church would be short, and the needs of the district are such that a large amount of power could be made use of quickly. At the rate American cities utilise electricity, Christchurch and its suburbs, with Lyttelton, should use 6,000-horse power for lighting alone. With this in view, together with the trams and the possible equipping of the Christchurch and Lyttelton tunnel with electric traction (ample power for which can be supplied from the above source), the initial installation should be 10,000-horse power, and complete plans should be made at the start for the complete installation. The total power available at Lake Coleridge as per reports received is 93,000-horse power theoretical continuous, or twenty-four hours per day, with the Harper and Wilberforce waters diverted into the lake.

I would recommend that further search be made near Wellington, Auckland, and Dunedin for suitable power-locations easily developed to 5,000- or 10,000-horse power.

In regard to cost and selling-price I cannot say much in this preliminary report, except that handsome returns on any investment will be secured by a very reasonable charge if all the conditions are carefully considered.

In regard to rainfall, snowfall, and height of lakes and rivers, I find that you have no complete records, especially for the thinly settled portions and the higher altitudes. I would suggest that you have a great many public servants scattered over the colony who could easily keep these records, and the necessary expense to equip them for the work is very slight; also many of the stations in the back blocks would keep records if encouraged, and these would be most valuable of all.

Incessant travelling during my stay in the colony, together with the approaching holidays, made it impossible for me to complete even this preliminary report before sailing. However, a full report will be forwarded as soon as possible.

In closing, I would say that I have seldom seen so promising a country, and I am sure that you will find that, next to your railroads, the utilisation of your water-powers by means of electric transmission of energy will do more to advance your material interests and to mitigate the evils of our civilisation than any other agency you can employ.. The world is looking to you for the solution of many of its difficulties. The investigation you have had me make is in line with answering their queries, and the utilisation of the forces of nature is one of the quickest means of reaching the solution.

Yours, &c.,

L. M. Hancock, M.A.I.E.E.,
Electrical Engineer.

Hon. W. Hall-Jones, Minister for Public Works, Wellington, New Zealand.

GENERAL REPORT.

San Francisco, California, 12th February, 1904.

Bay Counties Power Company: History and Results.

To satisfactorily solve the question of applying long-distance electric transmission to a new locality it is wise first to make a study of what has already been accomplished. In view of the fact that you have selected me for the work of examining the rivers of New Zealand on account of my connection with the Bay Counties Power Company, a bit of the history of that development may be to the point.

In 1895 capitalists were interested in a plan to utilise the waters of the South Yuba River, in Nevada County, to drive electric generators, and transmit the power eight miles to Nevada City, Grass Valley, and the adjacent mining district. Nevada City had a population of three thousand and Grass Valley six thousand. Each had gasworks, and each was supplied with electricity by means of small independent plants. Grass Valley was distant about eight miles and Nevada City about five miles from the generating-station. Two 500-horse power generators were installed, to be driven by impact water-wheels, supplied with water under 85 lb. pressure by means of a 48 in. pipe and three miles and a half of flume, 6 ft. wide and 5 ft. deep. Water was diverted into the flume by means of a log-crib dam, rock-filled, 28 ft. high and about 200 ft. long.

Work was started in July, 1895, and the plant was put into commercial operation early in February, 1896. Lighting for the towns was the first business secured, and after that had been worked up pretty well efforts were made to secure business-furnishing power to the mines. This was very slow, however, and it was two years before the original installation was loaded. At that time plans were completed to double the capacity at the power-house, and to instal a reserve water-supply. This was completed and put into service late in the year; ere this, however, both the little electric plants and one of the gas plants had been purchased. The other gasworks was purchased later.

While work was being pushed in Nevada County a scheme was floated in the adjacent county of Yuba to utilise the waters of the Brown's Valley irrigation system to drive generators near Brown's Valley and transmit the energy to Marysville, a distance of eighteen miles. Marysville was a very active business centre of five thousand inhabitants. The large flour-mill, cold-storage