Though there was a feeling among the local residents that the river-bed was rising (this is a widespread popular misapprehension), your Commissioners found no direct evidence of this. The shingle carried in this river is extremely coarse, and the moving down-stream of the 3 ft. concrete cubes formerly used in the protective works at the Arundel Bridge shows that the river in flood has tremendous transporting-power. It has an average fall of about 33 ft. to the mile, which in a river of this magnitude must be considered tremendous, especially in view of the fact that the fall is maintained almost down to high-water mark.

Where the river bifurcates the changes in the shape of the bed cause varying amounts of water to be deflected into the channels, so that in some years nearly all the water flows in the North Branch, and in other years, before the shortening of the south bridge, a very considerable proportion flowed in the South and Middle Branches. At one time the river so persistently flowed in the North Branch that the railway-bridge over the South Branch was shortened by 50 per cent., and, further, the complete filling-up of this channel with an embankment was considered, though the idea was not adopted. A few years ago a change took place, and it appeared almost as if all the normal water would come down the South Branch. However, this fear was not realized, and at the present time there is not as much water flowing in the South Branch as there was a year or two ago. Conditions are not stable, and the amounts of both flood and normal flow vary from time to time.

The shortening of the bridge practically closed the entrance into the Middle Branch.

FLOODS AND FLOOD-DISCHARGE.

Floods in this river are fairly frequent, and the following have been specially recorded:—

1868: The largest flood ever known in the river, when the rainfall at Mount Peel is said to have registered 8 in. in twenty-four hours.

May, 1876: Flood said to have been level with the top of the cylinders of the Arundel Bridge. (NOTE: Bridge was not at that time its present length.)

September, 1878: Flood washed out the protective works at one end of the Arundel Bridge, leaving the same isolated; also, as a result, threatened the railway. The flood-water flowed into a channel on the south side above the railway. This channel carried the water across the Rangitata Station and found its own outlet to the sea between the Rangitata and the Orari, partly, no doubt, through the Kapunatiki Creek. The flood at that time is said to have been 2 ft. 6 in. below the cap of the railway-bridge, or about 7 ft. 10 in. below the rail-level, and about 2 ft. above the formation-level of the Rangitata Railway-station.

November, 1886: This flood did not affect the railway, but below the railway three distinct outbreaks discharged water from the South Branch into the Kapunatiki Creek. Above the railway up to trig. station on Rural Section No. 23927 the river showed no tendency to break over, but from that point upwards there were several points where in high floods the banks were over-topped, and the escaping water did not, on account of the configuration of the ground, return to the present river-bed.

1899: This flood destroyed one cylinder of the Arundel Bridge, but was 6 in. below the 1913 flood at the railway-bridge over the North Branch. For reasons already pointed out, measurements of floods within 6 in. on this river cannot be made with certainty.

March, 1913: This flood is said to have been 3 ft. below the rails at the middle of the railway-bridge over the North Branch, and 12 ft. 6 in. below the rails at the north end of the same bridge, and 10 ft. below the rails at the south end. The railway-bridge was damaged, some of the piles being scoured out.

It must be pointed out that the proportions of the water which run through each branch in flood-time have no relation to the proportions which flow there at periods of normal flow.

To arrive at a definite measurement of the volume of water passing is a very difficult matter in a river of this kind, in which the river-bed alters appreciably during floods, and which is so wide that its width, in conjunction with the irregularities of the bed, results in the surface of the water not being level.