

VARIABILITY IN NEW ZEALAND PLANTS

Dr. Allan's presidential address on 21st February took the form of a lantern lecture. Many kinds of variability in New Zealand plants were illustrated and correlated with similar phenomena that have been more intensively studied in other countries.

In a single plant of the coast-growing Coprosma propinqua the exposed growth is tight and the leaves dwarfed and hard compared with the lax branching and much softer leaves on sheltered underparts. In Olearia arborescens likewise one branch may have no leaf over $\frac{1}{2}$ inch long, while on more favourably placed parts of the same plant, the average may be 2 inches. Thus a completely shaded plant might easily be considered to belong to a different species from the hard-bitten shrub of the open. The herbaceous Ranunculus monroi was shown in several forms, each correlating with the particular type of growing place.

Differences of this kind lend themselves well to experiment to discover what is the range of a plant's capabilities, and what are the controlling factors causing it to take one form or another. Schimper's pioneer work, that of Massart on Polygonum and that of Lothelior on gorse were briefly referred to. Goebel (who was shown at Castle Hill after the famous expedition to gather vegetable sheep for the Munich Museum) showed that in Campanula rotundifolia broad leaves like those of the rosette could be induced, by appropriate greenhouse treatment, to grow up the flowering stem where normally only linear leaves appear.

Bonnier investigated the effect of different natural conditions on a single plant by dividing a clone of Helichrysum and planting part high in the Alps and part in the lowlands.

Dr. Cockayne's experiments on the effect of environment on the growth of New Zealand plants are classical. We saw pictures of his spineless Discaria and leafy whipcord Hebes grown in a moist atmosphere.

These experiments show that a single species, or even a single plant, may have many tricks, but controlled culture work of the same kind may show also that differences between other plants have a deeper basis, e.g. the prostrate Hebe chathamica remains prostrate even under lush garden conditions that might be expected to induce it to show a tendency to raise itself above the ground; various forms of Hebe buxifolia maintain their difference in uniform culture. A host of problems of this kind must be tackled before the true taxonomic status of many of our plants can finally be decided. The case of the Kaitaia and Wairoa growth-forms of Pittosporum obcordatum was mentioned.

Inducing changes in plants, often in specially desired directions, by artificial means is a comparatively modern game that should have scope in New Zealand. Thus it has been possible in hemp to change the sex expression from strictly dioecious to mainly monoecious, so that in a plantation almost every individual instead of only half, produced a seed crop. In New Zealand coprosmas, Wild and Zotov have shown that flowers and plants are not always strictly unisexual. More work could well be done with this genus, which surely will one day be recognized as horticulturally valuable for its ornamental berries.

Recent work on the effect of X-rays in altering plant characteristics was briefly mentioned.

In connection with graft hybrids one famous example was illustrated where the plant had a core of hawthorn tissue, covered by a skin of medlar. Daniels grafted Artemisia on to Chrysanthemum frutescens (one of the very common white-flowered wild daisies about Wellington) and seed from the graft gave a range of leaf form and size between the two originals, which could scarcely be called parents.

Turesson's ecotype theory was briefly outlined, as of importance in the study of New Zealand plants. In Sweden the sea thrift appears in different forms along various stretches of the coast. These forms brought together under uniform conditions retained their

differences. Turesson's theory is that out of an originally polymorphic group, in each locality only those one or two forms especially suited will survive. Craspedia is a genus crying out for similar investigation here.

In England Marsden Jones and Turrill, using Plantago major, have tried to keep all factors constant in pot cultures, except the soil, to see how much its properties affect the form of the plant. In N.Z. recently similar experiments have been undertaken, but rather to gauge the fertility of the soil, than to analyse the plant responses.

Dr. Zotey of Holland, visiting New Zealand in 1925 was deeply impressed with the extent of wild hybridism, perhaps the most prolific cause of variability in our plants. Amongst the examples illustrated were the crosses between Ranunculus lyallii and R. buchananii, Mallocois ternata and M. simplex, Hebe elliptica and H. salicifolia. Dr. Allan did not make any mention of his own artificial hybrids between Coprosma robusta and C. propinqua of which he followed the progeny through till the second generation had displayed all its wonderful variety of leaf form and fruit colour. The only other controlled hybridizations of N.Z. plants except in grasses have been in Rubus (Rubus parvus x R. Schmidliodes, see Allan TNZL 58, p.51, 1927) and in genus phormium about which Dr. Allan has published results in collaboration with Miss Cranwell, and with Mr. Zorov. Rubus barkeri, of which all the cultivated plants that adorn many public gardens have come vegetatively from one original piece from Westland, was thought by Dr. Cockayne to be a hybrid. It was interesting to hear that it has been known to flower in cultivation.

Hybridism has been assumed to account for much of the variability in ferns, and the experimental work being carried out on Aspleniums in Auckland by Miss Crookes was mentioned.

Ferns also show heterophylly, i.e. different kinds of leaves in different parts or at different ages in the plant. Blechnum filiforme is our most striking example. In flowering plants Helleborus, coralloides, Pokaka, knikomako, Carpodatus serratus, Muehlenbeckia complexa, and the kowhals were mentioned in this connection. Flowers on reversion shoots, or even on plants with foliage entirely juvenile should always be watched for. The rejuvenation of lancewood after fire was interestingly described. The explanation of these juvenile forms is still awaited, and it is to be hoped that someone in New Zealand, even without the thousands of flower pots and acres of glass-house that we saw in American research stations, will some day be able to tell us why or how a pokaka, after remaining for years in a tangle suddenly sends up an erect shoot that becomes the trunk of a tree.

Mr. Beattie exhibited a collection of leaves gathered from a small area in North Auckland, that illustrated very aptly both the variability within the genus Pseudopanax, and the need for careful study in the field.

DEPARTURES.

The departure from New Zealand of Mrs. Watson Smith, formerly Miss Lucy Cranwell, is an event of moment to plant-lovers here. As botanist at the Auckland Museum, Miss Cranwell was well known for her work in popularising the study of native plants, while through her scientific papers, wide correspondence, and travels abroad, her name became familiar to botanists in all parts of the world. Some account of her interests, and a list of some of her publications are given in the latest Newsletter from the Auckland Botanical Society which she was instrumental in founding in 1937. Our Society might join with her own in wishing her good fortune in her new home in America.

Another plant-scientist to leave this country recently is Dr. Lai Yung Li, whom we had the pleasure of hearing in 1942. Dr. Li is returning to China to undertake teaching and experimental work with his own people. No news has been received since a report some weeks ago that he had reached Sydney safely. It is to be hoped that he will accomplish the rest of his perilous journey without mishap, and that it will not be long before his country is able to communicate freely with the rest of the world.