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EFFICIENCY OF COAL CONSUMPTION IN RAILWAY PRACTICE.*

BY HERBERT WALLIS, PRESIDENT CAN. SOC. C.E., 1896.

There are many subjects commonplace in themselves, whose very commonplaceness makes them interesting. Coal, for example, entering as it does so largely into our domestic economy, is a subject upon which few people are not willing, in some way, to express an opinion, and about this season of the year, when the mercury in our thermometers is ranging in the neighborhood of zero, it becomes a matter of deep interest to most of us, whether that supply which was so carefully cellared during the summer is going to outlive our necessities before inexorable laws require that it shall be again replenished. It has occurred to me that you might not be unwilling, in lieu of a general retrospect, to hear something about fuel in its various forms, of which coal is one, and especially in its relation to locomotive steam practice in Canada, where, owing to the extremes of atmospheric temperature, and to climatic disturbance, the conditions under which it is used are perhaps dissimilar to those existing in most other countries. Assuming, then, that this should be the case, I shall have to ask you to go with me while I retrace my steps, in reviewing the practice and past operations of the Grand Trunk Railway, that great Canadian artery with which, as is known to many of you, I have been identified for a quarter of a century, and from which I have collected such data

as I propose to bring before you to-day. I do not claim that my conclusions have been reached as the invariable result of exhaustive experiment, or that my figures are beyond criticism. They are suggested rather as a contribution to practical literature upon a subject which has occupied in the past, and which will unavoidably continue to occupy, the minds of those engaged in solving the great problems arising from the frequent calls for cheaper and more rapid transportation, in connection with which this question of fuel through the energy derivable therefrom stands out as the prominent feature. The fact that the coal bill alone in the accounts of our great railways absorbs some 14 per cent. of the total expenditure, is sufficient to constitute it, as it literally is, a burning question.

Years ago, when fire-boxes were made of copper and tubes of brass, when their repairs caused no anxiety in the minds of those engaged in their daily work of operating railways, and when their renewals did not constitute an important feature in the general expenditure, the forests of Canada supplied the staple fuel for locomotive consumption. It is true that trains had to be stopped every forty miles or so, to have the tender loaded with a fresh supply, an operation which occupied ten or fifteen minutes; but these were halcyon days, when time was not so valuable, because competition was not so keen as it is to day, and no inconvenience apparently resulted from the not infrequent arrival of passenger trains long after their schedule time. It was only when the possibility of sharing in the distribution of the great produce of the West suggested an assimilation of the gauge of the Grand Trunk with that of the American lines, that it was seen how totally inadequate was cordwood to meet the requirements of a first-class railway service. Even then the substitution of coal had to be very gradually effected, on account of the expense attending the conversion of the locomotives. A wood-burning engine was *hors de combat* after a very short tussle with coal, and the renewals of fire-boxes and tubes were of such a costly nature as to suggest, oftener than not, the substitution of an entirely new engine and the relegation of the old one to the "scrap" heap. It is not, therefore, to be wondered at that cordwood outlived for many years the introduction and even the extensive use of coal, particularly upon branch lines, from the neighborhood of which it could for many subsequent years be obtained cheaply, and also in other districts where competition was the least active, to the extent necessary to wear out those locomotives, which, while being still equal to the service, were not worth the expense of conversion. Fuel wood was purchased by the measure, in cords of 128 cubic feet, and was delivered under various contracts upon the railway "right of way" at the nearest points to the sources of supply. The piles were measured and removed by specially appointed and equipped trains to the wood sheds upon the line of railway, where the process of drying was supposed to be undergone. For a variety of reasons, however, this process was rarely completed, and, as may be imagined, the fuel differed very widely in its calorific value. The

* Extracted from the President's address at the annual meeting of the Canadian Society of Civil Engineers.