THE INSTITUTION OF CIVIL ENGINEERS.

SECT. II.—OTHER SELECTED PAPERS.

(Paper No. 1995.)

"On the Energy of Fuel in Locomotive Engines."

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THE object of this Paper and of the accompanying Table, is to show, by data obtained from different railway companies, what is the amount of fuel consumed per unit of work done by locomotive engines; how this consumption varies on different lines of railways; and how the energy of the fuel utilized compares with the full energy, in other words, how much of the energy is used, and how much lost.

The consumption of fuel per unit of work, that is, per ton weight moved 1 mile, is perhaps the most certain and reliable scale by which the capacity of a railway for doing work can be measured, and compared on the same scale with another railway. Any estimate based upon cost is misleading, since the price of labour, fuel, and everything that enters into the working of a railway, varies at different times and in different places. It might thus happen that a line showing a large cost per train-mile, or per car-mile, was more economically and carefully worked, and better able to do the work for which it was constructed, than another showing a smaller cost per car-mile. The comparison plainly depends upon the cost of labour and material in the two localities, and is vitiated by the rise and fall of markets. No true comparison of the respective railways, or even of different periods of the same railway, can be made until such vitiating elements have been eliminated, and a basis arrived at which shall be common to each, and unaffected by any adventitious circumstances. In the consumption of fuel per unit of work there exists such a common basis of comparison, and one which demonstrates the capacity for doing work which the railway possesses. For the consumption of fuel is almost an absolute standard, varying only with the quality of the fuel used, and is not affected by any other uncontrollable circumstance. Thus, if on one line of railway the consumption per ton moved 1 mile is very much greater than on

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