The reciprocal cross using *P. tenax* as female parent has also been successful. Several hundreds of these hybrids between the two species are being grown. By inbreeding from them it is hoped finally to secure a good fibre type with the uncoloured and almost unthickened leaf-edge and keel of *P. Colensoi*.

5. *Manurial Trials.*—The results from these trials at the Flax Research Station and at the Miranui Mill, near Shannon, cannot be judged by eye. Both of these areas are now ready for actual tests of yield. The results from the Massey area would have much more significance than those from the Shannon area owing to complete uniformity as to the variety of plant. The work of cutting uniformly, weighing, labelling, carting, and following all the various lots through the milling processes would entail considerable expense and the help of a trained assistant. The area in question is that planted with the Ngaro variety, which it is desirable to strip for other reasons also.

There has been no chance of inspecting the trial areas at Gordonton, in the Waikato, and it is therefore impossible to say how the trials have progressed there.

6. *Yellow-leaf Disease.*—Work on this disease for the year has been confined to the breeding of resistant strains and to observations of the susceptibility of different varieties to the disease. Yellow-leaf disease occurs in most of the trial area, so that all strains of flax are subject to attack. It is very noticeable that plants of one variety may show a high percentage of deaths from it, while plants of other varieties nearly either take the disease lightly and recover, or show no signs of infection. The bulk of the hybridization work is, of course, aimed at conferring resistance on otherwise satisfactory varieties.

7. *Fibre-testing.*—The main work in strength-testing of fibre was done in connection with fibre bleached artificially under a new process by Mr. J. Nightingall, of Auckland. The artificially bleached fibre was superior in colour and strength to control lots bleached in the ordinary way. After several months' storage the chemically bleached fibre shows to still greater advantage, having retained its good colour, while the control lots have turned yellowish.

8. *General.*—The point concerning this work which most needs emphasizing at the present time is that a definite stage has been attained beyond which but little progress is possible with the present staff and equipment. Without regular facilities for tests by complete processing of raw material, followed by strength tests, further selection and breeding work will be severely checked. The problem of the best place and method for the further increase of the best-quality strains must also be considered. The Ngaro is now ready to plant as much as 12 acres, and each year now new and excellent strains which need to be grown on a large scale for trials will become available. It seems necessary to propagate these in a neighbourhood from which transport of fans to commercial areas will be as cheap as possible. The reports of fibre-growing in other countries are considered by European fibre-merchants to indicate a certain fibre-shortage within three years. The fact that the fibre industry in other countries is unable to survive with present price-levels show that an energetic policy in New Zealand hemp has every prospect of success. The progress being made in Phormium growing in foreign countries, and the repeated efforts to secure our good varieties in bulk, indicate what other people think of this plant.

During the year co-operation was effected with the Native Department in procuring and removing to suitable land enough fans of the "S.S." variety to plant 1 acre. This variety has very strong fibre and is resistant to yellow-leaf disease. The plants are intended to be the nucleus of a commercial plantation under the control of the Native Department.

Thanks are due to the following donors for plants of rare and valuable varieties: Sir Apirana Ngata, Gisborne; Mr. W. J. Broadfoot, M.P., Te Kuiti; Mrs. Carroll, Wairoa, Hawke's Bay; Mr. H. Bunn, Whakatane; Mr. H. W. Christensen, Matakohi; Mr. G. McGregor, Ranana; Mr. H. Moore, Putaki; Mr. A. Seifert, Palmerston North; Mr. B. B. Wood, Wellington.

A chapter on the New Zealand hemp industry has been written for publication in a work entitled "Land-utilization in New Zealand," which is being published by the Institute of Pacific Relations. In the preparation of the article the writer was greatly helped by Mr. A. Seifert. Sincere thanks are due to the various flax-millers who have shown their usual willingness to help wherever possible.

J. S. Yeates, Botanist.

MINERAL CONTENT OF PASTURES.

EXTRACTS FROM FIFTH ANNUAL REPORT, DEPARTMENT OF AGRICULTURE.

Mr. B. C. Aston, Director of Research.

A notable feature of the year's work has been the extended use of limonite as a stock-lick in districts recognized as affected with bush sickness, and also in those districts where bush sickness is suspected. The good results appear to be due to (1) the power of limonite to correct iron deficiency, and (2) the tonic effects of iron, leading to a suppression of intestinal parasites.

The use of limonite as a lick for preventing and curing bush sickness has now become standard farming practice in the affected districts. It will be realized how important the discovery of the efficacy of the limonite salt lick has been when it is recognized that some 8,000 square miles, or one-fifth of the total area of the North Island, is comprised of air-deposited rhyolite pumice, on over half of which, or more than 2,500,000 acres, bush sickness has been found to occur to an extent which renders farming practically impossible.

Over the remaining portion of the pumice area there are also districts where symptoms of the disease have appeared from time to time, and consequently the full extent of the affected soils is not definitely known.