

tough stems round one or other of the slender young trees, covering them with its bright-green leaves. In some places young and graceful tawas give the chief character to the undergrowth. *Rapanea salicina*, *Nothopanax arboreum*, an occasional stemless young palm, young *Melicytus macrophyllus*, seedling *Coprosma grandifolia*, *Asplenium bulbiferum*, and the semi-tree-fern *Blechnum discolor* are also frequently present. High overhead are the great spreading limbs of the kauris, each equalling a fair-sized tree in bulk, and in the spaces between the supporting columns of the kauri, the pale-green, lace-like, open foliage of the tawa, and the darker and denser heads of the tarairi.

In this open forest lianes are few. Besides the *Lygodium* already mentioned, an occasional *Freycinetia* climbs the trees. But the kauri itself, owing to its bark-shedding habit, remains inviolate and quite without lianes, except for an occasional climbing rata of some species or another, which manages to ascend for a few feet on the basal portion of the tree, only in course of time to be ejected through the shedding of the bark. (Photo 12.)

The above description is quite inapplicable to the groves of kauris, large or small, or to the association of plants in the neighbourhood of individual kauri-trees, which form by far the most common examples of the kauri association as it occurs within a kauri-tarairi forest. The kauri-trees themselves are usually some chains apart, and the space between is occupied by the *Gahnia-Astelia* undergrowth. This consists of immense tussocks growing as closely as possible, so that it is extremely difficult to force one's way through them. Out of the mass emerge certain characteristic plants, especially the maireire (*Phebalium nudum*), its slender branches covered with dark-purple bark, and which, branching frequently, are clothed with small aromatic leaves, whose reddish under-surface imparts that hue to the plant as a whole. With the tussocks is mixed, and often to a considerable extent, the liane *Freycinetia*, thus adding to the density of the association; and the forest-groundsel, *Senecio Kirkii*, which branches in a somewhat candelabra-like fashion and has moderately dark-green leaves, which are pale beneath, borne only near the extremities. Seedlings also of this plant, with leaves most variable in shape, are extremely common on the open ground. The hangehange (*Geniostoma ligustrifolium*), with its soft, glossy, bright, shining, green leaves, pale beneath, grows mixed with the *Gahnia*. The liane *Metrosideros florida* is frequently abundant in a similar position, and where there is space *Blechnum Frazeri* is sure to be present. The branches of the kauri, rising high above the general forest-growth themselves approaching ordinary trees in size, form close heads of foliage, which are usually distant one from the other, so that much light enters the forest, which accounts for the luxuriance of the "grassy" growths.

Where the soil is wettest the *Gahnia* is most abundant, but where drier it becomes much less luxuriant, and the *Astelia* then is the dominant tussock. Sometimes the *Gahnia-Astelia* thickets are almost pure, with their erect or semi-erect leaves drooping at their apices, and, beneath, the straw-coloured dead leaves. Very frequently the neinei (*Dracophyllum latifolium*), with its peculiar and striking form, becomes a special feature of the kauri association, and the tall tree-fern *Cyathea dealbata*, the great fronds arranged after the manner of a huge umbrella, is nearly always present, as are young tarairi-trees, slender-stemmed and sparingly leafy, as before noted. Finally, *Coprosma grandifolia*, *Nothopanax arboreum*, and *Alseuosmia macrophylla* are common plants.

(c.) *The Tarairi Sub-association.* (Photo 13.)

With regard to this association, no account can be given which would be typical of the whole, its members varying in their relative proportion and changing according to topographical and soil conditions. Generally speaking, the tarairi itself is most abundant where the soil is richest, just as the pure kauri association occurs on the worst ground. The following, in inverted commas, are extracts from my note-books, and give a more truthful idea of the physiognomy of the tarairi association than would any attempt at a detailed general account. At the same time it must be clearly understood that many points were not noted, and that at best such notes give but a general idea of the forest and its composition, while invariably many species were overlooked or not recorded.

*On the Eastern Watershed of the Waikohatu Stream.*—"The trees are about 45 ft. tall, and have mostly moss-covered straight trunks. Palms 25 ft. tall are dotted about. The heads of the trees are very scanty. The tarairi (*Beilschmiedia tarairi*) is abundant, and there is some tawa (*B. tawa*). Here is an odd plant of the kawaka (*Libocedrus Doniana*), a rather rare tree in the Waipoua Forest, whose reddish-brown bark, hanging in long strips, renders it conspicuous.

"The undergrowth is rather close, and consists of young trees and shrubs 18 ft. or so tall—e.g., the kohekohe (*Dysoxylum spectabile*), *Melicytus macrophyllus*, the kanono (*Coprosma grandifolia*), the forest-groundsel (*Senecio Kirkii*), the hangehange (*Geniostoma ligustrifolium*), and the ivy-tree (*Nothopanax arboreum*). Where the trees are slender the mangemange (*Lygodium articulatum*) covers them with a delicate mantle of glistening green. A few mosses are on the floor, and *Blechnum Frazeri*, its slender trunks a foot or two tall, also seedlings of *Geniostoma*, together with small stemless *Cyathea dealbata*, *Blechnum discolor*, tufts of *Freycinetia*, and some of the grass-like *Uncinia australis*. There is an occasional lancewood (*Pseudopanax crassifolium*), some moderate-sized shrubs of the horopito (*Drimys axillaris*) and the ramarama (*Myrtus bullata*).

"Further on, the undergrowth becomes thicker and its members more spindling in character, *Coprosma grandifolia*, some 15 ft. to 20 ft. tall, being dominant. There are also a few tree-ferns, a tall palm or two, some *Geniostoma* and *Dysoxylum*. On the ground is abundance of *Blechnum filiforme* (a common ground-plant of this forest, especially of the drier portions) and a little *Freycinetia*. Logs are here and there, covered completely with the kidney fern (*Trichomanes reniforme*). Occasionally colonies several square yards in area may be met with of the great moss, *Dawsonia superba*, the individual plants from one to one and a half feet in height (Photo 1A), but the plant is by no means common.