

TIDE, SLUICE, AND LOCK GATES.

Every opportunity of viewing the various types of gates in use was taken advantage of, and the several engineers were most obliging in supplying data and plans. One of the most satisfactory gates seen was of the "butterfly" type, and is used in New Orleans. It can be opened under a head of 14 ft. with ease, and is simply operated.

CONCRETE OVERFALLS, FLUMES, AND SPILLWAYS.

In view of the probable installation of overfalls, flumes, and spillways to break grade in the drainage ditches of New Zealand, a point was made of inspecting as many as possible of these in the United States. The information gleaned at first-hand will be most valuable and useful.

HIGHWAYS.

In view of the future expansion of the main-highway systems of New Zealand, considerable attention was paid to observing the various classes of concrete roads in the United States. From several of the State Highway Commissions were obtained complete standard specifications and plans of all classes of roads; and, in addition, the Bureau of Public Roads, Washington, D.C., was good enough to provide its own standard requirements.

Quite a variety of highway formation obtains, and into its construction machinery very largely enters, and, in fact, is quite superseding the old methods. Construction of concrete roads is not undertaken on swamp land until many years of consolidation render it safe to do so. Unequal settlement of the roadways through swamps would soon ruin any paved formation such as concrete.

COMPARISON OF THE MUCK AND PEAT SOIL OF THE UNITED STATES WITH THAT OF NEW ZEALAND.

To see any considerable area of peat lands similar to those of New Zealand it is necessary to visit the States of Minnesota, Wisconsin, Michigan, and Florida. Here can be seen all the typical characteristics such as saw- (or cutty-) grass, maiden-cane, cat-tails (raupo), Sphagnum moss, ash-residue, and so forth. Wet and cultivated peat lands present all the well-known features seen in New Zealand. The Everglades, Florida, bear a close resemblance to the Hauraki Plains in New Zealand, but, of course, are enormous in area, comprising, as they do, some 5,000,000 acres. One feature is quite distinct, though, and this is the substratum of coralline limestone. We in New Zealand are fortunate indeed in not having this substratum, but in place thereof clay of varying quality. The peat depths seen in the several States are much shallower than in New Zealand, and range from a few inches to, say, 10 ft., and this applies particularly to the Everglades, Florida. The fact of these peat areas being of a consumable nature is causing much anxiety in so far as the Everglades country is concerned, seeing that the coralline limestone is immediately underlying same. Probably grassing and the maintenance of a fairly high water-table will ensure immunity from fire.

These genuine swamp areas are classed as "muck" and "peat," the former containing a fair proportion of silt, while the latter is pure vegetable matter. Both characteristics can be seen in most New Zealand swamps. A conclusion is arrived at that the "muck" and "peat" soils of both countries are similar in character and productivity, but that much better pasture can be seen on the drained swamp areas of New Zealand. Acre for acre, the American swamp lands are no better drained, nor responsive, than those of New Zealand.

COMPARISON OF ALLUVIAL SWAMP LANDS OF UNITED STATES AND NEW ZEALAND.

No land was seen in the United States of America to exceed in quality that of the alluvial swamp areas of New Zealand, and it may be mentioned that the Hauraki Plains area, together with Rangitaiki Plains, stand out as object-lessons in the way of both pasture and stock-carrying capacity.

Much attention is given to the question of the water-table in swamp lands, and exhaustive experiments are being continuously carried out as to point of saturation, &c. It is recommended that this field be explored in New Zealand, as first-hand knowledge is now available for its conduct.

THE SELECTION OF DRAINAGE MACHINERY AND SUPPLIES FOR NEW ZEALAND.

The foregoing ground covered by this report was necessarily a prelude to the consideration of the most suitable types of drainage machinery for use in carrying out the various undertakings of the Hon. Minister of Lands in New Zealand. Weight had of necessity to be given to the important factors of transport, not only overseas, but—what was more serious—transport in the Dominion. Then, again, the demands called for machines of latitude and flexibility, which might be called universal in their application to the several operations. They must be capable of undertaking either small or fairly large jobs. Ultimately, after most careful consideration of the several types, a selection was made, competitive quotations obtained and analysed, and a cabled recommendation forwarded to the Dominion as regards certain machines. Authority to enter into contracts being received, the several contract documents were prepared and completed with the greatest care. The whole of the transactions were carried out direct with the manufacturers on the basis of a f.a.s. price, New York.