

resorted to in extreme cases. The local body might also meet matters by training the river away from the dangerous spots with light temporary protective works, and by encouraging the growth of a dense belt of trees all along the river. The class of trees to be adopted should be the subject of careful experiment, but it is probable that if a strip, say, a chain wide, of Lombardy and silver poplars, backed by another chain of *Pinus insignis*, were planted, this would effect all that is necessary except in extreme cases. These trees should be planted sufficiently behind points where erosion is now taking place to enable them to become established before the erosion progresses far enough to uproot them. This belt might be made much wider than 2 chains with advantage, and if worked on proper silvicultural lines would, after coming to maturity, become a greater source of revenue than anything else which could be grown on the same area of land, while at the same time acting as a splendid protection against the incursions of the river. After the protective belt has become well grown the trees along any threatened portion should be connected together by strong wire cables, so that when the first row was overturned by the caving of the banks they would not be swept away, but would act as a protection for their neighbours. Upon the subsidence of the floods this outer row should be securely weighted, either by concrete blocks or by stones in wire nets, thus increasing their efficacy to withstand further erosion.

Should a violent erosion occur above the railway so that it appears likely that the river may break over the railway, as it did in 1878, then similar work to that carried out three miles and a quarter above the bridge would be necessary. But, as previously stated, work of this kind should only be put in hand as a last resource.

The growth of scrub of any kind within the river-bed proper should be prevented. Fortunately, this river, owing to its stony nature, does not favour such growth; nevertheless, unless constantly watched and eradicated, the growth will gradually tend to increase until it is a much greater menace than it is at present. The clearing of the river in the first place will be probably a work of considerable magnitude, but afterwards it should not be difficult, by burning at the proper time, to keep the river reasonably clear.

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.

No drainage-works would be required as the result of the previous recommendations, but there are, at the lower end of the island, moderate areas which require ordinary drainage. There are no drainage-works necessary of greater magnitude than could be attended to by the settlers themselves.

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 rivers and their banks.

It is impossible at the present time to furnish an estimate of the cost of carrying out all the works indicated above. The works will not be done in one operation, but, as indicated above, constant watching of the river, and the construction of small works at propitious times and in suitable places, must be carried out.

Your Commissioners consider that the controlling authority should aim at a regular income of £1,000 per annum, which should be sufficient to pay the interest on any loans, and also to provide a sum of money sufficient to enable work to be promptly put in hand whenever circumstances require. As the river becomes more and more controlled, and loans become gradually paid off, this sum may be continually reduced.

In the above figures, although purchase of necessary land is taken into consideration, nothing has been allowed for the cost of planting, in view of the fact that the protective plantations will very soon become a source of revenue rather than of expense to the controlling authority because of the scarcity of bush, particularly in Canterbury, and the very large and increasing demand for sawn timber and firewood.