

- “(4.) To ascertain the nature and extent of any drainage-works that may be required, and the best method of carrying out such works ;
- “(5.) (a.) To furnish estimates of the cost of such remedial measures as you may recommend should be taken for the effective control and improvement of the said river and its banks ;
- “(b.) To report what area or areas of land should be constituted a district in respect of which a rate may be levied to secure and pay the interest on and provide a fund for the repayment of any loan that may be raised to carry out any river-improvement works which you may recommend should be undertaken ;
- “(c.) To report your opinion as to what matters, if any, should be adjusted by legislation ; and
- “(d.) Generally, to report your opinion on all matters arising out of or touching the premises, including the question as to whether or not one or more competent authorities shall be appointed to control the whole or any portion of the said river, and what statutory powers should be possessed by such authority.”

Our Commission also required us to report separately in respect of each river.

#### INVESTIGATIONS MADE.

*Sittings, Evidence, and Inspections.*—After examining the various rivers in Otago upon which they were directed to report, your Commissioners arrived at Temuka on the 2nd July, 1919, and on the following day proceeded with their investigations in connection with the Orari River.

In company with Mr. J. E. McEnnis, Resident Engineer, Public Works Department, Christchurch, your Commissioners, on the 3rd July, inspected the Rangitata, Waihi, and Orari Rivers.

On the following day a sitting of the Commission was held in the Temuka Borough Council Chamber, when eleven witnesses were examined.

On the 11th July your Commissioners again inspected the Orari River from the sea-coast to the bridge above Geraldine, interviewing the settlers *en route* and examining the work that has already been done in the direction of clearing the river at Badham's Bridge and embanking at the Clandeboye Settlement. It was found that this settlement was in a rather precarious position at two points.

Your Commissioners also inspected the works erected on the south side of the river by the South Orari River Board, and could find no evidence of maintenance of these works, which were in a dilapidated condition.

#### PHYSICAL FEATURES.

The Orari River drains 220 square miles of country above the railway-bridge. The river possesses peculiar characteristics in that in normal times its flow becomes smaller as it leaves the hills and approaches the mouth, for a certain distance, and then increases slightly again. In regard to flow, during a large part of the year the river actually goes dry some distance below where it enters the plain, and the water reappears near the mouth in the form of springs. This is due to the shingly nature of the bed and the plains surrounding it. However, in time of high flood this characteristic is not apparent, as the shingle below, becoming charged with water, can absorb no more, and the flood-flow then proceeds uninterruptedly to the sea. The result of the first characteristic is that the bed becomes smaller over a considerable length, and therefore inadequate to carry the floods, which naturally become larger as they approach the sea, provided, of course, that the rainfall is general.

This river carries a fair amount of shingle, which is transported practically entirely during floods, and as the flood subsides bars of shingle are left at various points. (It is recorded that in 1902 a flood left a bar of shingle in the river-bed near Mr. G. A. M. Macdonald's Orari homestead higher than the level of the pad docks, but later freshes gradually reduced this.) The reduced flow is unable to move this shingle, and when the next flood occurs these bars of shingle become points of danger which may cause a rise in the flood-waters greater than any rise previously observed at that spot, even though the flood in question may not be so