

It may be stated in general terms that in the North Island no extensive areas have below the critical level of iodine, but some of the recent alluvial or river-bed soils, particularly in Wellington Province, are inclined to be low. Unless evidence of iodine-deficiency disease, such as enlarged thyroids, hairlessness in lambs, &c., occurs, however, the use of iodized licks is not warranted as extra iodine is of no advantage to the animal and may be harmful.

In the South Island, parts of Southland and Otago and the West Coast have a low content of iodine in soils, pastures, and thyroid glands of sheep. Many enlarged glands come from these areas, and the use of iodized licks is indicated.

SOILS.

A series of soil-samples collected from the area of blown sands at Ruakaka on the southern side of the entrance to Whangarei Harbour proved to be coarse sands to sandy silts and sandy loams. In some instances the soils were calcareous with fragments of sea-shells. A condition in the cattle resembling bush sickness was found to respond readily to treatment with a limonite lick.

Samples of soil collected from the various plant associations of the mud-flats at Kawhia and Aotea, Opuā and Waitemata Harbours, prove on analysis to be of suitable texture for reclamation—namely, sandy loams, silt loams, clay loams, &c.—none being either excessively heavy or light.

In most cases the usual high to moderate amounts of plant nutrients, especially available phosphoric acid, potash, and lime, associated with such mud-flat soils on the coasts of New Zealand, are present in these samples.

At the request of the Public Works Department analyses were undertaken of the soils of reclaimed land at Otaika, Whangarei, which it was proposed to use as an aerodrome. The mechanical analyses showed these soils to be fine sandy loams with one exception, a clay loam. They were therefore expected to drain and grass readily. All the samples contained excess of salt, but it was anticipated that with the shutting out of sea-water no difficulty would be experienced in gradually ridding the land of harmful concentration of salt, as has been the case in the Napier reclamations.

A special survey of a portion of the Kaipara Harbour was made in connection with reclamation plans at the request of the Public Works Department. The mechanical analyses show that the soils as a whole are lighter in texture than those taken from the areas nearer Helensville and reported on in 1933. In the latter case they were usually found to be clays, whereas the present series vary from a silt loam to a silt clay, with the exception of one sample, which is a clay.

The texture is an important point in the reclamation of estuarial muds, as the heavier the soil the greater is the care which must be exercised in cultivating, owing to the danger of puddling salty, heavy soils. The salt content of the areas at present growing salt weed or mangrove is high, but this salt would in time be reduced by leaching and by chemical change on permanently shutting off the supply of sea-water. The plant-food content of these soils is high, the available phosphate being abnormally so (up to 0.064 per cent.). In the case of the soils above the level of the normal tides and now supporting a vegetation of manuka and other shrubs and herbs the mineral plant food is much reduced (available phosphoric acid 0.006 per cent.), although the nitrogen is higher than that of the mud-flats which are submerged at high tides. The Kaipara mud-flats warrant intensive investigation in view of the enormous area available for reclamation and the indications of great richness in plant food.

A further series of samples were collected from the Napier Harbour lands in process of reclamation, particularly from the north end, to ascertain the changes that have taken place in soluble salts and plant nutrients during the past two or three years. Some fluctuations, but no very significant changes, were found, this area not yet being affected much by the drainage operations. A similar study is now being made of the recently drained southern portion. All the work has confirmed the previous favourable opinion as to the future of these soils when drained and brought into cultivation.

Soil samples from the Tiniroto District on which stock ailment occurred proved to be sandy silts similar to the Rotorua bush-sick soils. The use of limonite lick was recommended.

Soils were also analysed in connection with the weed-killing trials with various chemicals as it is recognized that weed-killing action varies with soil texture and seasonal variations in climate.

As a result of investigation and analysis of certain areas of ironstone lands near Okaihau, North Auckland, having a high percentage of iron, alumina, and titanium oxides (see 1934 annual report), it was recommended that liming be tried in addition to the previously unsuccessful phosphate-manuring. Reports to hand show that liming has proved very successful in encouraging the growth of pasture.

LIMING-MATERIALS.

Several samples described as "burnt lime" on analysis proved to contain either no quick-lime or only traces. Evidently some manufacturers fail to recognize that limestone merely heated (presumably to facilitate grinding) is not thereby necessarily converted into "burnt lime." Numerous samples of limestone and of commercial ground limestones have been examined. In some cases the carbonate of lime content fell considerably short of the claims made by the vendors, and steps were taken to secure better agreement.

TOXICOLOGICAL CASES.

The most interesting investigation during the year concerns the possibility of fairly widespread unthriftiness and mortality in pigs kept in conjunction with dairy-farms, being due to chronic zinc poisoning resulting from skim-milk, conveyed to the piggeries by galvanized iron pipes, dissolving quantities of zinc from the inner lining of the pipes. During recent years there has been a great increase in this method of feeding out the milk, which is often conveyed considerable distances by pipes, 16 chains and over being not infrequent.