

there is a continual seepage from the river coming out across the plain, and this keeps much of the land wet and adds additional work to the drains, especially in time of flood. The river has one satisfactory feature, however, which is that, being a comparatively short river, deriving its main supply of water from the Tarawera Lake, it does not flood badly, as the Tarawera Lake acts to a certain extent as a flood-impounding reservoir.

The settlers in the district are anxious to have the river diverted into a new cut commencing a short distance below the point where Hallett's catchwater enters the river, and extending from there into the head of the Tumarau drain. From there it would go down this drain, and enter the present course of the Tarawera River where this drain discharges into it. It is argued by the settlers that this would put the river behind a low range of hills that would effectually protect the plain; that it would not be necessary to stop-bank the new cut, as, if it flooded before it reached the protection of the low hills mentioned, it would only overflow on to an area of at present worthless country, and would be prevented from reaching the main plain largely by its own existing high banks. We have examined this spot, and we are impressed with the possibilities of the scheme, and think that further investigations should be made by an independent engineer, with a view to having the work ultimately carried out. If this suggested diversion is not made, then the present stop-banks must be very substantially increased in size and their river-face protected from scour.

DRAINAGE-WORKS.

The drains and works generally that have been done in connection with the Rangitaiki Swamp area are shown on plans numbered 1 and 4. The great bulk of the work has been finished, and practically every farm now has an outfall drain brought up to its boundaries into which the farm drains can discharge. There is, however, further work involving a capital expenditure that still requires to be done in order to make the present drainage scheme more effective and give the utmost fall that is obtainable.

It will be readily understood that, with such a large area of very low-lying land, every inch of additional fall or free-board in the drains is of importance, and, further, it is extremely desirable that after a flood the water should be got off the land as quickly as possible. Land that is subject to periodical flooding is not suitable for cultivation, but may be very useful for grazing-land provided the flood-water does not remain on the land too long a time. On a large area of low-lying land such as the Rangitaiki Plain, only a few feet above-sea-level, it is an impossibility—even with the most efficient drainage system—to prevent occasional flooding of the land. If flood-waters can be got off within twenty-four hours, floods do little or no harm to grazing-lands; but if the water remains much longer harm begins to be done, and much grass can be destroyed if the water remains on it for a longer period than two or three days. In order that a drainage system should be efficient it is obvious that the water in the main outlet drains should, under normal conditions, be kept at as low a level as possible. This is only to be effected by closing the drains to the ingress of tidal waters. It is with this object in view that we make the following recommendations concerning additional works urgently needed :—

Kopeopeo Outfall Drain.—This, as will be seen from the map, has two outlets—one into the Whakatane River and the other into the Rangitaiki River. The Whakatane outlet is provided with a tidal flood-gate—of insufficient width, however. The Rangitaiki outlet has no flood-gate. The entire course of this outfall drain is through very low-lying ground, the surface of the land along its banks being only a little above high-tide level. On account of there being no tidal flood-gates at the Kopeopeo outlet into the Rangitaiki River, the tide backs up this drain, and on the ebb tide a portion of the Rangitaiki water goes right through it and discharges into the Whakatane River. On the other hand, the Whakatane River would, when it is in flood, go through to the Rangitaiki but for the fact that flood-gates have been erected at the Whakatane end of the drain. We think that flood-gates of ample width (*i.e.*, not less than 75 per cent. of the width of the outlet drain) should be put at the outlet of this outfall drain to the Rangitaiki River, and that a new outlet