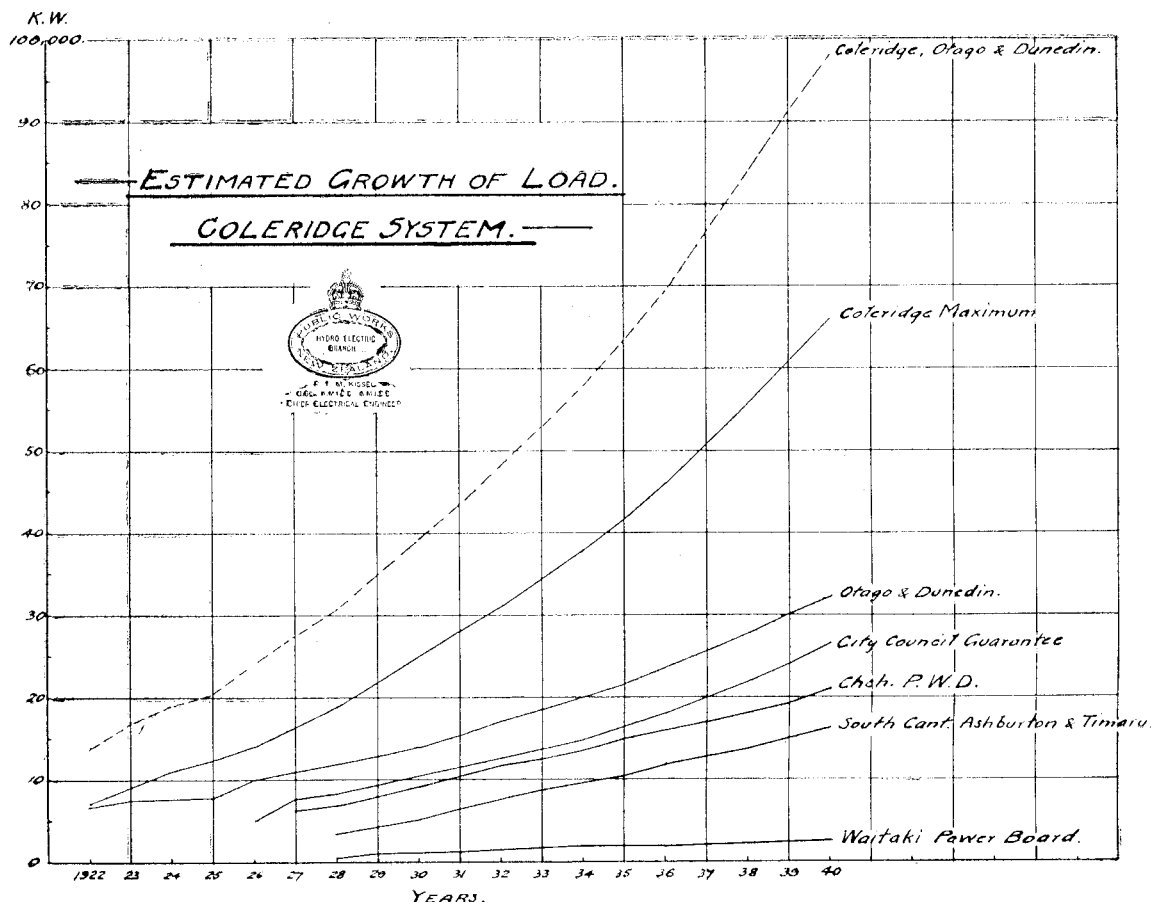


- (3) The location of the feed-point on the main line as affecting the security from interruption of all substations supplied off the main transmission systems :
- (4) The possibility of the generating source selected being developed at reasonable cost for the capacity immediately required, and of economical progressive extension to meet future growth.

*Load Possibilities.*—A forecast of the probable growth of load is shown on the following graph.



In this is shown the probable demand in the various sections of the country which have to be considered. The total load has been divided up into the following sections: Christchurch City Council guaranteed load; Christchurch and surrounding districts supplied by Public Works Department; South Canterbury and Ashburton; North Otago; Dunedin (including area now supplied from Waipori).

From this graph it is fairly evident that the present Lake Coleridge power-station of 27,000 kw. capacity will be fully loaded about 1931, and that Waipori (Dunedin) will have reached its capacity (assumed at 20,000 kw.) about three years later. It would appear that, neglecting Otago for the time being, by 1940 there should be a load available of about 65,000 kw. or 38,000 kw. in excess of the present Lake Coleridge capacity. Similarly it would appear that there should be a load of 12,000 kw. over and above the estimated capacity of Waipori available in the portion of Otago supplied from that source. There is also undoubtedly a very considerable prospective load in Otago Central, which could be quite economically supplied by the generating-station where located, as suggested later, on the Waitaki River.

The history of the growth of load at Coleridge also gives an indication of the size of development we should now consider. The Coleridge plant went into operation in 1915 with a capacity of 4,500 kw.; it was increased in March, 1917, to 6,000 kw., an increase of 33 per cent. This extension was overloaded by April, 1919, but extension was not possible on account of war conditions. An extension to 9,000 kw.—that is, 50 per cent.—was made in March, 1922. This was almost immediately overloaded and increased to 12,000 kw., or 33 per cent., in January, 1923. This development was again overloaded by May, 1924, and increased towards the end of last year (1926) to 27,000 kw., an increase of 125 per cent. The indications are that this stage will be fully loaded within three to four years. It would appear, both from the percentage-growths that have taken place at Coleridge, and from the prospective loads in excess of Coleridge and Waipori capacity discussed earlier, that nothing less than about 25,000 or 30,000 kw. must be considered as a first development, and that even such a development should be possible of extensions as required.

To supply the requisite amount of power three main drainage areas need to be considered:

- (1) The Waimakariri area, which was recently examined and reported on by the Christchurch City Council;
- (2) the Rakaia area, including Lake Coleridge, with the Harper and Wilberforce Rivers;
- (3) the Waitaki area, including the Lakes Tekapo, Pukaki, and Ohau and various gorges and dam-sites on the Waitaki River itself. These three areas need consideration in respect to each of the four main influencing factors mentioned earlier.