

there is so much power available that the best and cheapest part of it can now be utilised, and it will be many years before you will want the total capacity of the location developed. I would advise having complete surveys made of this locality, having contours run both sides of the river, so that races and pipes could be located to utilise about 1,000 ft. head. The contours should be run 10 ft. apart, and the locality should be studied also, to find if there is a limestone reef in the district, and for other peculiarities. It would be wise, too, to have rain and thunderstorm records kept here also.

*Wairoa*.—This is another of the power-sites we were unable to visit. Its nearness to Waikaremoana, together with its low head, and the small minimum flow of water without any lakes in its watershed, make it of little value on account of its neighbour. However, upon closer examination it may be that it could be developed cheaply. In order to determine this a complete survey would have to be made. The information is incomplete, so that it is impossible to make any estimates in regard to it.

*Waimakariri*.—This was the first of the rivers with wide shingle beds to be examined, and it was not necessary to a transmission engineer. The flow of the stream is ample, but when it comes to building a high dam to withstand this torrent, and to take the wear of the tons upon tons of silt and shingle, it gives the thoughtful man pause. In view of the fact that there are far better places to develop power, this river had better be left to its own sweet will for the present. Mr. Dobson's plan to utilise a part of the flow at the Gorge Bridge is the most sensible plan proposed, but his plans were for only a small development. For the present generation you will not need to trouble this stream.

*Rakaia*.—This stream we examined immediately after the Waimakariri. It is so similar in many respects that we did not spend much time on it. It has a wonderful flow of water, and were it not for the great quantities of shingle moving in its channel, there would be more encouragement to attempt to utilise it. It will require a high dam, and there is scarcely any opportunity to gain additional head by running races along the terraces, so that all the head available would probably be that created by the dam. This, of course, can only be determined by surveys. The most suitable plan suggested for these works was at the gorge where the wagon-bridge crosses it. I do not think it advisable to spend any time on this location at present.

*Lake Coleridge*.—This location impressed me as a very valuable power-location, and one where development can be started at a minimum of expense, and, as the demand increases, additions can be made at a proportional expense. There will be no large dams to be built, no shingle or silt to contend against, storage can be increased as needed, and the inflow of the lake increased as required. The surveys furnished me are favourable—in fact, more so than I anticipated—so I have selected this location to outline a plan for service to Christchurch and its district, giving as closely as possible the cost of the entire plant and the cost of operation of the plant, and the cost of energy delivered. Unfortunately, the sections made and referred to on the maps were misplaced or lost in transit, so that I did not receive them; therefore I cannot make the estimate as accurately as I would desire.

*Rangitata*.—This is very similar to Waimakariri and would be equally as expensive to develop. A complete survey should be made of the location selected by Mr. Wilson and reported on by him in December, which site is probably the best that can be found, but the great cost of so high a dam, with immense quantities of shingle to fight, would be a very expensive affair. The shingle and silt would be destructive, not only to the dam and its parts, but to the pipe, wheels, gates, and the whole of the hydraulic equipment; besides, some of the head would have to be sacrificed to make sure the wheels would be kept clear of it. This stream should not be considered for the initial development, but further study should be made of it if it should prove to be near to some great centre of development. There are so many other localities where immense quantities of power can be developed without these difficulties that this stream should not be considered now.

*Lake Heron*.—This district we were unable to visit; however, it is not probable that this can be developed to advantage now, on account of the long race necessary to secure the limited fall and available energy; then, too, there seems to be no storage of water at the end of the race, which is very necessary to secure constant service. The description Mr. Wilson gave is very good, but if it is thought advisable to develop here complete surveys will have to be made, so that plans can be devised for carrying out the work. I would suggest that all the further information possible in regard to this district be secured, such as rainfall, snowfall, thunderstorms, &c.

*Opihi*.—We spent a good deal of time on this in proportion to its value. We could not determine just where it would be best to do development-work. Surveys will have to be made for that purpose. I would suggest, however, that if development is attempted a dam of medium height—say, 25 ft. or 30 ft.—be built in the gorge below Fairlie, and that a flume be built along the side of the gorge to secure as much head as possible in a short distance—say, one mile or less. I am under the impression that a much better location ought to be available in this neighbourhood for an equal amount of power that can be more cheaply developed. I would not attempt development here only as a last resort, unless a survey should show better conditions than our examination disclosed.

*Lake Tekapo*.—This is a beautiful lake and very valuable as a power-location. There are several plans to utilise its waters, but surveys are not in my possession so that I have no means of knowing their relative merits. All of them, however, will be very expensive—not very expensive per unit ultimate development, perhaps; but the investment will be very heavy at the start, and the greater part of it will have to be made to get any machinery in operation. I do not think the present needs warrant the spending of so much money.

*Lake Pukaki*.—This location is in the list of those too expensive to figure on developing now. There is a magnificent flow of water from this lake, and it is possible to develop a large amount of power, but the interests of the colony do not warrant this. There is nothing that can be done here but to build a high dam and utilise the head created by it.