

SESSION II.
1921.
NEW ZEALAND.

ASHLEY RIVER

(REPORT OF RIVERS COMMISSION ON).

Presented to both Houses of the General Assembly by Command of His Excellency.

REPORT.

To His Excellency the Right Honourable John Rushworth, Viscount Jellicoe, Admiral of the Fleet, Knight Grand Cross of the Most Honourable Order of the Bath, Member of the Order of Merit, Knight Grand Cross of the Royal Victorian Order, Governor-General and Commander-in-Chief in and over His Majesty's Dominion of New Zealand and its Dependencies.

MAY IT PLEASE YOUR EXCELLENCY,—

The Governor-General's Commission, dated the 8th April, 1919, directed us to inquire into certain matters in respect of the Clutha, Orari, Rangitata, Waimakariri, Ashley, and Maerewhenua Rivers, and such other rivers as might be added thereto from time to time. The Governor-General's further Warrant, dated the 22nd July, 1919, added to the Commission the Waihi, Wairau, Waiarau, Taieri, and Aparima Rivers. The present report deals only with the Ashley River. The reports upon the Maerewhenua, Clutha, Aparima, Taieri, Rangitata, Wairau, and Waimakariri Rivers have already been presented; the reports upon the remaining rivers will be submitted in due course.

The time within which we were required to furnish our reports was extended by the Governor-General to the 7th June, 1920, further extended to the 7th December, 1920, and still further extended by Your Excellency to the 7th March, 1921.

The Governor-General's Commission directed us, in respect of each river,—

- “ (1.) To inquire into the cause or causes of the silting-up of the channel, the flooding of the adjacent lands by the said river, the erosion of its banks, and the damage to the surrounding country;
- “ (2.) To ascertain the nature and extent of the damage done to the lands adjacent to the said river, and what area of land is affected by such floods or erosion, or both, and whether it is practicable at reasonable expense to prevent such flooding or erosion, or both, either wholly or partially;
- “ (3.) To ascertain the best method of providing for the control of the said river and its tributaries so as to safeguard the lands affected, and to provide for the effective control and improvement of the said river and its banks;

- “ (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.”

The Governor-General's Commission also required us to report separately in respect of each river.

INVESTIGATIONS MADE.

Sittings, Evidence, and Inspections.—Sittings of the Commission were held at the Courthouse, Rangiora, on the 22nd and 23rd July, 1919, when thirteen witnesses were examined. The Commissioners inspected the river throughout the whole length of its course where any damage is anticipated, and also perused all the plans in the possession of the Sefton-Ashley Drainage Board, as well as the plans prepared by the Railway Department to illustrate the cause and effect of the flooding of the Ashley River which has taken place in the past.

PHYSICAL FEATURES.

The Ashley River rises in the foothills of the Southern Alps. There are no large snowfields or glaciers within its watershed. When it issues from the hills and runs on to the Canterbury Plains it, in common with practically every other important river, traverses the higher part of a shingle-fan. In some places the fall away from the Ashley River and towards the low country between the Ashley and the Waimakariri is fairly decided. As it approaches the sea, however, the fall becomes very slight, and for the last mile or two the river runs through a tidal estuary, while passing through which it is joined by the Saltwater Creek. The latter, through practically the whole of its length, runs at a very much lower level than the Ashley, traversing what is really the northern side of the fan, and obtaining the greater part of its water from springs which no doubt percolate through the fan from the Ashley itself. The decided diminution in the size of the river-bed lower down, and the reduced volume of water running in the Ashley below Rangiora, accounts, no doubt, by percolation or seepage, for the water in the Saltwater Creek, and also for the water in the swamps on the southern side.

HISTORY AND CONDITION OF PRESENT WORKS.

A considerable amount of levee-building, protective planting, and groyne work has been done by the Sefton-Ashley Drainage Board, and to a lesser extent by other interested parties. After the flood of 1905 the Railway Department did a considerable amount of work to protect the approaches to the railway-bridge and to lead the flood-waters safely under the bridge. While the river in the past has overflowed its banks, it appears now to be fairly well controlled. A good deal of evidence was given by witnesses as to the rising of the river-bed. That some such rising has occurred appears to be confirmed by the fact that it was found necessary to raise the Lower Ashley Bridge 4 ft., and also by the fact that the piles cut off at the time of bridge-renewals are now completely covered with shingle. The absence, however, of definite levels, properly referenced and showing the river as it was in the past, makes it impossible to decide definitely the extent of this filling-up or the length of the river over which it extends,

The fact that in 1902 the railway-bridge was reduced in length from 3,000 ft. to 1,700 ft. would tend to silt up the bed some distance above the bridge and cause scouring under the bridge. Nothing very decided, however, appears to have been noticed since that date.

The river-bed is very much overgrown with gorse, willows, and broom, while evidence showed that before the progress of settlement it was a clean river except for tussocky islands. The presence of exotic vegetation cannot but tend to silt up the river, and it is essential that a sufficient width of river-bed to accommodate the river should be kept permanently clear.

FLOODS AND FLOOD-DISCHARGE.

It appears that in 1868 an extraordinarily heavy flood occurred. If such a flood were to occur again the damage would be enormous, owing to the fact that the surrounding country is now densely settled, whereas in 1868 it was very sparsely populated.

In 1897 a flood broke over the river-bank near the Mount Thomas ford.

In 1905 the flood-waters, dammed up by the railway embankment, overflowed and came through into the Cam and found their way down to Woodend. A considerable amount of damage was done to the railway-bridge. This appears to have been the greatest flood since 1868.

In 1917 there was a fairly large flood.

It was stated in evidence that recent floods, though in volume less than those of 1868 and 1905, have nevertheless risen higher in the Lower Ashley. This will no doubt be due to the choking-up of the river-bed, and also to the rise in the level of the shingle, due to the first cause.

CHANGES OF REGIMEN.

Apparently the principal change that has occurred in the character of this river has been the overgrowing of the shingly river-bed with vegetation since the advent of white settlement, the worst class of vegetation being willows, gorse, and broom. The felling and burning of the bush in the headwaters, estimated as having covered between 6,000 and 10,000 acres, has resulted in a great deal of denudation, with the consequence that an added load of shingle has been thrown into the river, causing silting-up wherever the current has been choked by the vegetation referred to, or by other obstructions such as bridge approaches. The shingle in this river-bed is not very large, and this makes the growth of the vegetation fairly prolific.

LOCAL BODIES INTERESTED.

The local bodies interested in the control of the Ashley River are the Sefton-Ashley Drainage Board, the Rangiora County Council, the Rangiora Borough Council, and the new special local authority which your Commissioners have recommended in connection with the control of the Waimakariri River.

Your Commissioners consider that this new body will be interested in the control of the Ashley River because evidence showed that in times of very high flood the water has escaped from the Ashley River and run into the low country lying to the north and west of Kaiapoi. It is therefore essential for the safety of this country that the Ashley be kept within its banks.

The Railway Department is also interested in controlling the river so that its flood-waters are passed safely under the railway-bridge just north of Rangiora, and also in its control below the railway-bridge, as if it overflowed on the north side it would probably injure the railway-line to Culverden, which for a long distance is now built at a level considerably below that of the river, with which it runs roughly parallel.

REFERENCE NO. 1.

To inquire into the cause or causes of the silting-up of the channel, the flooding of the adjacent lands by the said river, the erosion of its banks, and the damage to the surrounding country.

Your Commissioners consider that any silting-up which has occurred has been due partly to increased denudation as the result of bushfelling and burning in the headwaters, but more especially to the unrestricted growth of gorse, broom, and

willows in the river-bed. The flooding of the adjacent lands is caused by the fact that along some portions of the river the natural banks are lower than the grade of a high flood, and furthermore by the fact that the river, in common with most other Canterbury rivers, is running on a "fan," and once the flood-waters get over the immediate river-bank they tend to follow old channels which lead away from the main river and do not return lower down, as is the case with valley rivers.

REFERENCE No. 2.

To ascertain the nature and extent of the damage done to the lands adjacent to the said rivers, and what area of land is affected by such floods or erosion, or both, and whether it is practicable at reasonable expense to prevent such flooding or erosion, or both, either wholly or partially.

Very little information was obtained as to the extent of the damage done to the lands adjacent to the river, and owing to the water escaping practically out of the watershed of the river, as indicated under reference No. 1 above, it is impossible to say what area of land is affected by the floods.

Your Commissioners are of opinion that it is practicable at reasonable expense to prevent such flooding, and to gradually so train the river as to eliminate erosion to a very considerable extent in the future.

REFERENCE No. 3.

To ascertain the best method of providing for the control of the said river and its tributaries so as to safeguard the lands affected, and to provide for the effective control and improvement of the said river and its banks.

The only work which, in the opinion of your Commissioners, is necessary is the extension of the levees at present existing so that they will reach along the whole of the river-bank where the grade of the highest known flood rises above the natural banks. Wherever levees are thus necessary they should be not less than 2 ft. above the probable flood grade. The existing levees should also be raised to the same height, if on investigation any places are found to be below that grade. Levees should be not less than 4 ft., and preferably 6 ft., wide on top, with 2-to-1 slopes, on account of the permeable nature of the material from which they must be made. On the river side of the levees they should be protected with willow and wire-fence protection, practically on the lines which have been found so successful by the Sefton-Ashley Drainage Board. Should the river, owing to local changes in its course, make a violent onslaught on to any part of the works, special protection (into the details of which it is not necessary here to go) must be provided. The growth of scrub of all kinds within the river-bed proper should be prevented. The controlling authority, after careful investigation of the river-bed, should decide upon the width necessary to contain the flood-water without danger, and when the limits have been properly defined and recorded all the river-bed within the proposed permanent channel should be cleared and kept clear, and the reclamation of the balance of the river-bed should be encouraged by judicious planting and fencing. This latter will tend to raise the portions of the river-bed to be reclaimed, and will afford an added safeguard against local erosion, while at the same time the keeping-clear of the desired channel will tend to make the same scour and thereby reduce the tendency for the river-bed to rise.

The levees previously referred to must, of course, not encroach at any point on the width laid down as the permanent river-channel, but may in many places be very much farther from the centre of the river in order to take advantage of high ground. At the Lower Ashley Bridge it will undoubtedly be necessary to keep the levees farther apart than the length of the bridge. Whether the bridge should be lengthened to span the whole width between the levees, or whether its approaches should be kept low and traffic suspended for a few hours during the very infrequent large floods, would be a matter for consideration by the local authorities interested.

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 works indicated above will not necessitate any drainage-work being carried

REFERENCE NO. 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.*

Without a great deal of detail surveying, which has not been done and which hardly comes within the scope of this Commission, it is not possible to furnish an estimate of the cost of carrying out the works indicated above. Your Commissioners do not recommend that these works should be done immediately, but that the defining of the river-limits should be proceeded with at once, and that thereafter the works recommended should be carried out in a regular progression, preferably with the revenue available. The greater part of the work consists of coaxing the river rather than coercing it; and it is not required to be done at once, as would be the case if the river were threatening violent damage at any particular point.

The constantly increasing value of timber, particularly in Canterbury, would seem to indicate that a great deal of afforestation might be done on the unnecessarily wide river-bed, which timber in the future would not only pay for the cost of its planting, but would be a valuable source of revenue to the Board, while during its life it would act as a valuable protection to the banks.

- (b.) *To report in the case of each river 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.*

The area of land which 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 the river-improvement works recommended herein by your Commissioners is the whole of the drainage area of the Ashley River, together with the lands lying outside that drainage over which the flood-waters of the Ashley River have flowed in the past.

- (c.) *To report your opinion as to what matters, if any, should be adjusted by legislation.*

Your Commissioners are of opinion that the present district controlled by the Sefton-Ashley Drainage Board should be extended to include the whole of the area referred to above, and that the Board's name should be changed to that of "The Ashley River and Drainage Board." This new Board should not undertake any works on the south side of the river other than such as are necessary to prevent the river overflowing or eroding its banks.

It is recognized that the southern limits of this district will overlap other existing or proposed river and drainage districts, but, as mentioned immediately above, the proposal is made with a view to revenue-producing for the control of the Ashley River, and not with the intention that any drainage or other works should be done on the lands over which the Ashley flood-waters have flowed.

- (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 or portions of the said rivers, and what statutory powers should be possessed by such authority.*

As indicated under reference No. 5 (c), your Commissioners are of opinion that one River and Drainage Board should have control over the whole river and its banks. This controlling authority should be specifically charged with the following duties:—

- (i.) To keep a record of all damage done in its district by flood-waters, both as to extent and monetary value.
- (ii.) To take all necessary observations and keep records that will assist in the study of the hydrology of the river, changes in its regimen, heights and duration of floods, &c.
- (iii.) To have detail surveys, plans, estimates, and specifications made for carrying out the necessary protective works in the district.

- (iv.) To forward annually a statement of works, with plans, to the Minister of Public Works, Wellington, for reference and record. It is very necessary that all plans should be referred to the same datum, and it is preferable that the datum should be that to which all plans in connection with the Waimakariri River have been and will be referred.

This our report, which has been unanimously adopted, we have the honour to submit for the consideration of Your Excellency, together with the transcript of the evidence taken by us in the course of our investigations.

Given under our hands and seals this 5th day of March, 1921.

F. W. FURKERT, Chairman.
ASHLEY J. HUNTER, } Members of
F. C. HAY, } Commission.

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