Extract from Railway Machinery, *May, 1907.*

While there is no doubt that ultimately electric traction on steam railroads will prove to be as economical and safe as it is convenient and pleasing to the patrons of the railways, it is impossible even for the most ardent advocate of electrification to extract much comfort out of the statements made by the chairmen of the English railroad companies who have undertaken to electrify part of their roads. The *Railway Engineer* states that in one case the shareholders of a British railway were notified by the chairman that electric working is more expensive than steam working, and that at the present time most of the companies having electrified their lines are very much disappointed in that the results have turned out to be considerably different from the estimates given to them by electrical engineers who were supposed to know a great deal about the matter. On the other hand, it was admitted that the cost of working electric traction is constantly being reduced, and that, while the cost is still far higher than the cost of steam traction, when we remember that electric traction on railroads is only in its experimental stage, there are still greater possibilities. There is, however, a consideration in regard to the permanent-way which cannot be too strongly emphasized. The electric rolling-stock cuts the rails to a much greater extent than any stock that has been used in connection with steam-power, and engineers are rather confused at arriving at any definite cause for it. It has been tried to overcome the difficulty by laying down hard-steel rails; but the better way by far would be to, if possible, get rid of the cause rather than to try to meet it by putting down a different kind of rail than has hitherto been necessary. We do not doubt that electric traction on railroads will prove a success in time; but the present results on English roads, where, for instance, in one case the half-yearly dividends on a certain section of the Metropolitan road were cut from 3 to 1 per cent., indicate that there is, as yet, a great deal of improvement to be desired.

Light Railway and Tramway Journal, *10th June, 1904.*

Steam traction costs more or less proportional to the train-mileage. Electric traction is practically proportional to the ton-mileage. Mr. Langdon expects that, with a third-rail system employing a continuous current at 600 volts driven from a primary three-phase current at high tension, the cost will not be much less than £10,000 per mile.

Mr. James Falconer pointed out the special interests attached to the report of the first year under electric traction, but added that the figures must not be taken as being a complete indication of what the results of the innovation would be. The working-expenses, he was bound to say, were not satisfactory, but it must be remembered that they were now giving a much better service, and in comparing costs all the comparisons were in favour of electricity. Thus:—

	Steam Service: Pence per Train-mile.	Electric Service: Pence per Train-mile.
Maintenance of permanent-way	3·9	1·6
Locomotive and generating power	11·3	5·2
Traffic expenses	13·5	7·3
Cost of ventilation	3·4	0·2
Cost of pumping	4·85	1·5
Total working-expenses	41·2	18·2

Application to the Christchurch–Lyttelton Line.

As before remarked, we consider it would be advisable to obtain practical expert advice upon the best system to be adopted as to the cost and methods of working, and we recommend that no further action be taken in the direction of proceeding with the work until this has been done.

In the Christchurch district there have been various proposals for supplying electricity from the water-power sources; but, as no scheme has been definitely decided upon, there is no information as to what would be the actual cost of electric current so supplied.

The question of obtaining electric current from the Christchurch Tramways need not be considered, as the Council could not supply what would be wanted without installing extra plant for the purpose; and, this being necessary, it would be more satisfactory for the Railway Department to install its own.

If electrification of this line were adopted, an acceleration of the speed would naturally be expected, and, as the starting and stopping of a train worked by electricity is quicker than with one worked by steam, no difficulty would be experienced in providing this.

The traffic on the Lyttelton–Christchurch line for the year ending 31st March, 1907, was as follows:—

Goods.

Number of tons moved (approximately only)	542,950
Number of tons moved per working-day	1,735

Passengers.

Number carried (approximately only)	1,340,000
Average carried per day (seven days per week)	3,671
Number of trains run each day	36

The following tables A and B show two methods of calculating the electrical energy required for the estimated train-services to be provided.