

Large masses of shingle are moved down the river during floods, and it is conceived that these masses of shingle travel more or less in the nature of waves, the crest of which may take years to pass over the distance from the hills to the sea, and while the crest of the shingle-wave is passing any point the flood-level there is unduly raised. After the passage of that wave of shingle, floods of a greater volume may not have so high a water surface. The propagation of these shingle-waves depends upon the weather conditions in the mountainous regions at the head of the river. When many avalanches have occurred as a result of a severe winter or series of winters, a great deal of detritus is brought down into the river-bed, and while this is being carried to the sea it raises the bed of the river progressively, as indicated above. A number of bad years is usually followed by milder weather, during which less material is discharged into the river and its tributaries, and in this way it is able to gradually relieve itself of the masses of shingle with which its bed has been encumbered. Later on, when the cycle is repeated, another mass of shingle starts on its way to the sea.

As the result of consideration of data available your Commissioners have come to the conclusion that it is impossible, with the data at their command, to form other than an approximate estimate of what constitutes a big flood-discharge in this river. Your Commissioners are of the opinion, however, that a discharge of 88,000 cubic feet per second may be considered to be a big flood, and that it is very unlikely that this discharge will be exceeded during any period of years which it would be reasonable to consider.

CHANGES OF REGIMEN.

The evidence did not point to any violent change having taken place in the character of the river within historic times, except that the South Branch has become very much larger than it was fifty or sixty years ago. In some old records it is referred to as the "Rangitata Creek": this in itself would indicate that it was not as large as the other portion of the river, and old maps show it with a very much narrower river-bed than it has now. This was probably only the result of a phase in the periodic oscillations of the flow between the North Branch and the South Branch, which has lasted long enough to enable vegetation to take possession of the river-bed of the South Branch, which had been abandoned for a time by its water.

In 1912 the greater bulk of the water had been running in the North Branch so long that the South Branch river-bed was very much overgrown with vegetation, with quite a small channel winding its way through, which could be easily crossed in a motor-car. It is quite conceivable that the same thing might occur again in either of the branches.

In 1859 the South Rangitata Creek is stated to have been bridged at one point by a 36 ft. stringer. It is further stated that extra water was led into the creek in order to make it act as a sheep-boundary. The South Branch was stated to have been in 1873 100 ft. wide of actual water. In 1886 almost the whole of the river was running in the South Branch, while evidence goes to show that in 1898 the river had practically been running entirely in the North Branch for several years. In 1916 the water commenced to increase in the South Branch, until early in 1918 there was considerably more water under normal conditions in the South Branch than in the North. The Middle Branch has been practically dry since the Railway Department shortened the bridge over the South Branch, about 1900. The embankment that was put in to replace the bridge had the effect of blocking the ingress of water to a great extent into the Middle Channel, but during freshes a portion of the water in the South Branch, after having passed the bridge, still finds its way into the Middle Branch.

The shingle in this river-bed is so rough that it does not favour the growth of willows, and consequently not much damage has been done by islands formed round stranded willows, as is so common in other rivers in New Zealand, but a very considerable growth of gorse and broom has spread over a large portion of the river-bed, thereby encouraging the deposition of small shingle and sand, and tending to force the river to cut new channels for itself. There is said to have been no gorse prior to 1873.