

A careful examination of the field conditions led the officers of the Institute to the conclusion that the swampy nature of the pakihi is at least as much due to the spongy and colloidal nature of the soil as to the presence of the pan itself. This is illustrated by the fact that the pakihi soil retains its ordinary character in the immediate neighbourhood of open drains.

Following a representation made to the Hon. the Minister of Railways by the Hon. W. H. McIntyre in 1926, an offer was made to the Cawthron Institute Trust Board of a twenty-one-years lease, without rental, for experimental purposes, of a considerable area of pakihi land, the property of the Department of Railways, at Sergeant's Hill, Westport. The offer was accepted, and in April, 1927, a number of plots were marked off for experiment by Mr. Rigg. A lock-up shed for storing tools and fertilizers was erected, and certain sections were ploughed by tractor, others by horse; others, again, were merely disked. An adjoining 1-acre section, upon which the explosion experiments of the Department of Agriculture were carried out in 1912, was also secured and fenced in. Flax-fans were planted on a section which had been thrown up into ridges to receive the plants, the fans receiving different manurial treatments on different ridges. In the following spring young flax-plants were planted on another plot. The planting was followed by an exceptional period of drought, which appeared to have killed the plants, but with the arrival of rain in the late summer the flax made a wonderful recovery. Quite recently flax-seedlings of six different varieties, presented by Mr. Alfred Seifert, of Palmerston North, have been planted.

During the parliamentary session of 1927 legislation was passed allowing the Buller County Council and the Westport Borough Council to contribute funds towards the pakihi experiments of the Cawthron Institute, such contributions to be subsidized at a £2-per-£1 rate by the Department of Scientific and Industrial Research. £300 per annum has thus become available for the cost of the experiments.

In April, 1928, a number of the plots were sown with mixed grasses and clovers, different fertilizers at different rates being used upon the plots, the fertilizers employed being lime, basic slag, superphosphate, and Nauru phosphate, alone and in combination. In November the growth under several of the treatments was so satisfactory that a public field demonstration was held, at which the farmers spoke with enthusiasm of the results obtained. At a later date the experimental area was examined by officers of the Fields Division of the New Zealand Department of Agriculture, who reported favourably at headquarters upon the results obtained. The results may be summarized as follows:—

(1) Plots ploughed in winter and fallowed during summer worked down to a better seed-bed than land ploughed and worked in autumn and sown directly afterwards. The fallowed land accordingly showed a much more even take of grasses and clovers.

(2) Almost as good a growth of grasses and clovers has been obtained upon land which has been thoroughly disked as was obtained on the fallowed ploughed land.

(3) Simple burning of the pakihi vegetation, followed by treatment with lime and basic slag, harrowing, at once, and then sowing grasses and clovers, gave a result which was little inferior to the best plots obtained by the ploughing and fallowing treatment. This treatment, which is inexpensive, is now being repeated on an extended scale.

(4) Plots receiving lime alone proved total failures; those receiving superphosphate alone were very poor. Nauru phosphate or basic slag alone gave better but still poor results. Where lime and basic slag, or lime and superphosphate, were applied together, very satisfactory crops of grass and clover resulted.

(5) On the ploughed and fallowed land the use of 1 ton of lime per acre with 5 cwt. of super or basic slag gave as good results as were obtained when the quantity of lime was doubled. Basic slag and super proved equally effective.

(6) Seven months after sowing, the crop of mixed hay approximated to 1 ton on the plots referred to in (5). Three months later a second crop of 2 tons of hay per acre was obtained. The appearance of the plots suggests that there will be great improvement in the second season.

(7) Areas of pakihi which received lime treatment fourteen years ago have responded wonderfully to either basic slag or superphosphate.

(8) In the first season rye-grass, Yorkshire fog, *Lotus angustissimus*, and red clover have been very vigorous in their growth. Paspalum, cocksfoot, and red clover are now showing up well.

(9) The texture of the soil which has received the lime and phosphatic treatment has become open and granular, and quite different from the ordinary pakihi; even in very wet weather it shows no tendency to remain sodden. The increase in the bacterial population of this soil has been extraordinary.

(10) *Phormium tenax* has made satisfactory root and leaf growth on plots treated with Nauru phosphate. No advantage has so far followed the throwing of the land into ridges. It is, however, too early to make any definite pronouncement about the success of this plant until the crop is ready to cut.

LEATHER RESEARCH ASSOCIATION.

REPORT FOR THE PERIOD 1ST JANUARY TO 31ST MARCH, 1929.

Advisory Committee: Messrs. J. E. Astley, A. E. Lawry, D. Phillips, A. M. Wright, and Dr. J. S. MacLaurin. Research Chemist, Mr. P. White.

The preliminary work of establishing and equipping the Leather Research Laboratory was carried out as expeditiously as possible. During this period contact was effected with the tanneries, boot-factories, and Government institutions using leather.

On the whole, the boot-manufacturers were buying New Zealand leather; however, attention was drawn to certain defects, such as bad colour, inability to scour the leather, and undue softness. In consequence, suggestions were made to the tanners whereby their leather might be improved and these defects overcome, and the result of their putting into practice these suggestions has been to give satisfaction to the boot-manufacturers.

In the past, Government institutions had not used New Zealand leather to a great extent. In the main, this was due to the fact that the tanner did not know the requirements of the institution, and the latter took it for granted that the tanner was unable to produce the goods required. All of the institutions visited in New Zealand are now using New Zealand leather.