

alignment a little to the south of Otokia Railway-bridge; the whole of this railway-deviation, approximately six miles, and also the line from the point in the junction of Bull Creek, to be constructed and raised to such a height as would enable it to act as a protective levee throughout its entire length. If this were done the whole railway would be protected against floods, while under the scheme previously mentioned it would receive no protection between Owhiro and Otokia.

Whether this scheme should be put in hand or not will depend entirely on the attitude of the Railway Department thereto, and on the amount which they would be prepared to contribute towards the cost of the works. If they are prepared to pay what extra expense would be involved by this second suggestion, then it should most certainly be adopted. On the other hand, if they would prefer to suffer the damage which they now periodically sustain rather than pay this extra expense, then the remedial measures as set out at length in paragraphs (a) to (n) hereof should be adopted.

In considering the possible remedial measures your Commissioners looked into the question of flood-storage reservoirs in the upper reaches of the river, which had been much stressed by previous investigators, notably the Commission of 1880, and which was fully considered with the aid of detail surveys by the Commission of 1917. Your Commissioners agree with the finding of the 1917 Commission, which is, shortly, that a careful study of all the conditions based on more recent surveys and data shows that such a scheme is economically unjustifiable, and need not be further considered.

Your Commissioners wish to emphasize the importance of the lengthening of the railway-bridge at Otokia, and are of opinion that whether any of the other recommendations made in this report are followed or not the first action to be taken should be the lengthening of this bridge.

REFERENCE NO. 4.

To ascertain the nature and extent of any drainage-works that may be required, and the best method of carrying out such works.

The contour channel should be diverted from the bend 40 chains above its junction with the lake to the present old channel of the Waipori, from which, under the flood-protection scheme, the river-water will be diverted. This channel should have adequate levees so that its capacity shall be equal to the largest section of the contour channel at present. The fact that the contour channel has been breached more than once in the past, although apparently the flood-waters have never filled it, indicates that its construction requires to be carefully looked over; and where after levelling it is found that the lower side of it is below such a line as will give a uniform channel, the low places should be raised. Furthermore, wherever streams from the hills now join the channel the lower side of the channel should be raised 2 ft. above the general grade for some distance above and below, and the direction of the incoming streams should be altered so that they strike the contour channel not at right angles, but as near tangentially as possible. The importance of carefully maintaining this contour channel with an unimpaired carrying-capacity cannot be too strongly emphasized. The controlling authority must recollect that almost all water escaping from the contour channel has to be removed from the plain by pumping, and is consequently a source of great expense.

Where the Waipori Lake joins the Waiholā channel the present shallow, narrow, and tortuous channel must be dredged to a cross-section not less than 60 ft. wide and 6 ft. deep; and where the channel joins the lake the former should be gradually shallowed and splayed, so that the water may have as unobstructed a passage as possible from the shallow wide sheet to a comparatively narrow and deep outlet.

The advantage which would be derived from a dredged channel from the new outlet of the Waipori River to the outlet of the lake would soon be lost by its liability to silt up very quickly under the influence of wave-action on the muddy bottom, especially in view of the shallowness of the water and the unstable nature of the material forming the bottom of the lake.

From the Maori Lake a channel twice as large in carrying-capacity as the combined drains (excluding the contour channel) which now enter it should most