system of acceptance by measurement took no account of the density of fibre or the amount of moisture it contained, and although hard and seasoned wood commanded a higher price than the soft or greener article, there was no practical means of establishing an accurate or reasonably accurate standard of value as a check upon extravagance on the part of users. For general statistical purposes, 3,712 lbs. was held to be the average weight of one cord of mixed and seasoned wood, and probably the figure was sufficiently reliable. In the year 1878 careful tests were made to determine the values relatively of the hard and soft woods which were delivered on the line of the Grand Trunk Railway in Eastern Canada. The former comprised chiefly hard maple and birch, and the latter covered those non-deciduous trees of which pine, spruce and helmlock are representative. The weight per cord of seasoned wood was about 4,000 lbs. for hard, and 2,700 lbs. for soft. The result of the tests showed that one cord of the hard wood was fully equal in calorific value to one and a half cords of soft.

So far back as the year 1868, the Grand Trunk Company, with the object of checking the advancing price of cordwood, introduced peat as a competitor. This peat was cut from the bogs at Lapigeonniere and at St. Hubert, in this province, and after being partially cured and otherwise prepared, was hauled, as in the case of wood, to the way station delivery sheds. The difficulties in its use, anticipated at its outset, were such as applied to cordwood. The crude peat was not uniform in quality, it was liable to imperfect manufacture and to absorb an undue amount of moisture. It was, moreover, very unpopular, owing to the pain its use inflicted upon the eyes of the firemen, and its death knell was rung about the year 1875. The last year's record, based upon issues of about 80,000 cords of mixed wood at 3,712 lbs. per cord, and of 8,000 tons of peat at 2,000 lbs. per ton, showed a consumption per engine mile of 95 lbs. of the former, and 118½ lbs. of the latter, the actual cost of peat per car mile being about 50 per cent. more than that of wood. These figures were, however, the result of the daily working of the railway, and the conditions were not perhaps in all respects the same. In 1876, I made very careful experiments to determine the relative values of the two fuels, upon representations having been made that a superior quality of compressed peat was in the market, which would eclipse anything that had been previously introduced, both as to its calorific value and its price. The cost of the wood was $3.33 per cord of 4,031 lbs. delivered upon the tender, and that of the peat $1.71½ per ton of 2,240 lbs., similarly delivered, and the evaporative efficiency proved to be 3.09 lbs. and 2.33 lbs. respectively of water per lb. of fuel, while the quantity used per ton of train hauled one mile, excluding the engine and tender, was .263 lb in the case of wood, and .362 lb. in that of peat, or an excess as against the latter of over 37 per cent.

It was during the autumn of 1873, when, after the gauge of the railway had been changed from Montreal westward to conform to that of American lines, that the Grand Trunk Company contracted largely for bituminous coal. During that year upwards of 150 engines, constructed for the purpose, replaced others of the wood-burning type, which were subsequently rebuilt or otherwise disposed of, and the number of coal-burning engines was largely augmented the following year, on the completion of the change which made the Grand Trunk a 4 feet 8½ inch, or standard gauge railway throughout its entire length. As a result, the influx of American traffic from the Western States to the seaboard, coupled with the increased capacity and fitness of the new engines, so greatly increased the mileage and added to the weight of the trains, that the superiority of coal and the insufficiency of cordwood as a steam generator could not be ignored, and the absolute retirement of the latter became merely a question of time. During experiments made in 1876, a locomotive hauling a freight train of 340 tons consumed .263 lb. of hard dry maple, weighing something over 4,000 lbs. per cord per unit of work (one ton one mile), as against .105 lb. of good Welsh steam coal, and the efficiency of the boiler under similar conditions was 3.09 lbs. and 7.94 lbs. of water evaporated per lb. of fuel respectively. Similar experiments made at the same time with stationary boilers of locomotive type produced similar results, so that it may be broadly stated that one pound of good steam coal effectually burned will in practice yield an equal result with two and one-half pounds of hard dry maple, or that a ton of coal is equal to a cord and a quarter of seasoned hard wood by measure. The best of soft woods did not yield by measure more than one-half the duty of coal, one ton or 2,000 lbs. by weight producing equal results with two cords. Meantime the gradual clearing of the country contiguous to the railways was making cordwood difficult to obtain, while competition and improved facilities in transportation were cheapening the price of coal. While therefore the issue of coal during the year 1871 amounted in all but to 200 tons, it had risen in 1875 to 140,000 tons, and in 1895 the quantity used exceeded 700,000 tons, and from the year 1884 cordwood ceased to be used except for lighting fires, or to a limited extent for stationary purposes.

In the early history of the use of coal upon the Grand Trunk Railway, the supply was, for the most part, obtained by water delivery, either at Montreal from Cape Breton and Nova Scotia, with occasional cargoes from Great Britain, or at Toronto, Belleville or Brockville, by way of the lakes from the coal fields of Ohio and Pennsylvania. Thus a large stock had to be provided during the season of navigation to meet winter requirements, which, by exposure to the atmosphere (for the quantity was too large to admit of it being piled under cover), lost much of its calorific value by decomposition and the gradual volatilization of the hydrocarbons. This loss was accelerated, in coals which contained sulphur, in a more than ordinary degree, to the extent that active combustion not infrequently followed upon or resulted from the heat generated on account of its presence. The loss by breakage in loading and unloading the vessels, as well as the loss of interest on invested capital, furnished additional reasons for inducing the opening of all-rail routes, and for making recent contracts on the basis of continuous daily delivery. Coal from some seams, owing to a soft and friable nature, is specially liable to damage in the process of mining and subsequent handling, and quantities varying from 75 to 25 per cent., according to the nature of the coal, pass through the screens, in the form of dust and slack, which, if used in the fire-boxes, would escape through the tubes in a condition wholly or partially unconsumed, thus helping to swell the volume of smoke, which imperfect combustion, the result of forced fires, too often produces.

It has often become a question as to whether it is desirable to forego the expense of screening, and to be sat-