The tributaries of the Waimea— the Wairoa, Lee, and Roding—have been examined. The Wairoa has a probable low-water flow of 30 to 40 cubic feet of water per second. By a race six miles and a half long a fall of about 160 ft. might be got, but the sides of the valley are not very favourable for the construction of a race, and the valley does not present very favourable conditions for storing water at an intake. Without storage only 500 or 600 b.h.p. could be got from the Wairoa.

The Lee has a minimum flow of about 20 cubic feet per second. Reservoir-sites are obtainable by a race four miles long, starting from its junction with the Wairoa. About 170 ft. of fall can be got. Only a small scheme is obtainable from the Lee—a few hundred horse-power.

The Roding, at a point behind Richmond, distant about three miles from the sea, is about 490 ft. above sea-level. A storage-reservoir could be got here. The drainage-area of the stream above this point is probably not more than about eighteen square miles. The minimum flow of the stream is put at from 20 to 25 cubic feet per second. A drive about one mile long would take the water through the hills, whence pipes of any length considered best could be led in as direct a line as possible to a power-station on the flats. Supposing the reliable flow could be raised by a dam by 50 per cent., about 1,400 b.h.p. could be got by taking the water to the sea-level—this for continuous working, and about double this for a plant working full power twelve hours per day. The cost of a dam, and its storage-capacity, would have to be ascertained before an estimate of the value of the scheme could be given. It does not appear to offer any marked advantages, but would perhaps prove a justifiable one.

A small power-scheme might be got for merely local requirements for Motueka from the Whangapeka.

There is a small lake, Boulder Lake, at the head of the Boulder River, a tributary of the Aorere. It is said to have a discharge of about 40 cubic feet of water per second, and this could probably be increased by conservation of the water. The lake is at a level of 2,850 ft. above the level of the sea. The rainfall at the lake is very heavy, I believe over 160 in. per annum. About six miles distant, the level of the Aorere is about 250 ft. above the level of the sea. If all this head could be utilised, either by a series of stations or one, about 9,000 b.h.p. would probably be got, or considerably more by conserving the water to the full capacity of the lake-basin.

Rotoiti Lake.

The drainage-area of this lake is about forty-six square miles. There is a fall from the lake to the Gowan junction according to the Survey Department heights of 1,200 ft. The area of the lake is small, about two miles and three quarters. Unless a high dam could be built the lake would probably be too small to store all the water from the drainage-area. The distance from the lake to Gowan junction is about sixteen miles. The drainage-area of the Buller River down to the Hope junction is 171 square miles. It should be possible to get a large amount of power from the Buller in this reach, say 20,000 b.h.p. by several stations in series, as has been done in one instance, at least, in the French Alps.

If any power-scheme for Nelson is investigated further, I think one of the first tried should be a scheme to utilise Rotoiti.

Rotoroa.

The area of this lake-basin is 150 square miles, and the area of the lake is four and three-quarter square miles. The upper end of the lake-basin is encircled by mountains reaching an altitude of over 7,000 ft. for a length of about sixteen miles. No gauging of the Gowan River has been made, but the flow in the river is evidently considerable. The lake-area is too small for complete regulation of the flow. A dam at the lower end of the lake would probably be of some length, and to improve the storage materially it would have to be of some height. There is a fall of 400 ft. in the Gowan River from the lake to its junction with the Buller; the length is about five miles and a half. Allowing for fall in conduit, flood-rise in the Buller, &c., about 340 ft. effective head should be available. I think power to the extent of 30,000 b.h.p. should be easily got at a power-station on the banks of the Buller just below the junction, for continuous working, or 60,000 b.h.p. or more for a twelve-hours day. If sufficient storage can be provided by a dam at reasonable cost, there is no reason apparent at present why this lake-basin should not yield relatively as large a flow as Lake Brunner. This would give much more power, by one third or more.

The Buller River below the Gowan junction would provide several schemes. The fall is not very rapid. It is shown approximately by the attached diagram compiled from the railway survey, but the connections to the river-level are only got by assuming that the Buller is about the level of the large tributaries crossed. The reach between the Gowan and Owen is steep, and should give some power. There are bends and rapids in the river near Newton which seem to offer favourable conditions for power-development. The bend of the river at Lyell could be utilised by a tunnel to take the low-water flow, and a scheme giving, perhaps, 25,000 b.h.p. got. The high flood-rise would give trouble in all cases, but this could be avoided as much as possible, and at least partly met.

Inangahua River.

By taking the water from the Inangahua River at a point a short distance above the Landing, in a tunnel to the junction of the Blackwater with the Buller, a scheme of some size could be got, perhaps 7,000 to 8,000 b.h.p. The fall to be got is about 125 ft. This could be supplemented by a low dam in the river, which would also store some water. The flood-rise in the Buller is about 50 ft., but the power-house could at the Blackwater be put above this, and the turbines work at a lower level in a shaft with a draw-off tunnel to Buller low-water level. The scheme would be relatively costly.