No direct evidence was brought forward as to the excessive denudation of the hills, which would be likely to cause a greater travel of shingle down the river than in the past before settlement took place; but, in view of the fact that the whole of the upper reaches are devoted to agricultural or pastoral operations, there is no reason to suppose that the farmers who occupy this land pursue a very different policy to that which has been so detrimental in Otago. This refers particularly to tussock-burning. The burning may not have been so widespread or so ill-timed, but there is no reason to suppose that its effect could have been otherwise than harmful to the condition of the river farther down.

Existing Works.

Protective works have been constructed on the river-bank at various points. The farthest up-stream of which it is necessary to take note were those built to protect the ends of the Arundel Bridge. These were very massive, and from what appears at the south end one would judge them to have been adequate. However, in 1878, from some cause of which there is no record now, the north approach to the bridge was completely washed away, and rather than go to the expense necessary to restore it the authorities in control decided to lengthen the bridge very considerably, and its north end is now so far from the main stream that practically no protection to its approach is necessary.

After the floods of 1878, when the railway in the vicinity of Rangitata Station was damaged and it appeared as though the river might take a permanent course in that direction, very strong protective works were erected at a point about three miles and a quarter above the railway-bridge. These works cost about £10,000, and extend along the river for about three-quarters of a mile. The works are of an extremely substantial character, and there is no doubt that they will be able to withstand any flood which may occur.

The trouble with rivers of this nature is that their point of attack on the bank shifts from time to time, so that the railway protective works are not now being subjected to any stress. To expend the sum of £200 to the chain on the river-banks is not warranted, nor is it necessary. The railway-work was done along a portion of the river where the natural bank is lower than the average, and where it was quite conceivable that the river might take a permanent course across country which would have created widespread devastation not only to the railway but to the country generally. Therefore the heavy expenditure was quite justified.

At the north end of the railway-embankment between the North Branch bridge and the South Branch bridge a very considerable amount of protective work has been done from time to time by constructing short groynes and tipping in heavy rock in order to save the railway-embankment in that locality, the river for a number of years having taken a course almost parallel to the railway prior to going through the bridge.

The south end of the same embankment has required a certain amount of protection of late years, and since the bridge has been so much shortened, owing to the return of a large volume of the flood-waters running parallel to the upper side of the embankment before entering the south channel. During an ordinary high fresh the water runs on to the island above the bridge near the point of bifurcation of the channels, and runs down on top of the island at a higher level than the water in the Main South Branch. When these waters meet the railway-embankment they are ponded up until they can run parallel to the railway and join the north or south channel again. This has necessitated a considerable amount of willow-planting and fences on the upper side of the embankment to catch the debris and also to prevent scour.

Various protective works have been constructed by the settlers on the island, some dating back as far as forty years. The works on the north side of the island are said to have cost £1,600, while the bridge over the flood-channel on Mr. Hearn's property cost £400.

In October, 1918, the settlers on the south bank of the Rangitata River built a groyne at a cost of about £1,000 near the point of bifurcation at the top of the island in an endeavour to prevent the waters of the South Branch increasing, as set out above. This groyne appears to have had no appreciable