

situ. From 23 miles upwards there are numerous thick and well-defined layers of shell-rock, which are, in a great measure, responsible for the rapids. In the lower reaches the gravel is comparatively scarce, and fine; but the higher the river is ascended the rougher the stone becomes, and the larger the proportion of it that comes from Mount Egmont.

There is abundance of stone of almost any size everywhere above 20 miles for any possible requirements for road-metalling or river-improvement. Even in the lower river—for instance, at 8 miles and 10 miles—there is stone suitable for river-works.

On the whole, the river is not much obstructed by snags, though in many places, especially towards the lower end, they could scarcely be worse (see Photograph). Most of the upper rapids are comparatively free from snags, and many of them entirely so.

The tide backs up the river at springs to about 10 miles, the rise of tide then—*i.e.*, at springs—being about 6ft. Above the tide the fresh-water discharge is about 150,000 cubic feet per second at low summer level (Sir John Coode). By rough measurements I made the discharge 126,000 cubic feet per second. Owing to the fact that there is not a single stream of any size entering the river from the sea to 59 miles, where the Mangaehu joins the Patea, the amount of water in the river from the top of tide to the Mangaehu junction is practically the same. The highest marks observed show that floods occasionally reach the height of 20ft. above summer level. In the tidal compartment there are comparatively few snags, and very few to interfere with canoe-navigation till the $7\frac{1}{2}$ miles is reached; from there to $9\frac{1}{2}$ miles, top of tide, the snags are very thick, and many of them large trees, in some cases extending almost across the river. The width of the river decreases from 3 or 4 chains at Patea to about 1 chain at top of tide; after that the width remains at about an average of 1 chain for fifty miles.

At about 3 miles there are about twenty large totaras standing erect to a height of from 3ft. to 10ft., still in the river, some of large size and quite sound, thus showing a great subsidence of the land and great durability on the part of the timber. At 7 miles is the old eel-weir mentioned by Sir John Coode, but now destroyed. In passing, I may mention that the Natives are at present erecting another one at 9 miles, which should not be allowed. From top of tide to 23 miles, up to which the land is disposed of, all along the left bank, and most of the way (to $18\frac{1}{2}$ miles) along the right bank, there has been a good deal of bushfelling done, often down to the water's edge, and, as a consequence, the river over this distance is more or less obstructed by slips and snags all the way—in some places being in regular blocks, while at other places for a mile or so there are very few. There is no question that the river has become very much worse for canoe-navigation since this bushfelling began. The land almost throughout rises very abruptly from the water's edge, often to a height of hundreds of feet. As soon as the bush is felled and the roots cease to have strength enough to resist the erosion of the rain, &c., large slips come down, bringing soil, trees, boulders, &c., with them, and in many places partially blocking up the river; and at one place—13 miles—entirely doing so. Here there is now a bad rapid, where formerly there was a quiet reach. At 19 miles and 22 miles there are also bad collections of snags. Above 23 miles, as before mentioned, the snags are not nearly so bad, partly owing to there being no bushfelling for the next 25 miles, and partly owing to the greater transporting power of the water on account of the greater fall in the river. The greatest obstacle to canoe-navigation in this upper part is the great fall in the river—about 7ft. per mile—and the shallowness of water on the rapids. On very many of them, where clean gravel bars extend completely across the river, the water was not 1ft. deep, though perhaps about 60ft. wide—thus not enough to float an empty canoe.

As to navigation, after a considerable amount of improvement has been done, small light-draught steam-launches could be taken up to 18 miles; but, owing to the broken nature of the country, the area of land tapped to here would be so limited that steam-navigation would not pay. Above 18 miles, on account of the great fall and the sharpness of the turns, the river may be considered entirely unfit for steam-navigation, except by locking, which is out of the question. Indeed, on account of the fall and the very great loss of distance caused by the bends in the river, I do not think that canoe-navigation will ever pay above 28 miles. There will probably some day be a road bringing to here a certain amount of traffic from the Kaitangiwhenua Block, but above this the traffic will all go towards Hawera by road, or towards the railway-line at Eltham and adjoining stations.

Below 28 miles canoe-traffic, with an improved river, is possible, and improvements to this point are expedient. Up to 28 miles may be required at some future time, but not for years. Up to 23 miles should be improved when the Crown land commencing at that point is offered for settlement; but up to 18 miles the works of improvement should be started as soon as possible. To this point the rise in the river is very moderate—30ft.—and the only obstructions are snags, or rapids formed by snags or slips, there being no solid bars. To this point there are settlers on both sides all the way, several of whom already use the river, obstructed as it is, and most of whom, especially those at the upper part, would use the river if made clear for canoe-traffic. Probably about twenty settlers would be greatly benefited by the work.

The river should not be cleared of snags for the full width—that would lower the water-level too much, and reduce the depth; but a channel of 30ft. width in the reaches and 20ft. width in the rapids, with curves not sharper than those of the banks of the river, should be cleared throughout, to a depth of 21in. below low summer level, the snags which are removed being sunk in deep sheltered holes or otherwise finally disposed off. At certain points some stones and gravel require removing to increase the depth, and at others the current requires confining to effect the same purpose. As far as 7 miles the work to be done is very trifling. Above that in many places the snagging is heavy: this extends over a distance of eleven miles. Much of the work could be done by axe, saw, jacks, &c., but a small punt and fittings would be necessary at places, and cheaper in the end. The outfit of plant would amount to about £100, and the work of snagging as described up to 18 miles would cost about £250; total plant and labour, £350. The sum of £200 previously