

and sampling. Graphs plotted with iodine content of blood against interval between dosing and sampling showed a very sudden rise to a maximum, with a more gradual fall to normal.

*Rat Colony.*—During 1931, five albino rats donated by the Glaxo Research Laboratories were imported from London. These animals are of the Wistar strain, a stock which has been selectively inbred for a very great number of years. As a result an exceptionally uniform product has been evolved, and this is of the greatest value in studying fundamental problems of nutrition. Among the advantages attending work with small animals are those of cheapness, exact control of conditions, rapidity of work, availability of a large number of uniform experimental subjects, &c. In some cases results cannot be directly interpreted in terms of larger animals, but the conditions surrounding a particular problem can be studied and many possibilities cheaply and rapidly eliminated. If necessary, experiments on larger animals can then be planned with a much greater degree of precision and with a saving of much laborious preliminary work. From the original rats a healthy and flourishing colony has been established and already experiments are in progress.

A study is being made of the conditions surrounding the absorption of iron—*e.g.*, the influence of plant acids, of elements such as magnesium, &c. Citric acid appears to have no effect on iron absorption, while magnesium as magnesium carbonate appears to exert a depressing effect. The importance of iron for hair growth is indicated by other experiments. In these experiments young growing rats fed for one to two months on rations containing very little iron, but adequate in other respects, became practically hairless. Remarkable response in hair growth follows the administration of iron, while the presence of iron in the ration from the commencement adequately protects the animals from hairlessness. The necessity of observations on iron feeding and wool growth in sheep is thus clearly indicated. Further experiments are concerned with the effect of feeding high levels of protein on growth and reproduction. So far, it has been found that growth is rather slower than normal when a diet containing 80 per cent. of protein is fed to animals weaned from the stock colony. After adult size is reached on this diet, reproduction also appears to be normal, but in all cases the suckling young have failed to reach the weaning stage. The effect appears to be inhibition of lactation in the mother, but this point is as yet undecided.

#### BONE ANALYSES.

Number of fresh bones from animals affected with various deficiency diseases have been analysed, the technique being improved. At the same time bones from normal sheep of various ages are being obtained and analysed to provide a basis for comparison.

#### SOILS.

A certain amount of research has been carried out in conjunction with routine work. A modified method (Warren and Pugh) for the colorimetric estimation of phosphorus in soils has been adopted with success. The publications of the Imperial Bureau of Soil Science have been of great value.

The problem of the movement of phosphorus in field soils is a most important one, and preliminary work on the penetration and availability of phosphorus in certain New Zealand soils is nearing completion.

Research on methods of dispersion for mechanical analysis of certain New Zealand soils which are not amenable to ordinary methods of treatment has met with considerable success.

#### RAPID SOIL SURVEYS FOR THE UNEMPLOYMENT BOARD.

In connection with several projects of the Unemployment Board for developing new areas for settlement, rapid soil surveys to determine the prospective agricultural value of the land have been carried out in conjunction with the Lands and Public Works Departments.

Two extensive blocks of country in the vicinity of North Cape were visited, sampled, and reported on. The soils were very varied, comprising both light sands and heavy loams of varied geological origin. Practically all were, however, very acid and lacking in plant food, especially phosphate. A certain proportion, including the old consolidated dune sands and some volcanic soils would probably, with adequate liming, manuring, and shelter, be suitable for fruit-growing, but the majority would require considerable preliminary treatment before being utilized for agricultural purposes.

As regards the suitability of the old consolidated sand-dunes for passion-fruit culture, there is already a commercial passion-fruit orchard situated on soil of this type at Waipapakauri near the south end of the Ninety Mile Beach. An analysis of this soil showed it to be nearly identical with that from the north end of the dunes. There appears to be no reason why passion-fruit, and probably citrus and certain stone fruit, could not be grown in the latter locality under orchard conditions, but with the present transport facilities and remoteness and unreliability of markets, the cost of transport of fertilizers and products would have a determining influence on the success of such a project.

Some eighty samples of mud and silt from the bed of Lake Ellesmere, collected by Dr. P. Marshall of the Public Works Department, were analysed and reported on, in this case the report being highly favourable from the agricultural point of view, provided the engineering difficulties can be overcome. The soils were of good texture and very rich in plant-food, comparing in this respect with similar reclaimed mud flats in the Hauraki Gulf, but, on account of their much lower clay content, free from the danger experienced in the latter case of the development of sodium clay with its attendant evils of deflocculated or puddled soil, excessive alkalinity, and partial sterility. If reclaimed, it is considered that the Ellesmere soils will be especially suitable for market-gardening. On the rating adopted by Dyer for available plant-food these soils are three to four times as rich in phosphoric acid and potash as soils classified as "good" and five to six times those considered "normal." Some of the most productive soils in the world have been reclaimed from tidal mud-flats, and a vast development of this nature is at present being undertaken in Holland in the "poldering" of the Zuyder Zee.