

The estimates of capital outlay and operating-expenses indicate that power can be supplied at about £6 10s. per horse-power per year for wholesale supply for distribution and for factories.

Although the Lake Coleridge system is the first in importance owing to the urgent demand for an adequate supply of power in the city and suburbs of Christchurch, other available sources of electrical energy are receiving attention.

An investigation of the available market in the Whangarei district, where hydro-electric power is available from the Wairua Falls, has been made, with satisfactory results, and preliminary steps are about to be taken for the development of power from those falls and from Lake Waikaremoana. The Electrical Engineer will visit both sources of power at an early date.

It is of fundamental importance for the future development of this work that the fullest possible information should be collected with regard to the rainfalls and variations in flow of our principal rivers over an extended number of years. This information is essential in order that, as the population and the markets develop, accurate and reliable estimates may be formed of the water-power available to meet the demands. For this purpose gaugings will be undertaken of all rivers and streams which are likely to be put under control.

RAILWAY ELECTRIFICATION.

The conditions pertaining to the electrification of the Christchurch-Lyttelton Railway are being investigated, and the requirements ascertained. It is anticipated that with a supply of power available from Lake Coleridge the conversion from steam to electric working will be profitable, and tenders for the work will be invited in due course with a view to its completion as soon as possible after the supply of current becomes available.

After the application of electricity to the working of this line, its application to other sections will be considered. In the meantime all information on the subject is being collated, and the progress of electrification of railways in other countries is being carefully watched. In view of the rapid extension of electric working in France, Germany, Switzerland, Norway, United States, and England, it is intended to make a systematic study of the traffic and train movements throughout the Dominion, with the object of ascertaining definitely the power requirements of the different sections. In other countries the electric working of railways, which has previously been limited to suburban services, is now being extended to main and branch lines, not only where the traffic is heavy, but also on lines with a comparatively infrequent service.

The Department is consequently studying the application of electricity not only to suburban services, where its usefulness is undoubted, but also as an alternative to regrading, which is proving necessary on many of the main lines in order to cope with the increasing traffic.

The use of electric traction would dispense with the necessity of regrading in a great many cases, inasmuch as steeper grades can be worked with electric haulage and at higher speeds than with steam-engines. On new lines also it would be possible to reduce the cost of construction considerably, and to expedite the work by the adoption of higher ruling maximum gradients than are possible with steam haulage, but which can be advantageously operated electrically.

IRRIGATION AND WATER-SUPPLY.

The surveys and explorations in connection with irrigation-works in Otago have been vigorously proceeded with during the year.

In the Ida Valley, the irrigable area is divisible into several sections, each section requiring different treatment. It is intended to deal first with the southern section, which contains some of the best land, and the surface characteristics of which are such as to render it suitable for irrigation with a minimum of expense. The water required for this portion can be obtained directly by gravitation, the chief sources of supply being the Manorburn and the Poolburn, in each of which it is proposed to erect two dams at favourable