion; and the business men of Winnipeg, as well as householders generally, are looking forward with keen anticipation to cheaper power.

The rates for power at present are as follows: 6 cents per kilowatt-hour up to 50 horsepower; 4 cents per kilowatt-hour over 50 to 100 horsepower; 3 cents per kilowatt-hour over 100 horsepower. Private lighting costs 10 cents per kilowatt; electricity for cooking costs 6 cents; gas, 1.20 per 1,000 feet.

ROLLING LOADS ON BRIDGES.*

By J. E. Greiner, Consulting Engineer.

Coincident with the introduction of a particularly heavy type of locomotive is always the question as to whether bridges are being constructed of sufficient strength to safely carry this heavy engine and its possible future development.

This same question has been cropping out time and time again during the past thirty years or more, and the answer has heretofore frequently been evidenced by the construction of somewhat stronger bridges, but in many cases to an extent merely sufficient to anticipate the increasing weight of rolling stock for a brief period.

During each successive revision of the specifications it was believed that the practical limits of locomotive weights and car capacities had been fully anticipated, but the fallacy of this belief has been demonstrated so frequently that now few engineers feel inclined to assert, with any degree of confidence, at what point or at what time this development will have reached its limit. It is apparent that we have not yet passed the period of expansion and development, and the question as to whether the structures now being built are of sufficient strength depends entirely upon future development in the type and weight of the rolling stock and the accuracy with which the designer has anticipated this development.

This discussion has a direct bearing on this question and is the result of an investigation made recently with a view of ascertaining the heaviest engines in operation, the requirements of bridge specifications and the anticipated development as indicated by the capacity of modern bridges. It is, therefore, hoped that the presentation of this matter at the present time will be of some practical use to those interested.

Heaviest Locomotives.

Since 1835, about the time the first bridge was built for carrying trains, locomotives have developed from the miniature 4-wheel grasshopper weighing less than 22,000 lbs. to the enormous 24-wheel articulated type weighing 616,000 lbs.

About 20 years ago the heaviest engine in service on the Baltimore & Ohio was a Consolidation weighing about 134,000 lbs.; at the present time this road has articulated engines weighing 463,000 lbs. Similar increases have taken place quite generally on other roads until the heaviest engines of each type have reached the weights given in Table 1.

This table also gives the weight and wheel base of double-header engines with their tenders for all types excepting the articulated, where a single engine with tender is used in comparison. Attention is called to the fact that the wheel bases of all double-header engines, excepting the electric types, are considerably larger than Cooper's E series generally used for bridge designs. The articulated types, being single, have shorter wheel bases than the double-headers of other types.

The weight per foot given in the last column of this table is the total weight of engines and tenders divided by the total wheel base, double-headers for all except the articulated types. This weight per foot does not signify anything in regard to the relative effects, on bridges, of the different types of engines, and, therefore, cannot be used in comparing these effects. It is given here merely for the purpose of illustrating this fact, which will be apparent upon comparing these weights with the relative stress effects given in Table 3.

*Abstracted from paper in Bulletin No. 139 of the American Railway Engineering Association.