

\$4,157,622; and anthracite, 4,642,057 tons, valued at \$22,034,839; or a total of 18,201,953 tons, valued at \$47,949,119.

The imports in 1912 were, bituminous, run of mine, 8,491,840 tons, valued at \$16,846,727; bituminous slack, 1,915,993 tons, valued at \$2,550,992, and anthracite, 4,184,017 tons, valued at \$20,080,388, or a total of 14,595,810 tons, valued at \$39,478,037.

Thus the increase of imports of coal in 1913 amounted to a total of 3,606,143 tons, or nearly 25 per cent. The increase in the imports of bituminous run of mine being 2,251,633 tons, or 26.5 per cent., increased imports of slack 900,430 tons or 47 per cent., increased imports of anthracite 458,040 tons or 11 per cent.

The apparent consumption of coal during the year was 31,685,456 tons as against a consumption of 26,934,800 tons in 1912. Of the consumption in 1913 about 42.8 per cent. was from Canadian mines and 57.2 per cent imported.

Coke.—The total output of oven coke during 1913 was 1,517,133 tons of 2,000 lbs., made from 2,147,913 tons of coal of which 1,598,912 tons were mined in Canada and 549,001 tons imported. The total quantity of coke sold or used by the producers during the year was 1,530,499 tons, valued at \$5,547,694.

In 1912 the total output was 1,406,028 tons and the quantity sold or used by the producers 1,411,229, valued at \$5,164,331.

The output by provinces in 1913 was: Nova Scotia, 920,526 tons; Ontario, 411,643 tons; Alberta, 65,104 tons, and British Columbia, 319,860 tons. That of Ontario was entirely from imported coal.

By-products from coke ovens recovered during the year included 10,608 tons ammonia sulphate; 8,371,600 gallons of tar and 3,353,731 thousand feet of gas, and the total value would approximate \$866,150.

The ovens of the Acadia Coal Co. and Londonderry Iron and Mining Co. in Nova Scotia, the Atikokan Iron Co. in Ontario, the West Canadian Collieries and Leitch Collieries in Alberta and the Canadian Collieries, Limited, in British Columbia were idle throughout the year. At the end of the year there were 1,720 ovens in operation and 1,325 idle as follows: Nova Scotia, 572 active, 376 idle; Ontario, 110 active, 100 idle; Alberta, 134 active, 233 idle; British Columbia, 904 active, 426 idle.

The exports of coke during 1913 were 68,235 tons, valued at \$308,410, and the imports 723,906 tons, valued at \$2,180,830. In 1912 the exports were 57,744 tons, valued at \$252,763 and the imports 628,174 tons, valued at \$1,702,856.

Messrs. Ohrt and Ouistgoord, Danish engineers, have prepared plans and an estimate of cost for a submarine channel tunnel to connect Denmark and Sweden. According to the plans, the railway will be carried along the coast south from Copenhagen on an embankment, and the first part of the tunnel will be under the "Drogd," as that part of the Sound is called which lies between the mainland and the little island of Saltholm. The railway will run across the island above ground and then dip under the Sound again, till it reaches the west coast of the Swedish province of Schonen. The end of the tunnel will be at Limuhamm, which is a little to the south of Malmo. The entire length of the new railway will be about 30 miles, of which nearly 9 will be submarine tunnel. The greatest depth at which the tunnel will run will be about 100 feet, and it is estimated that the undertaking can be completed in 5 years at the cost of about \$25,000,000. The tunnel will be worked by electricity, and will have to be driven through the same kind of stratum, grey chalk, as would the tunnel between England and France.

ORGANIZATION AND METHODS OF STREET CLEANING DEPARTMENTS.*

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THE organization and methods of street cleaning is a comparatively new field for the engineer, and in this respect it differs from the other branches of highway engineering, such as the construction and repair of pavements, which have always been—at least in some localities—more or less under the jurisdiction of the engineer, even though only considered seriously by the engineering profession and the public within the last few years. The construction, maintenance and care of pavements is distinctly a highway engineering problem, and the cleaning of the pavements is a part of this work, and the highest point of efficiency will never be reached until it is so recognized.

We all agree that ease of operation is the most important factor to be considered in any organization, and this cannot be accomplished without centralizing the control of all the functions so closely related and interrelated with respect to the different branches of the work that there is bound to be an overlapping of jurisdiction and a certain amount of duplication of work and lost effort if under separate organizations. This is the case where highway and street cleaning work are under separate control, and it is for this, aside from many other reasons, that the cleaning of streets is properly a function of the organization having jurisdiction over the construction and maintenance of the highways. It is obvious, from a business and engineering point of view, that the logical way to handle both of these branches of highway work, in order to attain the greatest economy and efficiency, is through one organization, which would properly be the highway department. Unfortunately, most of the discussions and papers written relating to highway and street cleaning organizations have been confined to an outline of the methods of carrying on the work of existing organizations. A careful review of the ground covered in these articles forcibly suggests that the field cannot be economically and properly covered through separate departments, and that the inevitable solution is the one organization controlling all the branches of the work relating to the highways.

A proper highway engineering organization, composed of a personnel capable of controlling such work, would also be equipped to handle the collection and disposal of ashes, garbage and waste with far less additional expense than through a separate organization, and, as the ashes and rubbish should be collected previous to cleaning the streets, each cleaning and collection schedule bears a relation to the other, and, therefore, the line of least resistance would be to carry on both branches of the work through the one organization.

In Europe, street cleaning work is more generally under the supervision of the engineers than in this country, and it is usually under the control of a department having jurisdiction over the construction and maintenance of the pavements.

In Paris, the street cleaning authorities are charged with the construction and maintenance of streets and sidewalks, as well as with sweeping the streets and sidewalks, sprinkling roadways, collecting house refuse and

* Lecture delivered by Mr. William H. Connell before the Graduate Students in Highway Engineering at Columbia University on January 15th, 1914.