Recommended Field of Investigation in New Zealand.—Although practically all officers of the Land Drainage Branch are construction men, yet it should be possible to incorporate with their duties some measure of investigational research, provided junior assistance is given them in the way of avoiding the personal daily round of visits to the various instruments, recorders, test-pits, &c. It is suggested that the time is ripe to undertake local investigations in regard to the following: Precipitation (rainfall); run-off; evaporation; soil-moisture; subsidence of drained land; flow of water in artificial canals and ditches; saturation; water-table research.

At present our means of determining the run-off of any particular watershed are meagre, and the approximate deductions arrived at unreliable.

This branch should be in a position to offer sound advice to drainage districts upon these most important questions, for upon it depends the size of ditches necessary to accommodate storm-water, the spacing of same, and the depths necessary to enable as low a water-table as possible being maintained. The value of such work would be greatly enhanced by the issue of bulletins from time to time.

In the event of the foregoing recommendations regarding drainage investigations being approved, it is not suggested that they take effect immediately, but rather that the principle be affirmed and action taken as soon as conditions return to normal.

Conclusion.

General.—The visit to the United States has been most educational, both practically and professionally, and it would not be possible within this report to bring out the technical phases of the works inspected.

The drainage-work done in New Zealand does not suffer by comparison with that of the United States—in fact, the finish of our work, both as to ditches, sluices, bridges, and general utility, is not surpassed. As to expedition, there is no doubt that this feature is more prominent in America. There dredges up to 6-yards capacity are not uncommon, while those of 2½-yards capacity are quite common. There there is no problem of transport, because railways are everywhere, and contractors can move plant more easily two thousand miles than we can one mile. The same applies to lumber, coal, &c. Repairs are quickly effected, due to engineering-works being readily reached for repairs, and so forth. Then, again, there are many large firms of contracting drainage engineers with plants innumerable. One firm has thirty-five floating dredges alone, and many own fleets of from ten to fifteen dredges. Other contractors concentrate on dry-land dredges. Thus the availability of floaters, walking-dippers, and drag-line excavators has quite displaced hand-labour, and no difficulty exists in putting a job through expeditiously.

Within our resources we have done remarkably well, and have no just cause for disappointment. It should not be overlooked that it is one thing to drain a district, but quite another to also form all the roads throughout that district and bridge and culvert them. No areas were seen in America under one authority that embraced so many operations as we have to undertake. Here we take the raw land and develop it in all directions, and ultimately settle it. In the States one authority drains the land and another roads it. An exception exists in the case of the Everglades, Florida, where the State is largely handling this project. The waterways through same are its main concern.

Drainage has not yet been reduced to an exact science, and the recasting of original schemes is going on daily in the United States, and will so continue. The general fault has been in ditches of too small capacity and the subsequent shrinkage of land. As land subsides, it must be followed up by deepening the drains. It is a slow process, and time is the essence of success with this class of work. Half of the operations seen in the United States consisted of redigging.

A cool consideration of the facts, together with personal observation, shows the settler on the swamp lands of New Zealand as occupying an equally favourable position with his fellow-settlers overseas.

Personal.—In conclusion, the very hearty reception and facilities afforded your responsible officer cannot be overrated, as it was thus possible to meet the most eminent drainage engineers and authorities in Canada and the United States. These gentlemen supplied a very large quantity of literature and data, and arranged visits of inspection to the many works under their control.

Mr. S. H. McCrory, Chief of Drainage Investigations, Washington, was very largely instrumental in making the visit the success it was, and his valuable assistance is hereby acknowledged. In the appendix hereto will be found a list of gentlemen whose interest was freely and generously given.

The attached plates are self-explanatory.

I have, &c.,

J. B. Thompson,
Chief Drainage Engineer.

The Hon. Minister of Lands, Wellington.