

(c.) *The Physiognomy of the Forest.*

The physiognomy of any plant formation depends upon the more common striking species of which it is composed, and as these are an expression of the adaptation of certain plant-forms to definite external conditions, the physiognomy of the vegetation is not merely a matter of scenery, but a biological phenomenon.

Seen from a distance, the forest of Kapiti appears as a close green mantle covering the steep slopes to the shore, and the almost precipitous declivities of the gullies. A merely superficial glance shows that it is made up of greens of various hues, and that its surface is not quite even or flat, but billowy rather—conditions arising from the diverse species and their different habits of growth. But a more searching glance reveals that on the margins and sides of the gullies, more especially, a few trees, frequently more or less damaged, rise high above the others.

If we consider in the first place the various greens, it will be seen that certain species especially determine that character. Thus, the dark rounded portions of the forest-roof consist of the karaka (*Corynocarpus laevigata*), the pale yellowish-green flatter masses the mahoe (*Melicytus ramiflorus*), the bright pale-green of the forest margin the ngaio (*Myoporum laetum*), and the large breadths in many places of a uniform rather dull darkish-grey is the manuka (*Leptospermum scoparium*), and this latter colour betokens a change in the character of the soil. These greens in early October are lit up by white masses of the flowers of the forest daisy-tree (*Olearia cunninghamii*).

The aspect of the interior of the forest varies a good deal in different parts. Generally speaking, there are at the most three tiers of vegetation, the two uppermost of which are barely distinguishable, so that usually only the roof and the floor can be separated. Between these, the eye meets multitudes of low greyish trunks, some few fairly thick, but the majority slender and rising up more or less perpendicularly from the ground. Some of the trunks may be occasionally clothed with one or other of the climbing ratas (*Metrosideros*, spp.) or with the beautiful, feathery, drooping, green fronds of a climbing fern, *Lomaria filiformis*, which entirely hides the slender trunks for many feet.

Should a second tier of plants be present it will consist of young forest-trees of the same species as those composing the forest, shrubs being usually absent altogether—a quite unexpected character, and one which recalls the shrubless forest of the Chatham Islands.* The chief exceptions are *Coprosma areolata* (but this plays no especially conspicuous part), and in the upper forest the pepper-tree (*Drimys axillaris*). In some places this second tier is reinforced by the graceful silver tree-fern (*Cyathaea dealbata*), here usually with a very short trunk clothed with dead brown fronds, and bearing at its apex a crown of immense spreading leaves, silvery on the undersurface. The much taller black tree-fern (*Cyathaea medullaris*) also plays its part, its rather slender† stem, quite bare of epiphytes, raising the fine fronds on their almost jet-black stalks right into the forest-roof. But the tree-ferns are not present everywhere, and are a rather exceptional character of the forest, though when present—and in certain parts they are abundant—they are distinctly plants of extreme physiognomic importance.

The above remark applies also to the nikau palm (*Rhopalostylis sapida*), which, very plentiful at times, is wanting over large areas of the forest.

The most important plant of the second tier, occurring, however, chiefly in the upper forest and in shady gullies, is the tawa (*Beilschmiedia tawa*). The young trees of this species stand side by side in hundreds, filling up all the space between the trunks of the larger trees, their elegant form and foliage alone meeting the eye. Such plants are about 8 ft. to 10 ft. tall. They have a slender erect main stem, from which are given off rather short distant very slight branches, and from these depend pale thin green leaves, whitish with a coating of wax on their under-surface, and by no means crowded together. Such young trees are graceful to no small degree, and lend a special charm to the upper forest. In this part, too, the northern rata (*Metrosideros robusta*) plays a conspicuous rôle. This tree varies much in stature in the Kapiti forest, sometimes being a low tree, almost a shrub, while in other places it is a veritable forest giant, 100 ft. in height, raising its open crown of rather thick dark-green leaves high above the forest, to which it hardly appears to belong. Indeed, at first I thought these ratas were the remains of some older plant formation, and that the general low arborescent growth beneath was a reproduction after the destruction of the original taller rata-forest. But, as will be seen further on, this conjecture was probably wrong. The trunks of the ratas are frequently of most fantastic form (see Plate VI, 1), in some cases arches being formed by aerial roots, so that one can walk beneath the trunk. They are covered with many epiphytes, and it is here that the great masses of the birds-nest-looking *Astelias* have their foothold. The bushy climbing red rata (*Metrosideros florida*) also climbs up the rata-trunks, and when old has very thick stems; and close masses of the kidney-fern (*Trichomanes reniforme*) drape their lower and shaded basal portion.

The forest-floor is frequently quite bare (Plate III, 1), an obvious distinction from a New Zealand rain-forest, and this not merely on the stony but on the loamy ground. At other times there is quite a close covering. Where the roof is fairly open, moderate-sized tufts or tussocks of the green flat-leaved *Uncinia australis* give the character, but where more dense, certain ferns dominate. Of these the most characteristic are *Nephrodium velutinum*, with rather large brownish-coloured fronds; *Aspidium richardi*, with stiff dark-green fronds; two species of maidenhair (*Adiantum affine* and *A. fulvum*), with shining-green delicate thin leaves; the pale-green and soft *Pteris macilentia* and *P. comans*; and finally, especially on the stony ground, the dimorphic *Lomaria filiformis*, which clings closely to the stones, frequently covering them completely, while where such emerge from the ground are hundreds of the small and tender green maidenhair spleenwort (*Asplenium hookerianum*) at their bases. In other places, especially where the roof is open, the climbing ratas form great masses on and amongst the stones.

* Loc. cit., p. 277.

† The details regarding this and other plants refer to the Kapiti vegetation alone, and must not be taken as necessarily true for the same species as met with in all parts of New Zealand.