

chart made by me it is 13 chains, having increased to twice its width in 15 years—a very rapid change indeed. The depth of water is materially affected by this change in the width of its passage: for whereas by Captain Drury's soundings the greatest depth was five fathoms in 1855, now I find in 1865 the greatest depth to be four fathoms, from which data it would seem that as the entrance to the lake widens so also does it shallow, and that the quantity of water is not affected by the increase or diminution of the width of that passage, from which significant fact some very important conclusions may be arrived at affecting the contemplated harbour improvements.

The direction of the ebb tide rushing out of the harbour was, about a month ago, due north, but it is subject to deflections according to the position of the bar or the Rangitira Bank.

The "Iron Pot" appears to have been formed by a tidal eddy and to be maintained alone by that cause, and I am inclined to think that any interference with that natural condition of things must result in its filling up so as to be useless for shipping purposes. It is evident from the following table of soundings (as per margin)* taken in 1862 and 1865 that since the commencement of what are called the "Harbour Improvements" a very great change for the worse has taken place in this interesting locality; at all events it can only be maintained in a useful state at an enormous first and an annual expenditure.

The shoals just inside the entrance shift under the influence of high floods and heavy seas, but return to their normal position upon the subsidence of the disturbing cause.

Thirdly, the rivers flowing through the Ahuriri Plains and into the Lake.

The Native chiefs, owners of the Ahuriri Plains strongly opposed my taking levels over that line of country, upon the ground that, somehow or other, that operation was connected with the introduction of steamers into their rivers. Mr. Commissioner Cooper was present at the time of these objections being made and to him I referred the matter, but that gentleman did not appear able to make any impression upon the objectors in favour of the levels.

I have, however, taken some few levels and measurements, from which you will gather that the fall of the Ahuriri Plains is from West to East, and that from North to South or South to North there is no material inclination, at all events not sufficient to overcome the natural tendency of the rivers flowing through the lower part of the plains to flow into the sea at due east from their sources, except in the case of the Tutaekuri river, if after all exception may fairly be taken to that river, which for the last two miles of its course runs from South to North upon which line the fall is slightly more than between the point of its deflection and the sea, going East.

A section line drawn from Pakowai to Mr. Rhodes' flats will show that the bottom of the Ngaruroro River at Pakowai is very much lower than that of the Tuki Tuki on Rhodes' flats; in fact, it is some feet below high water mark at Awapuni for by measurement I find that the north bank of the river at Pakowai is 18 feet above low water mark and that the depth of water below that again is about 9 feet and that the rise and fall of the tide is about 2 feet 6 inches. The Tuki Tuki river bed at the point B is about 26 feet above high water mark at the point C. It is to be observed as a consequence of this that the fall of the Ngaruroro from Pakowai is very gradual and that there is but a slow run in the water to the sea; whereas the Tuki Tuki river runs with great force from B to C, although the distance is shorter than from the point A (Pakowai) to the sea at Awapuni. The Ahuriri Plains, then may be considered to incline gradually from West to East.

The mouth of the Ngaruroro and Tuki Tuki rivers is for the present at Awapuni as shown on Chart No. 3 but as it shifts between the place and Waipureku under the influence of heavy floods and high seas it is difficult to say how long it will remain where it is now. The depth of water in the channel inside the bar is from $1\frac{1}{2}$ to 3 fathoms at high water, on the bar from 7 feet to 9 feet. It is at best however a dangerous passage and requires great caution and skill on the part of masters bringing in small craft.

The depth of water in mid-channel up the Ngaruroro from the Ferry to Pakowai is about 9 feet.

Iron pot { *1862—11 feet to 12 feet } Deepest.
 { 1865—9 " " " " }