Otaki, Tauherenikau, and Waiohine, and further north there are the Waingawa, Ruamahunga, Mangahao, and Ohau. No information has yet been obtained about these latter rivers.

The rainfall at the Summit Railway-station for a period of nine years is given on a diagram attached. There is every indication that the rainfall on the mountains around Mount Hector is much heavier than at the Summit. As one proof of this, practically simultaneous gaugings of the streams gave for the Tauherenikau a flow-off equal to 5·6 cubic feet per second per square mile, and for the Pakuratahi barely 2 cubic feet per second per square mile, while the previous weather-conditions were more favourable for the latter stream than the Tauherenikau, for on its watershed and on a neighbouring one heavy rains about ten days before had caused high floods, while the Tauherenikau had scarcely been affected by the storm, which, though severe, had been local, as observed by the Working Railways maintenance staff. Notwithstanding this special case, it may for the present be assumed that generally the variations in the rainfall over the Tauherenikau will follow those at the Summit.

A considerable sum extra per brake horse-power could be spent on power schemes on these rivers to avoid, for the Wellington supply, the cost of a long transmission to, say, Waikaremoana or Mangawhero, and the cost of the extra machinery required to give power to cover the line losses—a considerable item in a line up to 250 miles long, while the distance to Mungaroa is only twenty-five miles, and to Featherston forty miles, by probable transmission-line routes. All conditions being on the average equal, the longer line is more liable to interruptions and serious breakdowns, and a line to Waikaremoana or Mangawhero would cross much papa country, where the liability to slip is greater than in the slate country between Featherston and Wellington.

The conditions for these rivers would be most materially affected by the destruction of the existing forests on the mountain-slopes in the various watersheds.

An examination should be made of the Mangahao, Ruamahunga, Waingawa, Ohau, and perhaps Waikanae Rivers. A good power scheme may be obtainable from one or more of these rivers.

Waiohine.

This river above the junction of the two branches, Waiohine and Waiohine-iti-iti, has a drainage-area of forty-six square miles. The Waiohine branch rises in Mount Hector, and the Waiohine-iti-iti runs in a valley about eleven miles long, flanked by high mountains, spurs from Mounts Hector, Crawford, and Holdsworth—all very high ground. The area should be an excellent catchment one. The greater portion is at present bush-clad. There must be a considerable flow in both these streams—at the time I saw them about 400 cubic feet per second, but from the information I got as to lower states of the river and otherwise, the lowest flow is not likely to be much over half the above quantity. The height above sea-level of the junction of the streams is about 820 ft. There is a fall of 135 ft. in about a mile and a quarter below the junction, but from this point downwards the fall in the river is less rapid. The total fall from the junction to the railway-crossing is 520 ft., and to about the mouth of the gorge, say, 500 ft. The distance to this latter point is about ten miles. Taking a station just below the Goose Neck, after deducting fall in race, probably about 400 ft. of fall would be available. On a probable minimum flow this would give about 7,000 b.h.p. continuously. Some minor creeks could be led into the race in its course.

From the view I had of the country just at and above the junction, there does not appear to be any suitable site for a storage-reservoir. The gorges at the junction are too narrow, and the streams rise too steeply. Perhaps a storage-reservoir might be got further up the Waiohine-iti-iti. Considerable drainage-area might be lost, but some benefit might be got. It is probable that the Waiohine Valley is too steep to provide any sites for a large reservoir, but only search would show in both cases.

A regular survey of the river would show whether a power scheme could be got by taking the water from the river at a suitable point four or five miles or more above the Goose Neck. The water-level could be raised by a dam to give some overnight storage or more. The drainage-area would be about seventy square miles. Of this the portion above the junction of the two main streams would yield by far the largest proportion of water. Perhaps about 200 ft. fall could be obtained, but of this I am not sure, as the conditions were unfavourable for aneroid work when I was at this part of the river. Probably up to 7,000 or 8,000 b.h.p. could be got in this way for intermittent working during two shifts per day.

As a comparison with the Waiohine River, the works on the conduit of the Kern River Company, Los Angeles, California, are of interest. The minimum discharge of this river is 200 cubic feet per second. The conduit is 11½ miles long; the effective fall obtained is 260 ft.; the average annual discharge is about four times the minimum flow. The canal is designed to carry 600 cubic feet of water per second. At minimum flow only about 4,500 b.h.p. would be available in the above scheme, and about 13,500 when the conduit is running full. No mention is made of storage in the description available, so the plant may be intended to utilise the ordinary flow regardless of the extreme minimum flow. The works on the conduit—in addition to a timber diversion-weir with sluice-gates—are a settling-basin, 3,200 ft. long, 400 ft. wide, and 10 ft. deep, formed by an embankment; four tunnels of an aggregate length of 1,922 ft.; the tunnels are lined with cement concrete; the waterway in the tunnels is 10 ft. wide and 8 ft. deep. There are fourteen flumes of an aggregate length of 5,572 ft.; 1,371 ft. of flume is required to cross the Kern River. In this length there are four spans of 121 ft. The height of the flume above water-level at the highest point is 72 ft. The flumes are 16 ft. wide and 8 ft. deep. There are eight miles of canal, on a grade of 1 in 5,000. In earth the width at bottom is 22 ft., at top 49 ft., and the depth is 9 ft. The depth of water is designed to be 7½ ft. In rock a different section is adopted. Two miles of this canal are on a grade of 1 in 2,500, with a bottom width of 15 ft. In sandy soil, or