

At the present time the phormium industry appears to be in that transitory stage when it seems possible that future supplies of fibre will be drawn from artificially-established areas, rather than from native sources as hitherto. Projects for planting considerable areas are now under consideration throughout the Dominion, and the need is urgent for supplying those interested in these plantations with the best possible advice in order that serious mistakes may be avoided and the future of the industry made more assured. Consequently a survey of the main flax areas and plantations has been made with a view to ascertaining the practices and conditions that have been successful. It is proposed to embody in a bulletin the information gleaned from this survey.

More attention has been devoted to the discovery of new uses for phormium-fibre overseas. For this purpose consignments of flax have been forwarded to the Imperial Institute; the British Admiralty; the Plymouth Cordage Co., Boston, U.S.A.; Dr. Possaner von Ehrenthal; Imperial Chemical Industries; Spectrum Dyes, Ltd.; and the Bureau of Standards, Washington. These consignments will be tested for their suitability for a number of purposes, including paper, rope, and cordage, and cellulose and fabric manufacture. The hope that phormium-fibre might be used for the manufacture of artificial silk has not yet been realized.

It is gratifying to note that a considerable amount of local experimentation is being conducted by various enthusiasts throughout the Dominion, and during the year the committee has investigated a number of processes designed to effect improvements in flax-treatment.

Mr. P. W. Aitken has continued his investigations into the chemistry of phormium. The work dealing with the use of chemicals for fibre-bleaching purposes has been completed, and results indicate that only the cheapest of chemicals—viz., permanganate of potash and sodium hyposulphite—could be economically used for this purpose. With the knowledge of chemical bleaches now available, there yet remain to be developed suitable mechanical devices which will enable these to be put into practice.

It has been found that impurities occurring in the water-supplies available at flax-mills have been responsible for poor colour being secured in connection with the fibre. In consequence a large number of water-analyses have been made throughout the Dominion, and this information has been made available to flax-millers themselves.

Investigations dealing with the influence of various machines—strippers, scutchers, &c.—upon the chemical and physical properties of phormium also have been commenced. It would appear from strength-tests carried out with a specially devised machine that the mechanical processes through which phormium-fibre passes at present are responsible for considerable reduction in its tensile strength.

Phormium investigations under the supervision of the Research Committee are at present being conducted as follows:—

- (1) Chemical and mechanical researches by Mr. P. W. Aitken and Mr. C. R. Barnicoat.
- (2) Botanical and cultural researches by Dr. J. S. Yeates, at Massey Agricultural College.
- (3) Utilization investigations overseas at the Imperial Institute, London; the Admiralty; Plymouth Cordage Co., Boston, U.S.A.; Bureau of Standards, Washington; Dr. Possaner von Ehrenthal, Gothen, Germany; Spectrum Dyes, Ltd., Melbourne.

#### REPORT ON BREEDING, SELECTION, AND CULTIVATION OF PHORMIUM.

By Dr. J. S. YEATES, Massey Agricultural College.

(a) *General*.—During the past year it has been found possible to travel fairly extensively in both Islands on phormium work. Visits have been paid to all the important flax growing and milling districts, except the extreme north of the North Auckland District and Otago-Southland area. The objects of such travelling were several. First and foremost was the collection of material of phormium varieties, and also a preliminary study of the distribution of the main types of phormium. A secondary object was to secure first-hand acquaintance with the industry under all conditions, and to establish with millers and growers that personal contact which is necessary to the success of work of this type. Although a good deal of material was obtained in this way, it must be understood that on a lengthy and somewhat hurried tour much was left undone. It was, however, necessary to secure a general knowledge of all districts as a preliminary. In future years it is hoped to concentrate on a small area each year.

(b) *Progress of Plants Collected During the Previous Year*.—The “fans” of selected plants have now been planted for about twelve months in a small area at the Batchelar homestead. The growth has been quite satisfactory, although slow in beginning, on account of the severe treatment received in transplanting. Since most of the fans have to be carried long distances by motor-car, the roots and leaves need to be trimmed back very close to save carrying too much weight.

(c) *Growth of Pedigree and Hybrid Seedlings*.—(1) Pedigree seedlings: These are called pedigree seedlings to denote that each batch of them has been grown from a single pod of one bush, fans of which have been planted in the nursery. Wherever possible, several batches are grown from each bush, and a total of some twenty bushes was treated in this way last year. The growing of these pedigree seedlings is regarded as the most important aspect of the work. The immediate aim is to find bushes the seed of which produces a high percentage of vigorous seedlings of uniform milling-qualities. In other words, the object of this part of the work is to find varieties which will provide the best available seedling plants for commercial planting. Further than that, a great deal of valuable information will in time be obtained on the breeding behaviour of phormium, information which is necessary for systematic hybridization to procure improved strains. The seedlings under this heading have grown very well.