No. 24.

MEMORANDUM for the ENGINEER-IN-CHIEF.

In re Canterbury Coal.

YESTERDAY and to-day trials have been made with Canterbury coal to see whether it could be burnt without a spark-catcher and with fire-bars farther apart than with Waikato coal; the result proved that bars $\frac{3}{8}$ in. apart could be used, but that spark-catcher and cooling apparatus was necessary.

In putting on spark-catchers it has to be remembered that they lessen the steaming capabilities, and therefore that the blast should be sharpened a little; our blasts have an $\frac{1}{8}$-in. ring on them.

Our engines steam well with the Canterbury coal.

Auckland, 20th November, 1877. A. V. MACDONALD.

No. 25.

The ENGINEER-IN-CHIEF to the Hon. the MINISTER for PUBLIC WORKS.

In re Canterbury Brown Coal.

(Memorandum.)

THE experiments made in Canterbury to ascertain whether the native brown coal could be burned in the locomotives in use on that line were so unexpectedly adverse to the coal that I had ten tons sent to Auckland to be tried there by Mr. Macdonald, who has now had considerable experience in the use of a similar quantity of brown coal in the locomotives of the Auckland and Newcastle Railway. The result is contained in the two reports herewith, dated 6th and 20th November.

Mr. Macdonald finds no difficulty in using the coal or in keeping up steam with it on very much heavier gradients than obtain on the Canterbury lines. He finds it somewhat better than the Waikato coal, which is the only coal in use on the Auckland Railway.

The result of a year's working shows that the class of engine (6-wheeled coupled, $10\frac{1}{2}$-in. cylinder) burns 23 lbs. of Waikato coal per mile; the same engines burn 15 lbs. of Newcastle coal per mile. Roughly speaking, 1 ton of Newcastle coal is equal for steaming purposes to $1\frac{1}{2}$ tons of Waikato; but, as the men get more accustomed to the brown coal, the apparent difference will decrease, the management of the fire being of more importance with the inferior coal.

The same class of engine burned only 16 lbs. of Canterbury coal per mile during Mr. Macdonald's experiment against 18 lbs. of Waikato. The heavy Fairlie engine burnt $33\frac{1}{2}$ lbs. of Canterbury against $30\frac{1}{2}$ lbs. of Waikato, but the weather was against the Canterbury coal in the trial, as the rails were greasy and the wheels slipped badly, thus wasting steam.

On the whole I consider the result of Mr. Macdonald's experiments so satisfactory that I think Canterbury coal should be brought into use on the railway wherever it can be procured at a cost not greater than from 55 to 60 per cent. of the cost of Newcastle. This must be done gradually, as it takes time to teach the firemen the proper way of using the coal, and to overcome their conservative prejudices against it.

The locomotives were furnished with large fire-grates for the express purpose of using an inferior coal, and no alteration is necessary beyond that of furnishing a spark-bonnet and putting the fire-bars at a proper distance apart. The cooling apparatus fitted by Mr. Passmore to the ash-pans should also be used. The cost of the alterations would be about £35 per engine.

Public Works Office, Wellington, JOHN CARRUTHERS.
30th November, 1877.

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