possible, independent of any scheme for permanent improvement of the Waikato navigation; but we regret that we cannot make any recommendation that would be of any value in the direction of rendering early and temporary relief.

The detail survey and cross-sections of the river between Rangiriri and Maioro Bay, inside Waikato Heads, made in 1913 under the supervision of Mr. J. B. Thompson, have afforded us very valuable data on which to base our conclusions as to the feasibility of improving the river for navigation. Unfortunately, the survey did not extend up the river above Rangiriri, but from our own observations and the evidence tendered to us we are justified in the assumption that the river-conditions existing between Rangiriri and Huntly, a distance of about 9 miles, are on a parity with those obtaining for a distance of about 12 miles below Rangiriri. These 21 miles of the river in length, together with about 7 miles between the Devil's Elbow and Maioro Bay (through the delta, to be hereafter mentioned), present the greatest difficulty to navigation, on account of the numerous shoals.

The Waikato River has its origin in Lake Taupo, a lake having an area of about 238 square miles, with a drainage-area of about 995 square miles, a considerable portion of which is high land, and from which the run-off of water is at times very considerable, due to the melting of snow and other causes. The length of the river below Lake Taupo is about 220 miles, and the total area of the river-basin, including its tributaries, is some 5,400 square miles. The greater portion of this area is overlain to a considerable depth by rhyolitic and pumiceous sands, with the result that there is a continual supply of light and easily shifted sands, which, entering the river, are carried down it to a very considerable extent. Examination of the bed of the river shows a constant down-stream movement of a thin layer of fine pumice and quartz sand, with small rolling lumps of pumice, and this is apart from the silt which is carried down in suspension during every fresh in the river.

Above the Town of Cambridge the question of the navigation of the river may be dismissed, on account of numerous rocky shoals and small rapids.

Between Cambridge and Ngaruawahia the river is, upon the whole, good, and offers very few impediments to safe navigation for boats drawing up to 4 ft. 6 in. Between Ngaruawahia and Huntly the river, which now has the added waters of the Waipa, is also safely navigable to vessels of that draught. From Huntly down to Meremere the banks of the river widen out and the depth of water becomes less, the resulting shoals and moving sand-bars making navigation during the periods of low-water level in the summer months exceedingly difficult for all but small and very shallow draught boats.

Below Meremere and down to and below Tuakau the river, even at low summer level, is fairly good for navigation, provided that the deepest channels are followed. Under normal conditions the tidal effect is felt as high as Tuakau, a distance of some 18 miles from the heads, while under very low summer conditions the tidal effect is observed as high as Mercer, 7 miles farther up. From Kaitangata, for a length of about 6 miles, to Maioro Bay the river becomes a true delta river, with numerous channels. It is probable that in the early history of the river it discharged directly into a very much larger inland bay, extending over what is now known as the Aka-aka Plain. The river now presents the unique feature of a delta river discharging into an inland or enclosed bay; and this feature is a most important one to be considered in connection with any projected scheme of river-improvement in the lower reaches.

Another noticeable and exceptional feature of the Waikato is that the beds of most of the creeks flowing into the river below Ngaruawahia are, near their outlets, at a lower level than the bed of the river itself. In the case of the Whangamarino Creek this difference in level amounts to some 14 ft. or 15 ft., the bed of the creek being 11 ft. below mean sea-level. This points to a general land subsidence having taken place within recent geological times, and this view is confirmed by the fact that the old river-bed was found to be, when sinking the cylinder piers for the railway-bridge at Hamilton, at a depth of some 46 ft. below the present mean sea-level.

The existing deposits of sand in the bed of the river may have been due to such land subsidence having caused a flatter river gradien twith an insufficient velocity