An observation of these plans will show that comparatively little change has taken place in the general character and course of the river, and that the soundings have not materially altered: the principal changes being in the direction of the deeper channels, more particularly just above what is called the Landguard Bluff; these changes being for the better, as the channels are now straighter and more regular in their course.

The river, just before reaching the sea, passes by another bluff (Castle Cliff, about two miles to the west of Landguard Bluff), and impinges strongly against the foot of it, forming at that particular place a deep entrance channel.

It is extremely probable that at some former but remote time the river flowed into the sea immediately to the west of the Landguard Bluff, and that a range of corresponding height reached from there to the Castle Cliff. This range has been gradually worn away by the continued action of the river (a westward direction being given to the latter by the flood-tide in Cook Strait, which at this place flows to the west and north); and this wearing action to the westward is still progressing at a comparatively rapid rate.

The change in the position of the entrance channel has been naturally followed or accompanied by the formation of a sandspit between the river and the sea, reaching from the Landguard Bluff to the present entrance, the spit gradually lengthening as the wearing action proceeds.

Across this spit the sea occasionally breaks in very heavy gales.

At no very distant day, it is certain, unless measures be taken to prevent it, that the portion of the cliff or range yet remaining, viz. that on which the signal station is situated, will disappear altogether, it being of no great extent, and the river, having then no check, will most probably find its way to the sea in one or more wide shallow channels quite useless for navigation.

Across the line of entrance to the river, and at a considerable distance seawards, viz. from a mile to a mile and a half, lies the bar, which is changeable in extent and position, presenting channels of varying width and depth for navigation, according to the prevalence of strong winds or of heavy floods in the river. At the time I crossed it, there were 10 feet of water at high tide, representing about 4 feet at low water, the rise and fall being from 6 to 8 feet.

Inside the river, and about half a mile above the Landguard Bluff, there is a deposit of snags, as is usual in all rivers of like character, extending over half to three-quarters of a mile; the deposit having taken place where the descending current of fresh water is checked by the influence of the inflowing tide. In this case they are in considerable numbers, and spread over a large area, their influence being to reduce the depth of the water, both by their actual presence and the collection of sand and silt, and to increase its lateral action in floods, causing destruction to the adjoining banks, and a consequent widening of the river at this place, where there is only, as on the bar, about 4 feet of water.

Above this the river gradually deepens and retains a tolerably uniform depth of channel, free from obstructions; and soundings give 8, 9, 11, 13 and 15 feet over several miles of its upper course.

There are three distinctly and permanently deep portions of the channel within six miles of the bar, viz.,—1st, under the Castle Cliff (where the depth is as much as 36 feet); 2nd, under the Landguard Bluff (29 feet); and 3rd, opposite the town of Wanganui, about a quarter of a mile above the bridge (30 feet). In all these places the channel is narrow, and the river impinges with force against one of the banks. Within this same distance there are two permanently shallow places,—1st, the bar, and 2nd, the Snag Flat, where a depth of only 4 feet is to be found, the above depths being all given at low water.

This general description will show what is required to improve the navigation—namely, the deepening of the two shallow places last described.

In the case of the bar, it is at once evident that this object to any great extent cannot be attained by any ordinary amount of expenditure; its position being so far to seaward, works of such a character would be required as would be completely beyond the means of the province, or indeed of the colony, at the present time, and the result would not by any means justify the outlay.

Within the river, however, the case is different, and much improvement in the channel can be effected by the removal of the snags above described. This operation should be carried on in a defined line of not too great a width, so as to secure as direct a course as possible (that indicated by the pile-beacons lately erected under the direction of the Harbour Master seems to be well selected); and if persistently followed up, permanent good will be effected, and a really safe river navigation be secured, with the probable result that the increased velocity of the river in this newly cleared channel, more especially in floods, will have a beneficial effect in deepening the water on the bar and straightening the entrance across it; it is probable, also, that the destruction of the river banks now going on at this place will to a great extent cease.

With the view of still further directing the outflow of the river within a defined channel, it may at some future time be found serviceable to erect low transverse groins at moderate distances apart—say 5 to 10 chains—across the shallow flats outwards from each bank, the effect of which would be to arrest the velocity of the water where they were built, and cause a deposit of sand and silt between them, thus gradually raising the surface of the flats, and virtually narrowing the water way with good effect. These might be built in a rough cheap way with stakes and brush manuka wattled between; they should be built low enough to be submerged every tide. I should not, however, recommend this work being executed until the channel has been cleared and the effect observed.

The protection of the Castle Cliff is a work that demands early attention, and the protective works should be of a permanent character. This cliff, which is about 50 or 60 feet high, is composed of gravel above and clay (*papa*) below, and has a nearly vertical face, with a *talus* or slope at its foot, the highest point of the slope representing high water line, and the lowest point low water line. It varies from 6 to 20 yards in width, and is strewn with large angular blocks of the clay mixed with gravel, which fall from the face of the cliff. An examination of these shows that the destruction of the cliff is not due to the river alone, but that it is largely accelerated by the operations of a marine boring insect, which honeycombs the clay between high and low water in such a way as rapidly to destroy large masses, which on inspection and fracture are found to be completely perforated through and through with holes about $\frac{1}{4}$ inch diameter in every direction.

I was at a loss on this discovery to devise means that would effectually resist both the wearing action of the river below and the combined action of the surf and the borers above, as in the im-