Senecio Kirkii, the commonest shrub of the forest, is, as described before, of a very open habit. Strange to say, although usually an epiphyte in the central floristic province, it is here, so far as I could judge, invariably a ground-shrub, and yet the rata, at any rate, would afford it a typical station. *Alseuosmia macrophylla* is an upright shrub with stiff, slender stems of irregular form, frequently branching sparingly into distant, flexible, leafy twigs. *A. Banksii* is a very small, little-branched shrub, and *A. linariifolia* is erect, with many slender branches. The *Corokia* is quite rare, and found only on the forest-margin at nearly 1,000 ft. altitude, while *Leptospermum scoparium* and even *Styphelia fasciculata* are rather plants of the heath than of the forest proper.

The leaves of the shrubs (leaving out *Carmichaelia australis*) are all simple, 10 are toothed or otherwise cut, 9 are entire, and 6 thin, while 13 are coriaceous.

The flowers of the forest-plants are for the most part very small and inconspicuous, some thirty only having a claim to showiness, and this frequently to a very limited extent. Nearly all of these are white, the following being exceptions: The puriri (*Vitex lucens*), dull-red; the kowhai (*Sophora tetraptera*), golden-yellow and 1½ in. long; the waiouatua (*Rabdothamnus Solandri*), orange, striped with purple in the throat and red round the margin of the lobes; the hoihoi (*Alseuosmia macrophylla*), creamy-yellow, marked with pink lines on the exterior and slightly flushed within; the northern rata (*Metrosideros robusta*), dark-scarlet; the rewarewa (*Knightia excelsa*), dull-crimson.

Comparatively little has been written on the fertilisation of New Zealand plants, the important paper of G. M. Thomson (26A), published as long ago as 1881, being still the main authority. The whole matter needs going into most carefully, and, above all, experiments can alone decide in most instances as to the capacity of a plant for self-fertilisation. But with regard to the kauri-forest trees and shrubs, thirty-seven species, at any rate, are unisexual or nearly so, and of the remaining forty several are more or less gynodiœcious at times. It is therefore obvious that in a majority of cases cross-fertilisation either by means of animals or wind takes place. Birds doubtless play some part in fertilisation, as suggested by Petrie (23) for *Rhabdothamnus Solandri* and *Vitex lucens* (24). Possibly *Metrosideros robusta* and *M. florida* are similarly fertilised. The large number of species with inconspicuous flowers suggests wind rather than insect fertilisation, but here speculation is of no moment; each case must be investigated and considered on its own merits.

No less than forty-three species of the forest-plants have more or less succulent fruits, many of which are very showy, while many others are likewise edible, winged, adhesive, or minute and light. Thus there is every facility for the distribution of nearly all species, especially by means of birds.

2. Lianes.

Lianes, as in most New Zealand forests, are an important ecological group, and probably affect the general physiognomy more than any other class of plants. Here no detailed account can be given. Schenck's (26) various divisions—scramblers, root climbers, twining plants, and tendril climbers—are all represented. Nearly all the spermaphytic lianes are ligneous, but there are a number of climbing ferns, of which many are at the same time epiphytes. The plants under consideration do not always climb; frequently they sprawl over the forest-floor, and occasionally, under certain conditions, from shrub-like bushes. The most important lianes to be found in the Waipoua Forest are the supplejack (*Rhipogonum scandens*), the various climbing species of *Metrosideros*, the kiekie (*Freycinetia Banksii*), the climbing hard fern (*Blechnum filiforme*), and the mangemange (*Lygodium articulatum*). In some places *Lycopodium volubile* is common, and in the transition forest and the taller heath *Gleichenia circinata*, its wiry leaf-stalks lengthening excessively, and the plagiotropous position of their segments enabling it to reach 8 ft. or more as a scrambler. So, too, does the delicate-looking fern *Hypolepis distans* raise itself for a number of feet (though when of that length quite unable to stand alone), thanks to its slender, black, brittle stems and their numerous minute excrescences.

The supplejack (*Rhipogonum scandens*) puts forth a soft, succulent stem from its stout root-stock, covered closely with short, brown hairs, and provided only with adpressed, subulate, slightly fleshy, dark-coloured, non-assimulating leaves, 2½ in. in length, at considerable distances and quite different from those of the final flowering-stems, which are 3 in. or 4 in. long, coriaceous, green, and of oblong type. The seedling has similar leaves to the adult, but they are smaller and quite thin. These primary leaves are almost fully developed before the lengthening of the internodes, and, pressed together, effectually protect the growing-point of the stem. The plant grows usually at some distance away from any support which it can use, and the stems straggle over the ground until a sapling is gained, up which it can wind, and, having reached the summit, still lengthening, manages to gain a taller trunk, by means of which it, winding from right to left, can reach sufficient light to produce its leafing stage.

The methods by which the lianes gain their final supports have been little studied: a few notes taken *re Rhipogonum* may be of interest:—

"Here *Rhipogonum* winds round a small tree of *Beilschmiedia tarairi* 14 in. in diameter. The stem is 6 yards long and arches from the ground several times until the tree is gained.

"Here is another stem erect for 5 ft., then it bends, arching, and catches hold of a twig of a tarairi, 8 ft. tall from the ground, then bending laterally it catches into a tarairi sapling, 25 ft tall, ascending right into its slender head of foliage.

"Here a third makes a good-sized arch of 4 yards in length, then turns for 2 ft., ascends, making a half-turn round a *Weinmannia* at 4 ft. from the ground, passes up to a tarairi of 11 in in diameter, and catches it at 25 ft. from the ground.

"Here several quite slender stems of *Rhipogonum* are wound round one another, two are dead or semi-dead, one is broken, and one remains, which was wound round a dead sapling and thus on to a young tarairi.