1909.

NEW ZEALAND.

DEPARTMENT OF LANDS:
A BOTANICAL EXAMINATION OF THE HIGHER WAIMARINO DISTRICT

(REPORT ON), BY E. PHILLIPS TURNER.

Presented to both Houses of the General Assembly by Command of His Excellency.

SIR,— Department of Lands, Wellington, 4th May, 1909.

I have the honour to submit herewith a report upon a botanical examination of the Higher Waimarino District by Mr. E. Phillips Turner, Inspector of Scenic Reserves.

I have, &c.,

WM. C. KENSINGTON,
Under-Secretary.

The Right. Hon. Sir Joseph G. Ward, P.C., K.C.M.G., Minister of Lands.

REPORT.

THE Waimarino district may perhaps be said to comprise all that extensive area of forest land and open plain that lies between the Wanganui River on the west and north, Ngauruhoe and Ruapehu volcanoes on the east, and the Karioi–Pipiriki Road on the south, and contains about eleven hundred square miles. This large area, ranging from a few hundred feet above sea-level to over four thousand, probably contains most of the plants represented in the central botanical province of New Zealand; so in my present observations I propose to deal only with that part lying above 1,000 ft. above sea-level, specimens of which are included in the scenic reserves along the North Island Main Trunk Railway; and I hope later on to deal with the low-lying area when reporting on the reserves that are to be cut out along the Wanganui River.

At the height of about 1,000 ft. above sea-level the plant association may be said to be that of the Rotorua plateau, rimu, matai, totara, and white-pine being present to such an extent that the forest might be termed a taxad forest; miro is also present to a lesser extent on the spurs. The soil is a light pumice, and in this the taxads seem to master other competitors in life's struggle. At Kakahi I was particularly struck by not only the number of taxads, but also by their unusual size. The greatest height so far given for the kahikatea (*Podocarpus dacrydioides*) is 150 ft., but I had one measured there which went 196 ft., and there were others that looked as tall.

The smaller trees of this taxad forest are tawa (*Beilschmiedia tawa*), hinau (*Elaeocarpus dentatus*), white maire (*Olea lanceolata*), rewarewa (*Knightia excelsa*), mahoe (*Melicytus ramiflorus*), horopito (*Drimys axillaris*), rangiora (*Brachyglottis repanda*), patete (*Schefflera digitata*), titoki (*Alectryon excelsum*), houhou (*Panax arboreum*), raurekau (*Coprosma grandifolia*), lancewood (*Pseudopanax crassifolium*), tawhero (*Weinmannia sylvicola*), and toro (*Myrsine salicina*). On the margins of the forest tarata (*Pittosporum eugenioides*), tawhiri (*Pittosporum tenuifolium*), makomako (*Aristolia racemosa*), houhere (*Hoheria populnea*), and fuchsia (*Fuchsia excorticata*) are the prevailing plants. Lianes are plentiful: *Metrosideros hypericifolia* is seen frequently quite clothing the trunks of tree-ferns and the

big trees; supplejacks (*Rhipogonum scandens*), lawyers (*Rubus australis, Rubus cissoides*, and *Rubus schmideloides*), *Parsonsia heterophylla, Muehlenbeckia australis, Clematis indivisa*, and *Passiflora tetrandra* are all seen scrambling over the lower shrubs or hanging in graceful festoons from the bigger trees.

Tree-ferns are well represented by the Wheki-ponga (*Dicksonia fibrosa*), punga (*Cyathea dealbata*), wheki (*Dicksonia squarrosa*), *Hemitelia Smithii*, and in a lesser degree by the mamaku (*Cyathea medullaris*). Among the smaller ferns are prominent the beautiful green lace of the *Todea hymenophylloides*; *Lomaria discolor, L. lanceolata, L. capensis*, and *L. fluviatilis*; the *Polypodium Billardieri, P. pennigerum, P. grammitidis*, and *P. australe*; *Aspidium aculeatum* var. *vestitum, Aspidium aculeatum* var. *sylvaticum*; *Asplenium bulbiferum, A. flaccidum, A. falcatum*, and *A. lucidum*; and *Hymenophyllum dilatatum, H. demissum, H. multifidum, H. scabrum, H. australe*, and *H. flabellata*; some *Todea superba* are sometimes met with.

In scrub and fern openings the manuka (*Leptospermum scoparium*), mingi (*Leucopogon fasciculatus*), and *Leucopogon Frazeri*, tutu (*Coriaria ruscifolia*), houhou (*Panax arboreum*) karamu (*Coprosma lucida*), tawhiri (*Pittosporum tenuifolium*), *Veronica salicifolia, Gaultheria rupestris* and *G. fagifolia*, and *Cordyline australis* and *C. Banksii* form the chief trees and shrubs. At Kakahi the rather rare *Teucridium parvifolium* was found on a flat near the Whakapapa Stream. Along the stream, also, kowhai (*Sophora tetraptera*) and *Olearia nitida* are plentiful. The bracken fern (*Pteris aquilina*) abounds here in scrub country. Half-way between Kakahi and Owhango the parasitic shrub *Loranthus micranthus* in two places was found growing on the common totara, a fact, I believe, not previously noticed.

A noticeable absentee from this district is the kiekie (*Freycinetia Banksii*), so common elsewhere.

The foregoing association shows little change till in the vicinity of Raurimu, 900 ft. higher, and fourteen miles farther south. Here the mountain-cedar or pahautea, locally kaikawaka (*Libocedrus Bidwillii*) and manoao or silver-pine (*Dacrydium Colensoi*) appear in force among the conifers; there also come in rahutu (*Myrtus pedunculata*) and papauma (*Griselinia littoralis*); *Pittosporum Colensoi* has taken the place of *Pittosporum tenuifolium*; *Fagus Solandri* and *Fagus fusca* appear along streams; also *Coprosma tenuifolia* and horopito (*Drimys axillaris* and *D. colorata*) are some of the chief shrubs in the forest undergrowth. The tree-fern (*Cyathea medullaris*) and the supplejack (*Rhipogonum scandens*) have practically disappeared, as also have the rewarewa (*Knightia excelsa*) and titoki (*Alectryon excelsum*), or else they have become very rare. The mountain cabbage-tree (*Cordyline indivisa*) is now to be seen projecting its stately crown above the tops of *Pittosporum Colensoi, Panax Colensoi*, and other small trees that form the forest-margin. Mountain flax (*Phormium Cookianum*), is also a new accession to the flora. The soil in this locality is generally a light-brown volcanic loam.

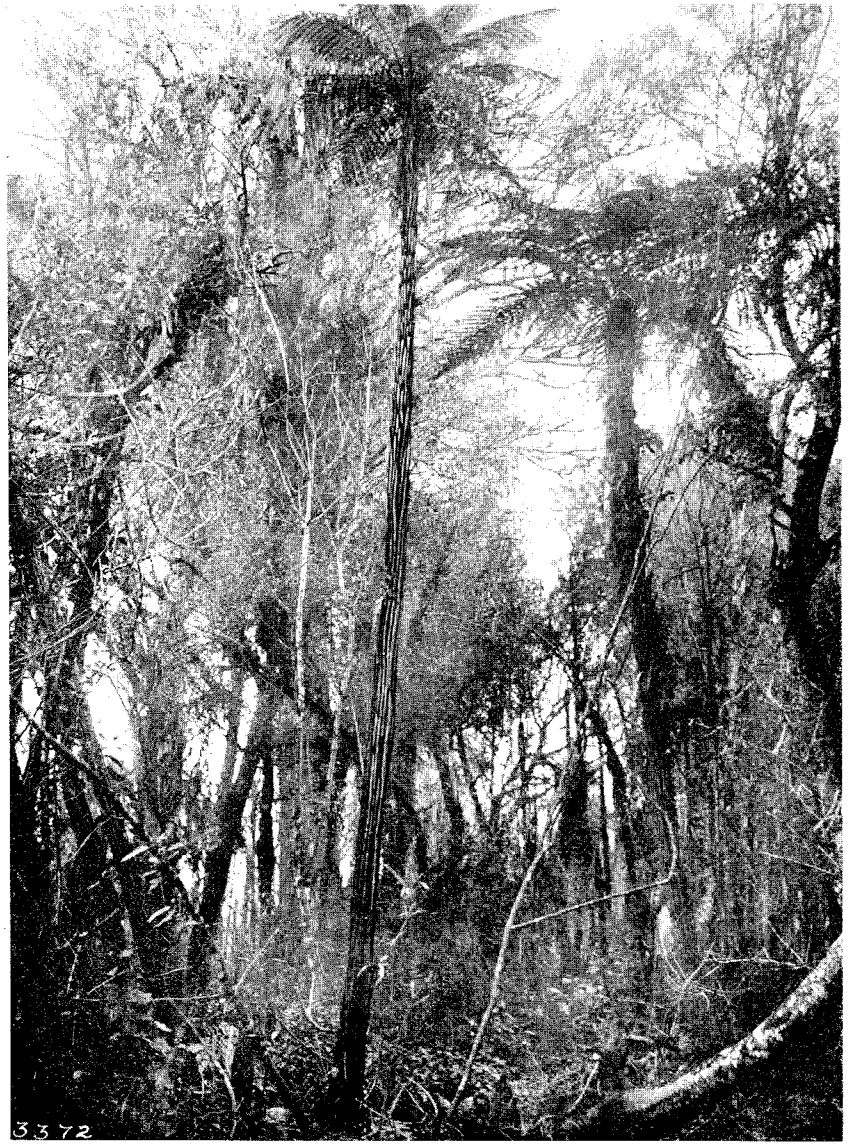
As one ascends from Raurimu, rimu and matai, though still abundant, become much smaller in size. On the higher spurs near the Spiral short-barrelled totara (both the common and Hall's) and kaikawaka (*Libocedrus Bidwillii*) become very plentiful. On the Waimarino table-land a height of about 2,600 ft. above sea-level is reached. Here the forest differs largely from that at an altitude of 1,000 ft. Of the forest-trees, tawhero (*Weinmannia racemosa*) is predominant; there is an abundance of *Griselinia littoralis*, white and black maire (*Olea lanceolata* and *O. Cunninghamii*), toro (*Myrsine salicina*), and kaikawaka (*Libocedrus Bidwillii*); rimu (*Dacrydium cupressinum*) and matai (*Podocarpus spicatus*) are still plentiful, though rather stunted; the silver-pine (*Dacrydium Colensoi*) and the two totaras (rather dwarfed) are both present in fair quantity; *Cordyline indivisa* is common; *Senecio Kirkii* is seen perched in the forks of the biggest trees; the forest is fringed with a dense growth of *Phyllocladus alpinus, Aristotelia fruticosa, Panax anomalum, Melicytus lanceolatus*, korimoko (*Veronica salicifolia*), *Panax Colensoi* and *P. simplex, Pittosporum Colensoi*, and *Coprosma foetidissima, C. cuneata*, and *C. parviflora*. The short and almost trunkless tree-fern (*Dicksonia lanata*) is fairly plentiful; but *Cyathea dealbata, Dicksonia squarrosa, Hemitelia Smithii*, and *Dicksonia fibrosa* are present only in small numbers; and in places the beautiful *Todea superba* is the chief covering of the forest-floor, often giving to the scene the enchanting beauty of fairyland. The undershrubs within the forest are chiefly *Drimys axillaris, Drimys colorata, Alseuosmia quercifolia, Coprosma tenuifolia, C. foetidissima*, and *C. grandifolia*, and *Myrtus pedunculata*, and *Fuchsia excorticata*.

The bush lying to the west of the railway between Waimarino and Erua Stations carries some rather rare plants—viz., *Aristotelia Colensoi*; one specimen of *Panax arboreum* var. *laetum* was found. *Panax simplex* var. *parvum*; and *Pittosporum rigidum* (here a bushy-topped tree, 15 ft. high, and with mature leaves 1 in. long) was found growing in a clump of *Olearia virgata* scrub on the Waimarino Stream; close by the latter were several shrubs of *Hymenanthera dentata* var. *angustifolia*, exhibiting, like the *Pittosporum rigidum*, extreme variation in the size and shape of the leaves; *Olearia nitida* var. *capillaris* is also found here; and in the bush the ferns *Trichomanes reniforme* and *Lindsaya trichomanoides* were seen; this was the only locality where I found this *Lindsaya*, but it probably grows on the lower slopes. The *Hoheria populnea* and *Plagianthus betulinus* (lacebarks) are here only rarely seen; tawa is represented only by occasional small specimens; *Podocarpus dacrydioides* is rare, *Cordyline australis* has only a few (but big) specimens. The lianes *Muehlenbeckia australis* and *Muehlenbeckia complexa, Rubus australis, Rubus cissoides*, and *Rubus schmideloides, Parsonsia heterophylla*, and *Clematis indivisa* are all plentiful.

The Waimarino Steppe.

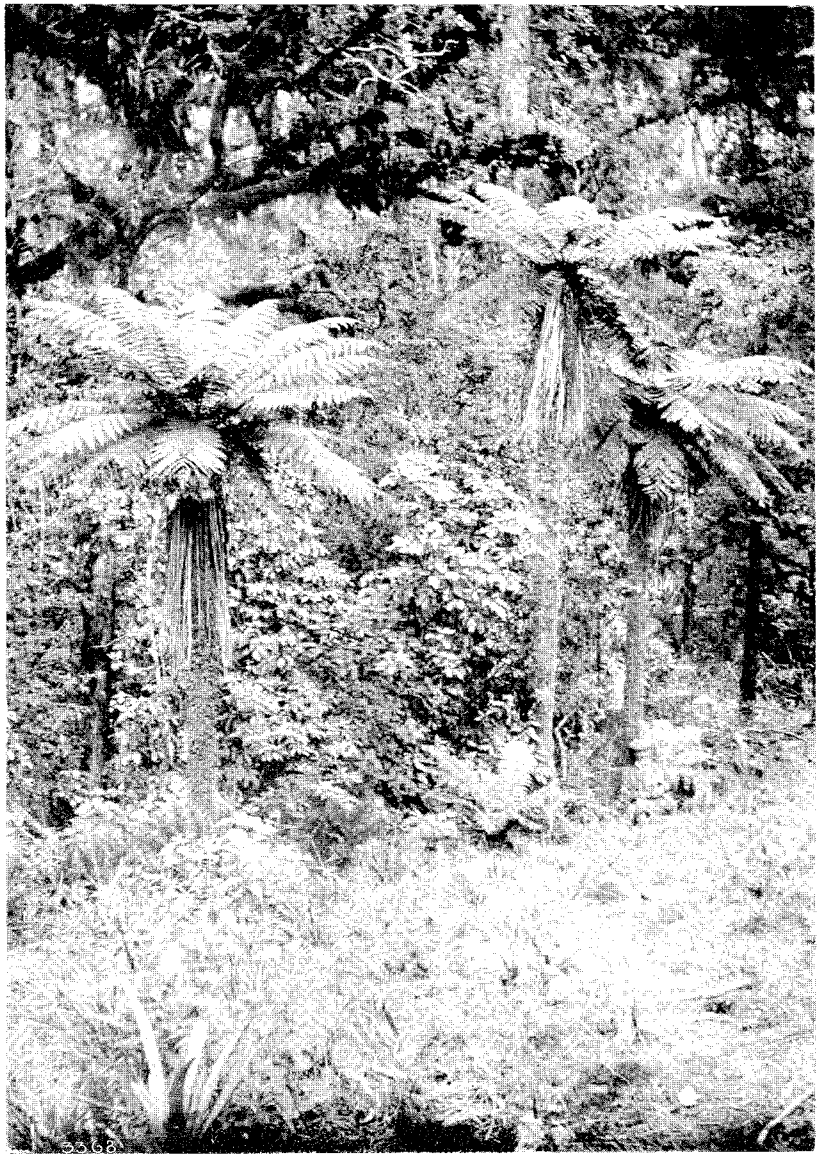
Lying between Waimarino Station and Hauhungatahi Mountain, and trending generally in a north-easterly direction, is the Waimarino grass and shrub steppe, containing roughly some 150,000 acres of land. When viewed from Hauhungatahi this plain has the appearance of an extensive and irregular sandy desert lying spread out below the zone of forest that clothes the lower slopes of the mountain. Examined from its own surface, however, this apparent desert proves to be an extensive alternation of peaty bogs and narrow dry tongues of land. The bogs bear a vegetation composed

GROUP OF MAMAKU TREE-FERNS (*Cyathea medullaris*).
The trunk shows the scars left by the old stipites.



THE SLENDER TREE-FERN (WHEKI), (*Dicksonia squarrosa*).
The bases of the old stipites adhere persistently to the trunk.
[*C. T. Salmon, photo.*

THE FIBROUS TREE-FERN (*Dicksonia fibrosa*).
Showing the persistent habit of the dead fronds.
C. T. Salmon, photo.



THE TREE-FERN *Hemitelia Smithii*.
Showing the persistent habit of the dead rachides.

mainly of *Carex*, stunted *Phormium*, *Craspedia uniflora*, *Epilobium*, *Drosera*, *Hypolaena*, *Carpha*, and *Celsmisia longifolia*. The dry tongues are clothed principally with *Danthonia Raoulii*, *Poa Caespitosa*, *Hierochloe redolens* (sweet-scented holy grass, "Karetu" of the Maoris), manoao (*Dracophyllum subulatum*), spear-grass, *Aciphylla squarrosa*, *Coprosma depressa*, *Uncinia rubra*, hawkweed, and native dandelion (*Microseris Forsteri*), *Celmisia longifolia* and *Celmisia glandulosa*, *Euphrasia cuneata*, *Viola Cunninghamii*, *Leucopogon Frazeri*, *Pimelea laevigata*, *Epacris alpina*, *Gaultheria antipoda*, *Wahlenbergia saxicola*, *Gleichenia dicarpa*, *Lomaria alpina*, *Lycopodium scariosum*, *Herpolirion novae-zelandiae* and the orchids *Thelymitra longifolia* and *Microtis porrifolia*; there are also occasional poor specimens of tea-tree (*Leptospermum scoparium*), which here has a hard fight to maintain its place with other competitors.

The plants in this association are at all times of interest to the nature-lover; but in summer the bright blooms of the euphrasias, celmisias, native violets, orchids, native dandelion, the sparkling berries of the dwarf coprosma, the snowy or deep-red berries of the gaultheria, and the delicately blue-tinted flowers of the wahlenbergia cannot fail to claim the attention and admiration of all who pass over them.

This grass-steppe has once carried a dense growth of the small conifers *Dacrydium Bidwillii*, *Dacrydium Colensoi*, and *Phyllocladus alpinus*, as in many places their dead stems may be found beneath the surface of the more swampy parts. It seems probable that this growth has been destroyed by a shower of hot ashes from one of the craters of the Tongariro cones. The trees on the dry places would be consumed, while those growing in the swampy places would only be killed, and, afterwards falling, would sink into the soft wet ground and be preserved.

Along the small streams traversing this grassy plain are fringes or patches of scrub which consists principally of *Olearia virgata*, *Coprosma propinqua*, *Aristotelia fruticosa*, *Carmichaelia flagelliformis*, *Veronica salicina*, *Panax Colensoi*, *Pittosporum Colensoi*, *Phyllocladus alpinus*, *Coriaria ruscifolia*, *Coriaria thymifolia*, *Myrsine divaricata*, *Gaultheria rupestris*, and occasional plants of *Fagus cliffortioides*, *Corokia cotoneaster*, and one or two *Pittosporum rigidum* plants. The *Pittosporum rigidum* here grows to the abnormal height of 15 ft., and shows extreme variation in size and shape of its leaves. Being accustomed previously only to the dwarf form (perhaps 18 in. high) that grows on the eastern side of the volcanoes, it was with astonishment that I received Mr. Cheeseman's decision that the two plants are one and the same species. In this scrub fringe are an abundance of the ferns *Aspidium aculeatum* var. *vestitum*, *Hypolepis tenuifolium*, *Lomaria alpina*, *Lomaria capensis*, *Lomaria fluviatilis*, *Gleichenia Cunninghamii*, and *Polypodium punctatum*, with *Phormium tenax* and *Arundo conspicua*.

On that part of the plain intersected by the Mangahuia and Whakapapa Streams, at an elevation of about 2,800 ft., the mountain-beech (*Fagus cliffortioides*) predominates to such an extent that the forest here might be called a mountain-beech forest, the only conifers being *Libocedrus Bidwillii* and *Phyllocladus alpinus*, with an occasional *Dacrydium Colensoi* and *Podocarpus Hallii*. The other chief plants are broadleaf (*Griselinia littoralis*), tawhero (*Weinmannia racemosa*), pokaka (*Elaeocarpus Hookerianus*), *Panax Colensoi*, and *Panax simplex*. The undergrowth is principally *Coprosma tenuifolia* and *C. foetidissima*, *Myrtus pedunculata*, *Aristotelia fruticosa*, horopito (*Drimys axillaris* and *Drimys colorata*), *Coprosma cuneata*, *Veronica salicifolia*, *Pittosporum Colensoi*, *Leucopogon fasciculatus*, and *Gaultheria antipoda*, *Gleichenia Cunninghamii*, *Lomaria discolor* and *L. capensis*, and *Cordyline indivisa* are in abundance. This association of plants extends from the junction of the Mangahuia and Whakapapa-iti to the forest-limit up the slopes of Ruapehu.

There are numerous openings in the forest in this locality which carry the same plant covering as that above described for the grass-steppe. These openings have probably been caused by fires made by Maoris as they passed at different times from Taupo and Rotoaira to old settlements at Makaretu and Moturoa.

In the neighbourhood of Erua, which is about 2,600 ft. above sea-level, and along the lower slopes of the volcanic mountain Hauhungatahi the forest is composed principally of tawhero (*Weinmannia racemosa*), white maire (*Olea lanceolata*), black maire (*Olea Cunninghamii*), rimu (*Dacrydium cupressinum*), matai (*Podocarpus spicatus*), *Podocarpus Hallii*, kaikawaka (*Libocedrus Bidwillii*), broadleaf (*Griselinia littoralis*), miro (*Podocarpus ferrugineus*), toro (*Myrsine salicina*), *Coprosma tenuifolia*, *C. foetidissima*, and *C. grandifolia*, *Fuchsia excorticata*, horopito (*Drimys colorata* and *D. axillaris*), *Dacrydium Colensoi*, *Myrtus pedunculata*, papapa (*Alseuosmia quercifolia*), putaputaweta (*Carpodetus serratus*), houhou (*Panax Colensoi*), *Panax simplex*, *Panax anomalum*, lancewood (*Pseudopanax crassifolium*), karamu (*Coprosma robusta*), *Aristotelia racemosa*, *Pittosporum Colensoi*, *Schefflera digitata*, *Coprosma cuneata*, *Coprosma parviflora*, and *Coprosma Colensoi*. In this association, which is about a quarter of a mile wide and rises about 700 ft. above the plain, fern and moss life are abundant. *Todea superba*, *Lomaria discolor*, *Lomaria Pattersoni*, *Lomaria lanceolata*, *Aspidium aculeatum* var. *vestitum* are the chief. On the trunks of the cedar (*Libocedrus Bidwillii*) the remarkable and beautiful fern *Hymenophyllum Mallingii* is abundant; and I may here remark I found it on both dead and living trees of the cedar, and on one occasion on the trunk of a *Dacrydium intermedium*.

From a height of about 3,200 ft. to about 3,800 ft. there are only occasional stunted rimu (*Dacrydium cupressinum*), *Libocedrus Bidwillii* having now become the most plentiful tree; tawhero (*Weinmannia racemosa*) is still present; Hall's totara (*Dacrydium Colensoi* and *Dacrydium intermedium*) are plentiful. The uppermost zone of forest is mostly *Phyllocladus alpinus*, *Dacrydium intermedium*, *Dacrydium Colensoi*, *Dacrydium Bidwillii*, *Panax Colensoi*, *Panax simplex*, *Coprosma foetidissima*, *Coprosma cuneata*, and *Coprosma parviflora*, and the grass *Gahnia pauciflora*.

Above the last-described association one comes to a mixed growth of subalpine shrubs, grasses, and herbs, principally *Senecio Bidwillii*, *Olearia nummularifolia*, *Cassinia Vauvilliersii*, *Veronica laevis* *Veronica buxifolia*, *Veronica tetrayona*, *Pimelea buxifolia*, *Panax Colensoi*, *Dracophyllum recurvum*,

Dracophyllum subulatum, *Gaultheria rupestris*, *Leucopogon Fraseri*. *Podocarpus nivalis*, *Dacrydium laxifolium*, and *Phyllocladus alpinus*. There are also prominent the herbaceous plants *Celmisia spectabilis*, *Celmisia longifolia*, *Celmisia incana*, *Celmisia glandulosa*, *Helichrysum bellidioides*, *Ourisia macrophylla*, *Ourisia Colensoi*, *Euphrasia cuneata*, *Gentiana bellidifolia*, and *Ranunculus nivicola*: *Poa Colensoi*, *Danthonia Raoulii*, and *Hierochloe redolens* abound. *Carpha alpina* is also much in evidence. The foregoing plants extend up through the boggy slopes almost uniformly to two or three hundred feet from the rocky summit (about 5,000 ft.), where there are only a few gaultherias, celmisias, dracophyllums, *Totara nivalis*, *Veronica tetragona*, *Coprosma depressa*, *Poa Colensoi*, &c., with lichens and mosses, to represent the vegetable kingdom.

In the valley lying between Hauhungatahi and Ruapehu are large patches of mountain-beech forest, between which are boggy spaces carrying the shrubs, herbs, &c., that other similar localities in the district carry.

Travelling from Erua in a southerly direction to Pokaka, the same approximate altitude of 2,600ft. is kept; and the predominating forest-trees are tawhero (*Weinmannia racemosa*), *Olea lanceolata*, *Griselinia littoralis*, *Myrsine salicina*, *Panax arboreum*, *Carpodetus serratus*, *Elaeocarpus Hookerianus*, *Libocedrus Bidwillii*, *Dacrydium cupressinum*, *Podocarpus spicatus*, *Podocarpus ferrugineus*, *Podocarpus dacrydioides*, and some *Fagus Solandri*; with the usual undergrowth of *Coprosma tenuifolia*, *Coprosma grandifolia*, and *Coprosma foetidissima*, *Drimys axillaris*, *Drimys colorata*, *Myrtus pedunculata*, with an abundance of the ferns *Todea superba*, *Aspidium aculeatum* var. *vestitum*, and *Lomaria discolor*. The giant astelia (*Astelia nervosa*), *Enargea marginata*, and *Cordyline indivisa* now form prominent features in the forest. The *Cordyline indivisa* (mountain cabbage-tree) almost takes possession of any neglected bush-clearing, and forms beautiful avenues along the roadsides. It is a shame that this queen of lilies should have a name that associates it with the kitchen-garden. Unfortunately, my best picture of it was spoiled. In the accompanying photo it is represented by only small specimens.

In this stretch of country lie the Makatote* and Manganui-a-te-ao Gorges, and, being some 300 ft. deep, they naturally carry plants that are not seen on the table-land above. For instance, *Fagus cliffortioides* is found on the gorge-sides, *Cladium Sinclairii*, *Dracophyllum longifolium*, *Coriaria ruscifolia*, *Coriaria thymifolia*, *Gaultheria rupestris*, *Gaultheria antipoda*, *Lomaria vulcanica*, *Senecio latifolius*, *Olearia nitida*, *Arundo conspicua*, *Veronica catarractae*, *Ourisia macrophylla*, *Calceolaria repens*, *Carmichaelia flagelliformis*, *Leptospermum scoparium*, *Cyathodes acerosa*, *Raoulia tenuicaulis*, *Helichrysum bellidioides*, and the subalpine plants *Ranunculus insignis*, *Veronica Hookeriana*, *Gentiana bellidifolia*, *Celmisia spectabilis*, *Cassinia Vauvilliersii*, and *Senecio Bidwillii* here and there make their appearance on the river-beds.

Travelling due west from Pokaka Station, though the altitude remains about the same, the dominant *Libocedrus* gradually lessens, and at a distance of about three miles from the railway the forest approaches in constitution that growing at the 1,500 ft. level. The chief tree components are rimu (*Dacrydium cupressinum*), growing much more luxuriantly than in the last-described localities, matai (*Podocarpus spicatus*), miro (*Podocarpus ferruginea*), *Weinmannia racemosa*, *Griselinia littoralis*, *Olea lanceolata*, *Myrsine salicina*, *Carpodetus serratus*, *Pennantia corymbosa*, *Panax arboreum*, *Pseudopanax crassifolium*, *Elaeocarpus Hookerianus*, *Olea Cunninghamii*, *Panax Edgerleyi*, *Elaeocarpus dentatus*, *Podocarpus dacrydioides*, *Coprosma Colensoi*, *Plagianthus betulinus*, and *Dacrydium Colensoi*; the undergrowth is principally *Aristotelia racemosa*, *Drimys colorata* and *D. axillaris*, *Fuchsia excorticata*, *Coprosma tenuifolia* and *C. grandifolia*, *Panax Colensoi*, *Myrtus pedunculata*, *Coprosma foetidissima*, *Melicytus ramiflorus* and *M. lanceolatus*, *Brachyglottis repanda*, and *Coprosma parviflora*. Tree-ferns are more plentiful, the chief being *Dicksonia fibrosa* and *Hemitelia Smithii*, with occasional *Dicksonia squarrosa* and *Cyathea dealbata*. Of small ferns, *Todea superba*, *Lomaria discolor*, *Lomaria fluviatilis*, *Lomaria lanceolata*, *Lomaria Pattersoni*, *Lomaria capensis*, *Pteris incisa*, *P. scaberula*, and *P. aquilina*, *Hypolepis distans*, *Hypolepis tenuifolia*, *Asplenium falcatum*, *A. flaccidum*, and *A. bulbiforum*, *Aspidium aculeatum* var. *vestitum*, *Polypodium Billardieri*, *P. novae-zelandiae*, and *P. grammitidis*, *Hymenophyllum pulcherrimum*, *H. demissum*, and *H. rarum*, are all plentiful. The lianes are *Rubus australis*, *R. cissoides*, and *R. schmideloides*, *Muehlenbeckia australis* and *M. complexa*, *Parsonsia heterophylla* and *P. capillaris*, *Clematis indivisa*, and *Metrosideros hypericifolia*; the *Rhipogonum scandens* is still noticeable by its absence. The soil in this locality is still a light-brown volcanic loam.

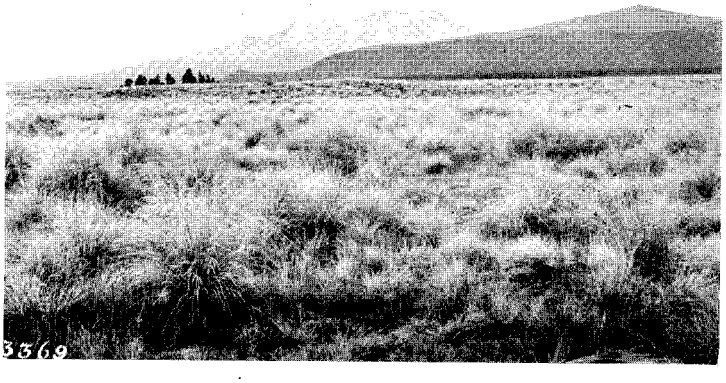
Progressing from Pokaka, still at the same altitude, in a southerly direction to Horopito, one traverses between the *Fagus* and taxad zone; on the west the forest is composed mostly of rather stunted *Dacrydium cupressinum* (rimu), *Podocarpus spicatus* (matai), *Podocarpus ferruginea*, *Libocedrus Bidwillii* (cedar), *Podocarpus dacrydioides*, and occasional *Dacrydium Colensoi*. Between the railway and the base of Ruapehu the forest-trees are mostly *Fagus*, *Weinmannia racemosa*, *Griselinia littoralis*, *Panax arboreum*, *Elaeocarpus Hookerianus*, with an occasional rimu, kaikawaka, totara, and matai. The chief shrubs and smaller trees are *Myrtus pedunculata*, young *Fagus Solandri*, *Panax simplex* and *P. anomalum*, *Coprosma tenuifolia* and *C. foetidissima*, *Myrsine divaricata*, *Pseudopanax crassifol um*, *Leucopogon fasciculatus*, *Cyathodes acerosa*, *Coprosma robusta*, *C. propinqua*, *C. Colensoi*, *C. cuneata*, and *C. parviflora*. *Astelia nervosa* is plentiful on the mossy floor. In this locality I found growing on a rotten tree-trunk one or two very large specimens of the orchid *Chiloglottis cornuta*. At about three miles from the railway the *Fagus Solandri* gives place to the *Fagus fusca* and *Fagus Menziesii*, which continue to the outer zone of forest, where *Fagus cliffortioides* takes their place, and becomes the dominant tree.

Advancing from Horopito to Ohakune (which is 2,000 ft. high) the taxads again become more vigorous, and another more noticeable change is the occasional instrusion of wedges of rata (*Metro-*

* "Makatote" (which is locally mispronounced "Makkatote") is a contraction of the Maori "Manga katote"—*manga* meaning a branch of a river, and *katote* being the name of the tree-fern *Hemitelia Smithii*.

THE SILVER TREE-FERN (PONGA), (*Cyathea dealbata*).
Showing the spreading habit of the fronds.

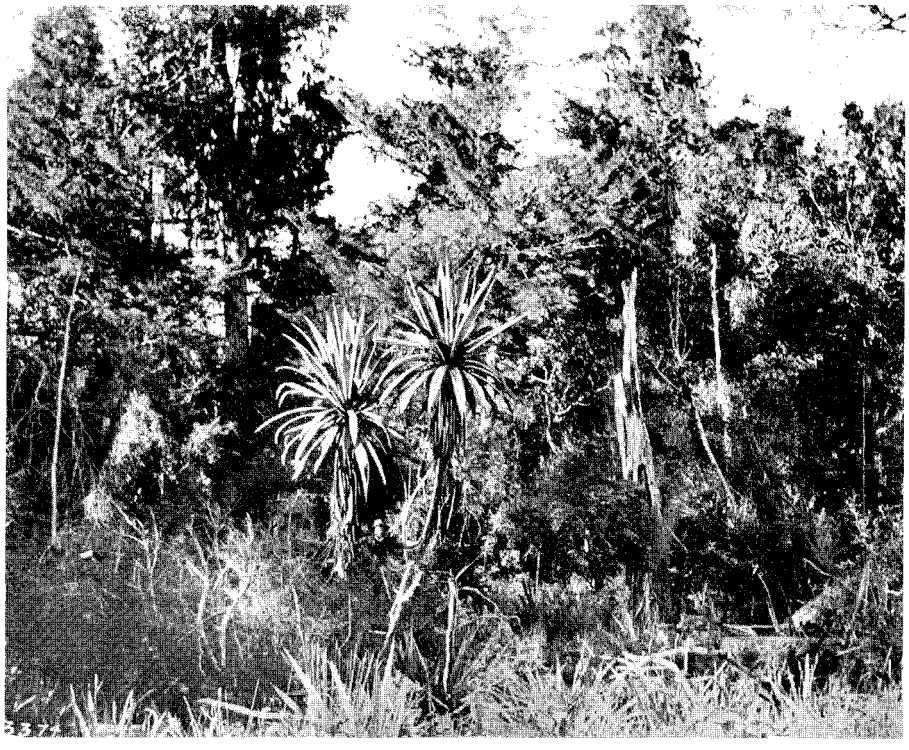
[*C. T. Salmon, photo.*



THE WAIMARINO "GRASS STEPPE," WITH *Danthonia Raoulii*.
Hauhungatahi and Ruapehu in background.

Face p. 4.]

[*Mr. Moore, photo.*



THE TOI (*Cordyline indivisa*) IN HIGHLAND FOREST.
[*T. A. Johnston, photo.*

THE NEW ZEALAND CEDAR (PAHAUTEA), (*Libocedrus Bidwillii*), AT HOROPITO.
[*T. A. Johnston, photo.*

sideros robusta). These wedges of rata, it may be remarked, occur on or in the vicinity of spurs formed by old flows of andesitic lava; and near Ohakune Station the rata abounds on the slopes between some small craters and the steep shell-limestone hill called Raetihi. In this locality, growing on an *Olea lanceolata* I found a solitary specimen of *Pittosporum Kirkii*, perched in the forks of the highest trees in this locality are frequently seen the epiphytic daisy shrub (*Senecio Kirkii*) which, when in full flower, looks like a mass of snow. The summits of the flat-topped hills Raetihi and Rongokoupa are clothed chiefly with *Fuchsia excorticata*, tawhero (*Weinmannia racemosa*) and broadleaf (*Griselinia littoralis*). Down the course of the Mangawhero River there is a considerable wedge of *Fagus Solandri* with some *Fagus fusca* and *Fagus Menziesii*.

Around Ohakune and towards the Raetihi Township rimu is the prevailing large tree; tawhero, matai, miro, black and white maire are also abundant; whilst white-pine (*Podocarpus dacrydioides*) is plentiful in the swampy parts. The accompanying undergrowth has several new accessions here: there is an increased quantity of *Alseuosmia quercifolia*; *Melicytus ramiflorus* is fairly plentiful; *Gahnia xanthocarpa* is common, also *Hoheria populnea* var. *lanceolata*, *Pennantia corymbosa*, *Paratrophis heterophylla*, and tawa (*Beilschmiedia tawa*). Here alone in the region under description I found a solitary plant of the parasite *Tupeia antarctica* growing on *Olea lanceolata*. The ferns *Asplenium Hookerianum* var. *Colensoi* and the orchid *Adenochilus gracilis* were also found in this locality. In the Ohakune locality, perhaps, a greater variation is to be expected, as the presence of several small craters proves that volcanic action has here been particularly great; and when the original plant covering was destroyed the new growth would be almost certain to contain some plants that were not formerly there. These craters are features of considerable geological interest. They are not merely the small craters that are often formed when lava from a big volcano flows over a swampy piece of land, and the gas generated by the combustion of the underlying organic matter explodes, and forms a crateral hollow. The same convulsion which produced Ruapehu may have produced these craters; but that they are otherwise unconnected with Ruapehu is, I think, proved by the existence between them and Ruapehu of the Raetihi hill, which is composed of unaltered shell-limestone rock.

From Ohakune to Rangataua there is practically no change from the last-described association of plants; but beyond Rangataua to the end of the forest on the Karioi Plains the beeches have descended in full strength; here, however, the black-beech (*Fagus Solandri*) is subordinate to *Fagus fusca* and *Fagus Menziesii*. Taxads are represented only by occasional rimu (*Dacrydium cupressinum*) and matai (*Podocarpus spicatus*). There is here little variation in the undergrowth; the beautiful lace-fern is not so plentiful, *Lomaria discolor*, *Lomaria Pattersoni*, and *Aspidium aculeatum* var. *vestitum* sharing between themselves the ascendency. *Coprosma rotundifolia* and *Coprosma rhamnoides* are common, and there is a greater prevalence of the divaricating shrubs *Myrsine divaricata*, *Panax anomalum*, *Elaeocarpus Hookerianus*, and *Aristotelia fruticosa*; the beautiful *Cordyline indivisa* is here, also, abundant. This beech forest continues uninterrupted for eight miles towards Ruapehu, giving out only on the appearance of *Phyllocladus alpinus* and *Fagus cliffortioides*. There is this, however, to be noticed: that on the lowest elevation *Fagus Solandri* predominates, on the next higher *Fagus fusca*, and then *Fagus Menziesii*, till the *Fagus cliffortioides* is reached at an altitude of about 3,600 ft.

Why these plants should be found in the associations that they are found in can only be conjectured. As far as I have experienced, and from what I am informed by those who have a longer experience than I of the areas described, the climatic conditions all over are fairly similar. There is a heavy winter and spring rainfall over all the district; frosts in winter are severe; snow falls often; and winds are, I believe, far less frequent here than in any other part of the Dominion: I have now spent in this district two summers and one spring, which are the windiest seasons in other parts of New Zealand, whilst here the usual condition has been one of comparative atmospheric tranquillity. That there should be a marked difference between the vegetation on the spurs and foothills of Ruapehu and that on a plateau 1,000 ft. lower is easily comprehended; for in these cases, in addition to the marked difference in climate, there is also a great difference in soil-condition. On the slopes of Ruapehu the soil consists mostly of small particles of rock chemically little altered; whereas on the plains the soil is generally a fine volcanic loam, which (though originally of the same composition as the other) has been more easily altered by the action of air and water, as the particles were finer.

The wedges of beech that penetrate the taxad forest may be the result of a volcanic discharge of hot sand or lapilli which have destroyed the original plant covering; the beech having succeeded as being the most suited to withstand the resulting exposed situation, and the (as yet) imperfect soil.

A notable feature, perhaps, of the district described is the number of plants with polymorphic characteristics. The photographs show specimens of the white hinau (*Elaeocarpus Hookerianus*), lancewood (*Pseudopanax crassifolium*), *Panax arboreum*, and *Panax anomalum*. Before obtaining its mature leaves, the white hinau bears three other forms of leaf; sometimes all four forms are found together on young plants; but as a rule the leaves and habit of growth (very divaricating) of the young plant differ so much from the adult that many people, when told that the two plants are one and the same species, would be incredulous. Few, also, would recognise the very close relationship that there is between *Panax arboreum*, with its large, glossy, digitate leaves and open habit of growth, and the *Panax anomalum*, close-set, and with minute, lustreless leaves. I have already referred to the remarkable difference there is in appearance and habit of different specimens of *Pittosporum rigidum*. The lancewood is a tree so peculiar that most people have their attention attracted to it whenever they are in the bush; but a complete stranger, seeing the young and the old tree for the first time, would find it difficult to believe they were identical in species.

A tree that is very plentiful in Waimarino forests is the tawhero, towai, or kamahi (*Weinmannia racemosa*); in fact, in many parts it is the dominant tree. It starts its life as a seedling in another tree that is decaying, and very often on a tree-fern. As it grows it sends down several aerial roots, which

in the end kill the tree-fern, and, afterwards coalescing, serve as an ordinary tree-trunk. From irregular coalition the trunks have frequently quite a network appearance. The epiphytic habit is also very common with the *Panax* genus; and *Panax Edgerleyi* and *Panax arboreum* are frequently seen growing high up on the trunks of tree-ferns, which will eventually be killed by the treacherous embraces of the aerial roots of the *Panax*.

Another very plentiful plant in the bush is the red horopito (*Drimys colorata*), the bright-red leaves of which serve as compensation for the general absence of coloured flowers.

It is remarkable how plants that are the most assertive in the lower plains give way to others in this table-land. The manuka (*Leptospermum scoparium*) and bracken (*Pteris aquilina*), appear only as weakly specimens of their kind. Tree-ferns are far less plentiful than in lower districts, the two that are most seen being *Dicksonia fibrosa* and *Hemitelia Smithii*, both of which have their stems protected by a thick coating of fibre. *Cythea medullaris* disappears at an altitude of about 1,100 ft.

The Forest economically considered.

The Waimarino Forest probably carries in its timber the most valuable crop it will ever produce. In several localities rimu and matai are so plentiful that they are the chief forest-trees. The Maori owners of the land in some instances get as much as £8 an acre solely for the timber-rights. The bush worked by one sawmill in the Kakahi locality I was told was yielding 40,000 sup. ft. of rimu, totara, and matai to the acre. The bush in the Ohakune locality in several places yields over 20,000 sup. ft. of rimu, matai, and white-pine to the acre.

The kaikawaka, or mountain-cedar (*Libocedrus Bidwillii*) is very plentiful in the Waimarino district. The mills do not yet convert it, but when its value is known there should be a strong demand for it, for it is quite equal to Australian cedar.

Maire is very abundant, but, as steel is now so much used for the purposes for which it is valuable, the commercial value of it is doubtful. It is the strongest wood in the world, and it is also very durable.

The red-beech (*Fagus fusca*) is admitted to be durable and strong, but it has many defects which make it unsuitable for building purposes. It will soon, however, become of value for fencing purposes; and, Powellised, it may be of value for railway-sleepers; it is fairly tough and should hold the rails well.

The Waimarino Grass-steppe.

The altitude of the Waimarino plain or grass-steppe is 2,600 ft. above sea-level. The winters are severe; and the soil is of a poor pumiceous nature. The land, therefore, will never be of value for farming purposes; consequently, I think it would be a most suitable locality to reforest. Round the borders of the steppe trees of varied nature flourish, so there should be no difficulty in finding trees of commercial value to re-cover what (practically considered) is now almost a useless waste. Many portions of the plain are, indeed, boggy; but there is a good fall, and draining would be a matter of no difficulty.

E. Phillips Turner,
Inspector of Scenic Reserves.

LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST.

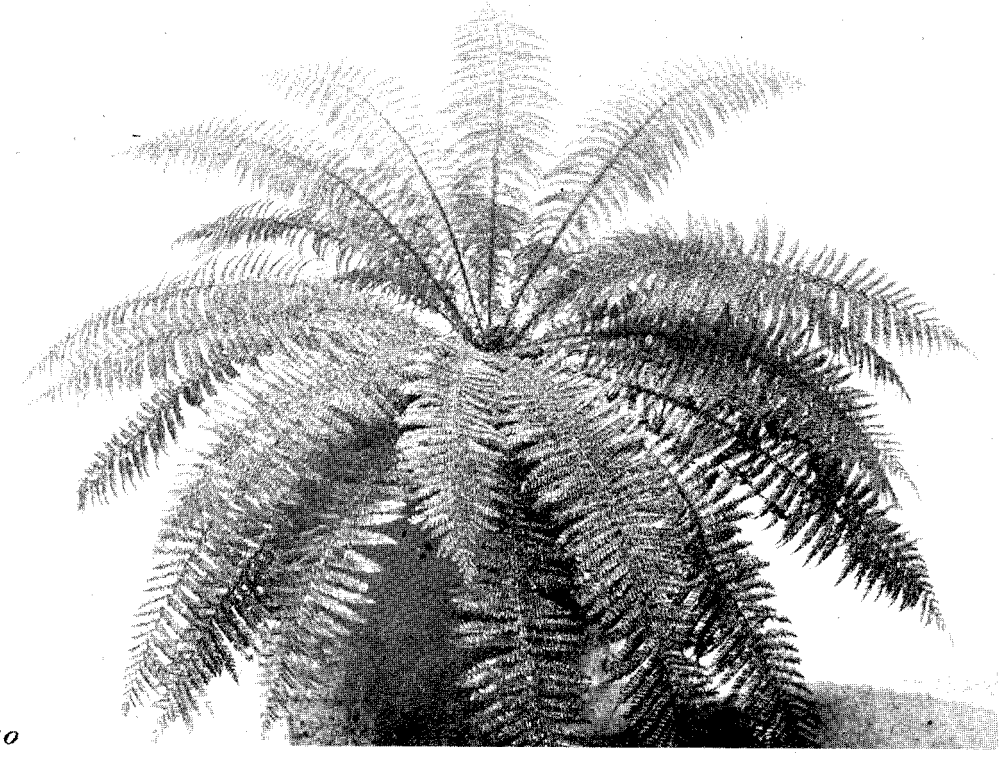
Explanation of Abbreviations used.

N. = Northern botanical province of New Zealand. C = Central botanical province of New Zealand. S. = Southern botanical province of New Zealand. Ch. = Chatham Islands province. Sub. = New Zealand subantarctic islands province. Ker. = Kermadec Islands province. End. = Endemic. Aus. = Australia and Tasmania. S.A. = South American and subantarctic. Pol. = Polynesia. Mal. = Malay and South Asian. Cos. = Generally distributed in tropical or temperate lands.

Natural Order and Species.	Maori Name.	English Name.	Distribution.		
			Beyond New Zealand, or Endemic.	Within New Zealand.	In the Waimarino Forest.
Ranunculaceae.					
Clematis indivisa	Puawhananga	Clematis	End.	N. C. S.	Forest.
Ranunculus insignis		Mountain-buttercup	End.	C. S.	Bed of Maungaturuturu River.
—— nivicola			End.	C.	Hauhungatahi and river-beds.
—— hirtus	Maruru	Common N.Z. buttercup	Aus.	N. C. S. Ch.	Grass-steppe.
—— rivularis	Waoriki	Marsh-buttercup	End.	N. C. S. Ch.	By streams and swamps.
Magnoliaceae.					
Drimys axillaris	Horopito	Pepper-tree	End.	N. C. S.	Lower forest.
—— colorata	Horopito	Pepper-tree	End.	N. C. S.	Forest; abundant.

THE CRAPE-FERN (*Todea superba*), FORMING THE FOREST-FLOOR.

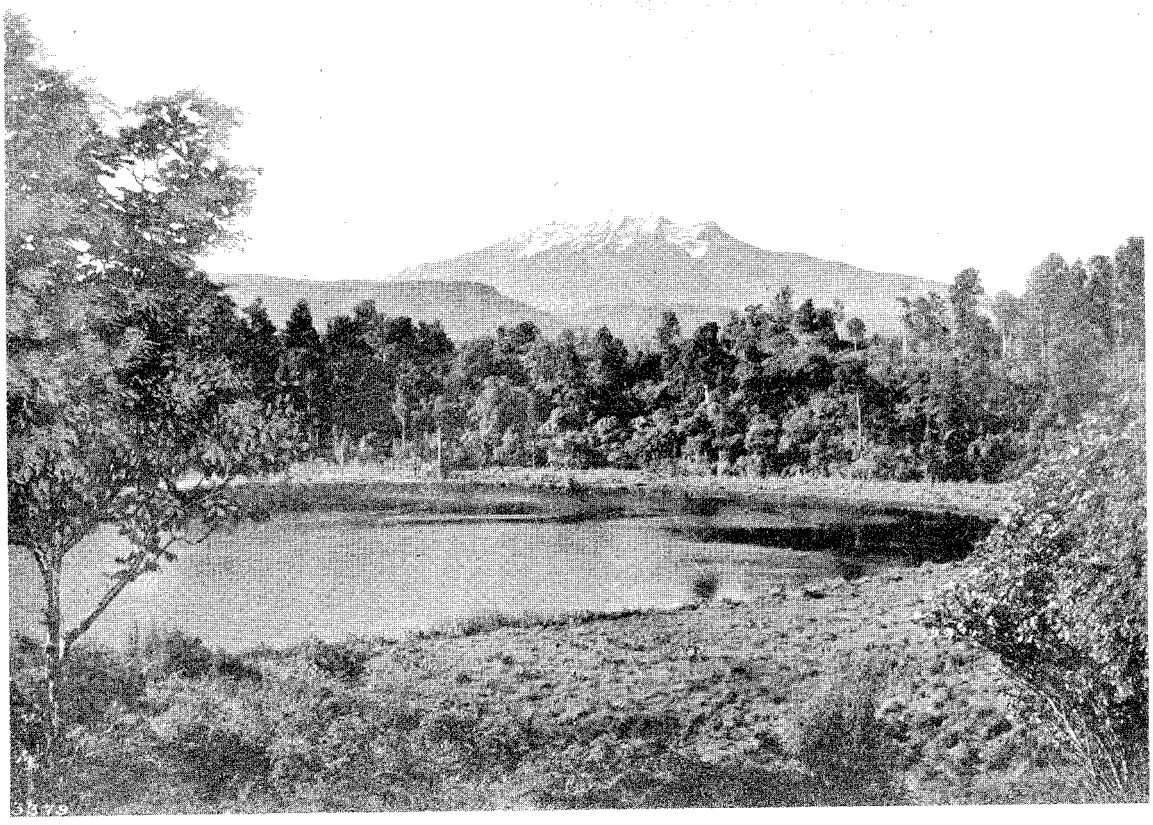
[*C. T. Salmon, photo.*



THE CRAPE-FERN (*Todea superba*).

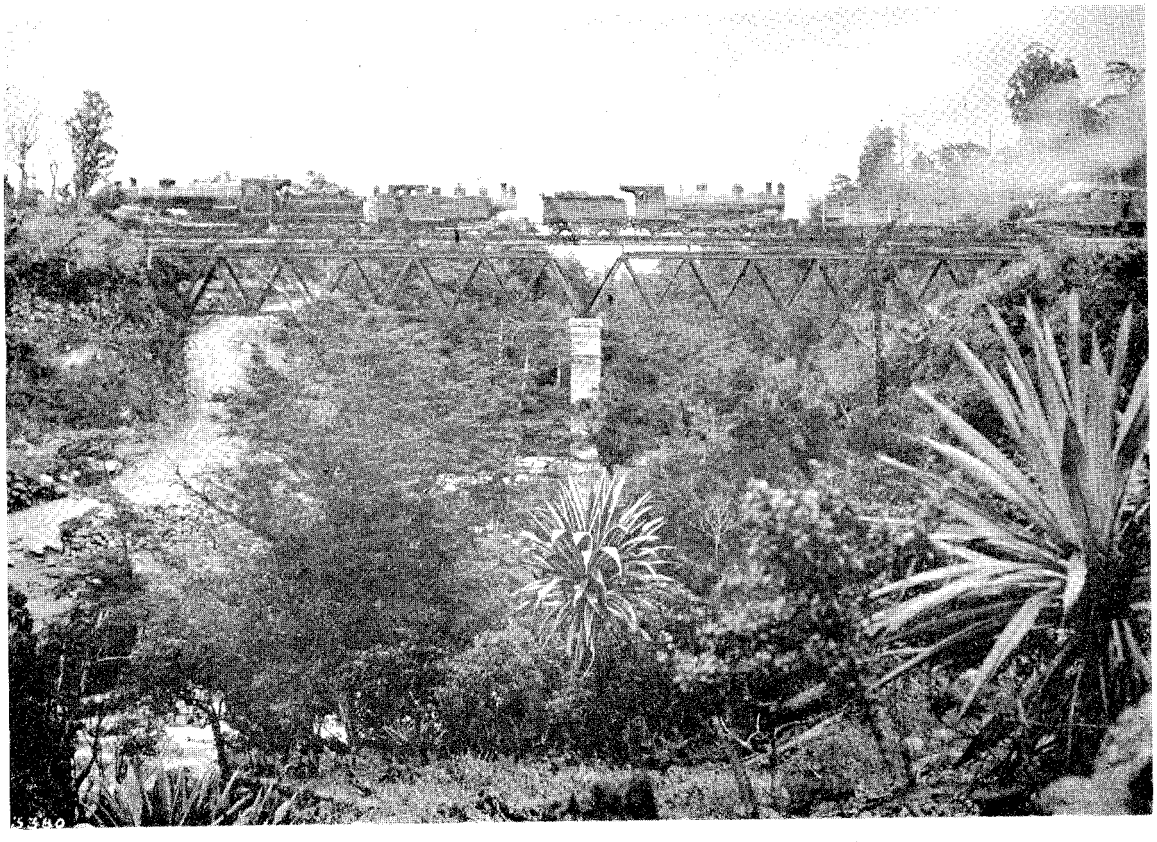
[*C. T. Salmon, photo.*

Face p. 6.]



The Margin of a Taxad Forest at Rangataua Crater-lake.
Ruapehu in background, and midway between Raetihi Hill, a limestone bluff.

[*Mr. Lilley, photo.*



Facies Forest in Gorge of the Manganui-a-te-Ao.
Cordyline indivisa in foreground.

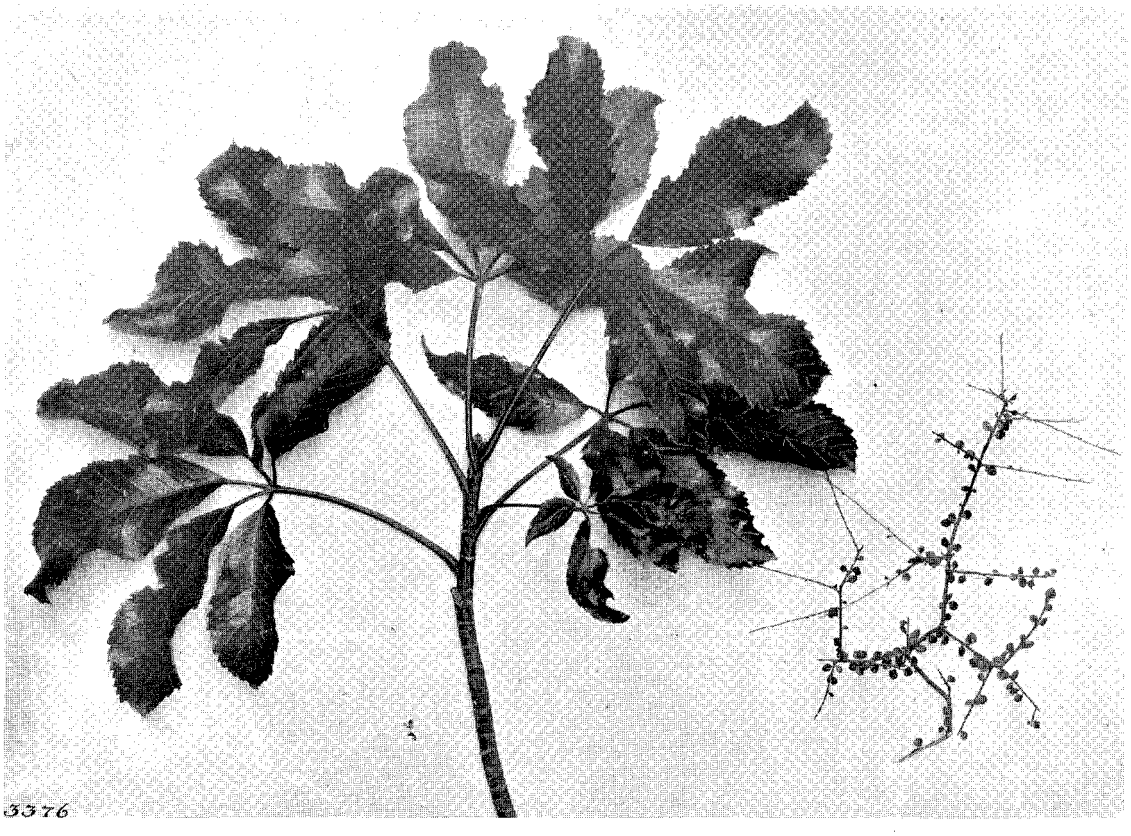
[*Mr. Lilley, photo.*

LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued.*

Natural Order and Species.	Maori Name.	English Name.	Distribution.		
			Beyond New Zealand, or Endemic.	Within New Zealand.	In the Waimarino Forest.
CRUCIFERAE.					
Cardamine hirsuta	..	Hairy bittercress	Cos. temp.	N. C. S. Ch. Sub.	Forest, near streams.
VIOLARIEAE.					
Viola filicaulis	..	..	End. ..	N. C. S.	Forest.
——— Cunninghamii ..	..	Common N.Z. violet	Aus. ..	C. S. ..	Swampy places.
Melicytus ramiflorus ..	Mahoe ..	Whitewood ..	Pol., Norfolk Island.	N. C. S.	Lower forest.
——— lanceolatus	..	..	End. ..	N. C. S.	Higher forest.
Hymenanthera dentata var. angustifolia	..	..	Aus. ..	C. S. ..	By stream in scrub.
PITTOSPOREAE.					
Pittosporum tenuifolium ..	Kohuhu or tawhiri	..	End. ..	N. C. S.	Lower forest and scrub.
——— Colensoi	..	..	End. ..	C. S. ..	Forest and scrub.
——— rigidum	..	..	End. ..	C. S. ..	15 ft. high; by stream in Waimarino grass-steppe.
——— Kirkii	..	..	End. ..	N. ..	Higher forest.
——— cornifolium ..	..	..	End. ..	N. C. ..	Forest.
——— eugenioides ..	Tarata ..	Lemon-wood ..	End. ..	N. C. S.	Lower forest-margin and in scrub.
MALVACEAE.					
Plagianthus betulinus ..	Manatu ..	Lacebark ..	End. ..	N. C. S. Ch.	Forest-margin to 2,500 ft.
Hoheria populnea var. lanceolata	Houhere ..	Lacebark ..	End. ..	N. C. S.	Forest-margin to 2,200 ft.
TILIACEAE.					
Aristotelia racemosa ..	Makomako ..	Wineberry ..	End. ..	N. C. S.	Forest, common.
——— Colensoi	..	..	End. ..	C. S. ..	Forest-margin.
——— fruticosa	..	..	End. ..	N. C. S.	Margins of higher forests and scrub.
Elaeocarpus Hookerianus ..	Pokaka ..	..	End. ..	N. C. S.	General in forests.
——— dentatus	Hinau ..	..	End. ..	N. C. S.	Forest to 2,400 ft.
GERANIACEAE.					
Geranium microphyllum ..	..	Small-leaved cranesbill	End. ..	N. C. S. Sub.	Grass-steppe.
Oxalis corniculata var. ciliifera	..	..	..	N. C. S. Ker.	Forest-opening.
RUTACEAE.					
Melicope simplex	..	..	End. ..	N. C. S.	Forest; common.
OLACINEAE.					
Pennantia corymbosa ..	Kaikomako ..	..	End. ..	N. C. S.	Forest; common.
CORIARIEAE.					
Coriaria ruscifolia	Tutu tupakihi	..	S. A. ..	N. C. S. Ch.	Forest by streams and in open country.
——— thymifolia	Tutupapa ..	..	S. A. ..	C. S. ..	By streams in high forest and open country.
LEGUMINOSAE.					
Carmichaelia flagelliformis ..	Taunoka ..	N.Z. broom ..	End. ..	N. C. S.	Grass-steppe and by lower streams.
Sophora tetraptera ..	Kowhai ..	N.Z. laburnum	S. A. ..	N. C. S. Ch.	By streams at margin of lower forest.
ROSACEAE.					
Rubus australis	Tataramoa ..	Bush-lawyer ..	End. ..	N. C. S.	Forest and scrub at lower levels.
——— cissoides	..	Bush-lawyer ..	End. ..	N. C. S.	Forest.
——— schmideloides ..	..	Bush-lawyer ..	End. ..	N. C. S.	Forest on Hauhungatahi, &c.
Acaena novae-zelandiae ..	Piripiri ..	N.Z. burr ..	End. ..	N. C. S.	Grass-steppe and bush-roads.
——— sanguisorbae ..	Piripiri ..	N.Z. burr ..	Aus., Tristan da Cunha	N. C. S. Ch. Sub.	Forest.
——— microphylla var. depressa	..	..	End. ..	C. S. ..	Grass-steppe.
SAXIFRAGEAE.					
Weinmannia racemosa ..	Kamahi, towai, tawhero	..	End. ..	N. C. S.	Forest, and by streams in open.
DROSERACEAE.					
Drosera arcturi	..	Alpine sundew	Aus. ..	C. S. ..	Hauhungatahi bogs.
——— spathulata	..	Spoon-leaved sundew	Aus. ..	N. C. S.	Bogs near Erua.
——— binata	..	..	Aus. ..	N. C. S.	Bogs near Erua.

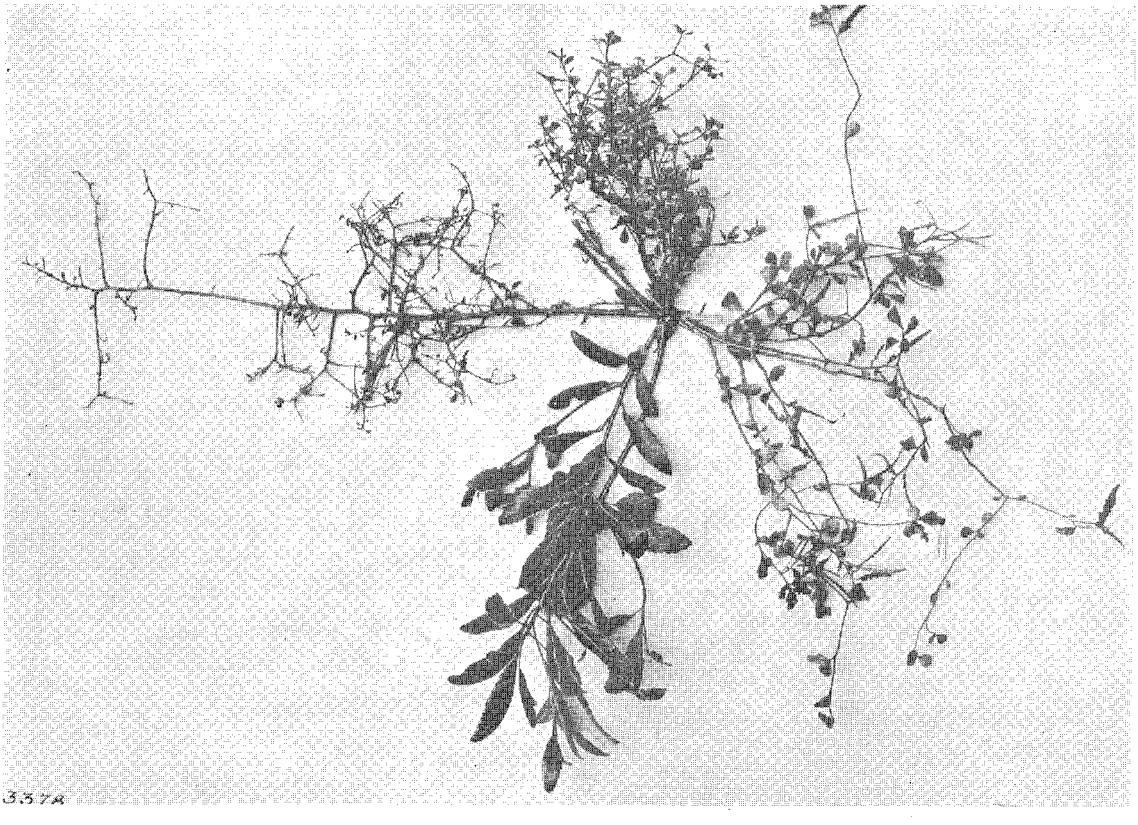
LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued.*

Natural Order and Species.	Maori Name.	English Name.	Distribution.		
			Beyond New Zealand, or Endemic.	Within New Zealand.	In the Waimarino Forest.
HALORAGEAE.					
Haloragis depressa	..	..	Aus.	N. C. S.	Bog near Pokaka.
Gunnera monoica	..	..	..	N. C. S. Ch.	Common on wet banks.
MYRTACEAE.					
Leptospermum scoparium	Manuka, kahikatoa	Tea-tree	Aus.	N. C. S.	Margin of forest, and by streams in open.
—— ericoides	Manuka	White tea-tree	End.	N. C. S.	In open and by river-banks in forest.
Metrosideros hypericifolia	..	Rata	End.	N. C. S.	On trunks of forest-trees and tree-ferns.
—— Colensoi	..	Rata	End.	N. C. ..	At Ohakune, on forest-trees and tree-ferns.
—— scandens	Aka	Rata	End.	N. C. ..	Near Ohakune, on forest-trees and tree-ferns.
—— robusta	Rata	..	End.	N. C. S.	Forest, but local.
Myrtus pedunculata	Rahutu	..	End.	N. C. S.	Forest.
ONAGRARIEÆ.					
Epilobium nummularifolium var. pedunculare	..	Long-stemmed willow-herb	End.	N. C. S. Sub.	In bed of sulphur-stream. Horopito.
—— pallidiflorum	..	..	Aus.	N. C. S. Ch.	Swamp in Pokaka Forest.
—— junceum var. macrophyllum	..	Tall willow-herb	Aus.	N. C. S.	Plentiful in scorched forest at Pokaka.
—— pubens	..	..	Aus.	N. C. S. Ch.	Forest near Pokaka.
—— insulare	..	..	End.	N. C. S. Ch.	On roads through forest.
—— glabellum	..	Glossy-leaved willow-herb	End.	N. C. S.	Beds of rivers in high country.
Fuchsia excorticata	Kotukutuku	Fuchsia	End.	N. C. S.	In all forest.
PASSIFLOREAE.					
Passiflora tetrandra	Kohia	..	End.	N. C. ..	In bush near Kakahi.
UMBELLIFERAE.					
Aciphylla squarrosa	Taramea kurikuri	Spear-grass	End.	C. S. ..	Grass-steppe.
Ligusticum aromaticum	..	..	End.	C. S. ..	Hauhungatahi, Mangaturuturu Stream, &c.
ARALIACEAE.					
Panax simplex	Haumakaroa	..	End.	N. C. S. Sub.	Common in forest.
—— simplex var. parvum	..	..	End.	C. S. ..	Forest near Ohakune.
—— Edgerleyi	Raukawa	Lemon-wood	End.	N. C. S.	Common in forest.
—— anomalum	Wauwaupaku	Shrubby panax	End.	N. C. S.	Forest.
—— —— var. microphyllum	..	..	End.	C. S. ..	Forest, Ohakune.
—— Sinclairii	..	..	End.	N. C. ..	Highest forest.
—— Colensoi	Houhou	Ivy-tree	End.	N. C. S.	Forest, and sub-scrub.
—— arboreum	Houhou	Ivy-tree	End.	N. C. S. Ker.	Forest.
—— —— var. laetum	..	..	End.	N. C.	Forest west of Erua.
Schefflera digitata	Patete	..	End.	N. C. S.	Forest; common.
Pseudopanax crassifolium	Horoeka, hohoeka	Lancewood	End.	N. C. S.	Forest; common.
CORNACEAE.					
Corokia cotoneaster	..	..	End.	N. C. S.	By stream near Erua.
Griselinia littoralis	Papauma	Broadleaf	End.	N. C. S.	Common in forest.
CAPRIFOLIACEAE.					
Alseuosmia quercifolia	Papapa	N.Z. honeysuckle	End.	N. C. ..	Common in forest.
RUBIACEAE.					
Coprosma grandifolia	Raurekau kanono	..	End.	N. C. ..	Common in forest.
—— lucida	Karamu	Yellow-wood	End.	N. C. S.	Forest and scrub.
—— robusta	Karamu	..	End.	N. C. S.	Forest and scrub.
—— Cunninghamii	Mingimingi	..	End.	N. C. S.	By streams and forest-margin.
—— tenuifolia	..	Soft-leaved coprosma	End.	N. C. ..	Forest.
—— rotundifolia	..	Round-leaved coprosma	End.	N. C. S.	Forest.
—— tenuicaulis	..	..	End.	N. C. ..	Kaitieke forest.
—— rhamnoides	..	..	End.	N. C. S.	Edge of forests.
—— —— var. divaricata	..	..	End.	C. (N. and S.?)	Edge of forests.



Houhou (*Panax arboreum*); and *P. anomalum*.

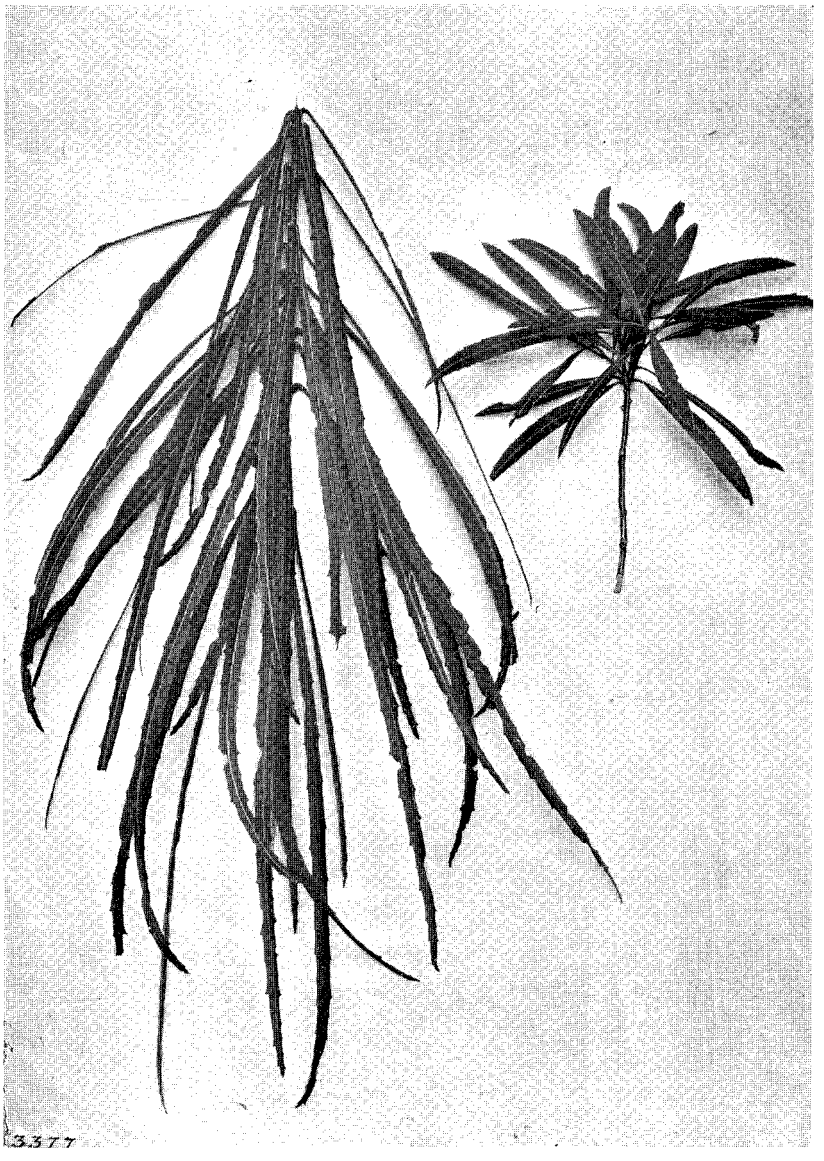
The large leaves are those of the houhou (*Panax arboreum*); the small specimen is *Panax anomalum*, showing its minute leaves and divaricating habit.



Heterophylly: Four Different Leaves which may be found at one time on the Pokaka (*Elæocarpus Hookerianus*).

The largest are the adult form.

Face p. 8.]



HETEROPHYLLY: LANCEWOOD (*Pseudopanax crassifolium*).

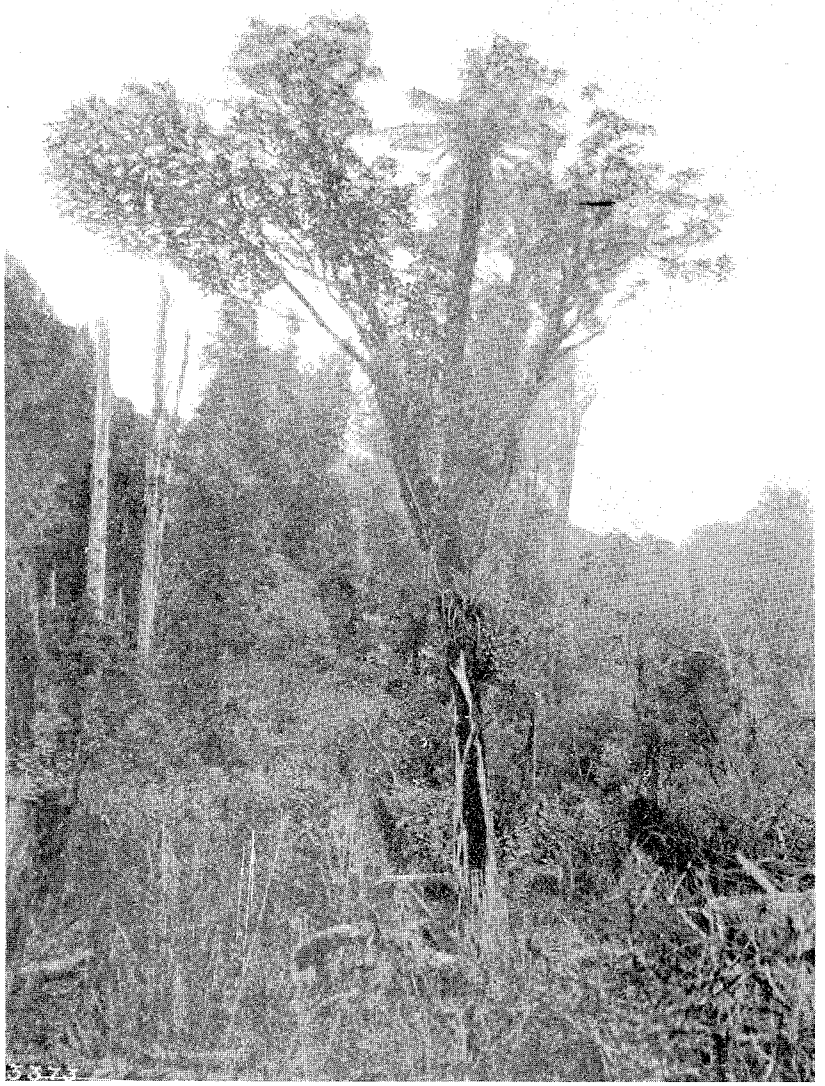
The long are the juvenile and the short the adult leaves.

LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued.*

Natural Order and Species.	Maori Name.	English Name.	Distribution.		
			Beyond New Zealand, or Endemic.	Within New Zealand.	In the Waimarino Forest.
RUBIACEAE—*continued.*					
Coprosma parviflora ..	..	..	End. ..	N. C. S. Sub.	Common in high forests.
—— acerosa var. brunnea	Tataraahake ..	..	End. ..	N. C. S.	Grass-steppe.
—— propinqua	Mingimingi ..	..	End. ..	N. C. S. Ch.	Forest, and by streams in scrub country.
—— foetidissima	Hupiro, karamu	Stinkwood ..	End. ..	N. C. S. Sub.	Common in higher forests
—— Colensoi	..	..	End. ..	N. C. S.	Forest.
—— cuneata	..	..	..	C. S. Sub.	In highest forests.
—— depressa	..	..	End. ..	C. S. ..	Waimarino Plain and Hauhungatahi.
COMPOSITAE.					
Lagenophora petiolata ..	..	N.Z. daisy ..	End. ..	N. C. S.	Abundant everywhere.
Olearia nitida	..	Daisy-tree ..	End. ..	C. S. ..	Common by streams.
—— ——var. capillaris ..	..	..	End. ..	C. ..	On bank of Waimarino Stream near forest.
—— Cunninghamii ..	Heketara ..	..	End. ..	N. C. ..	Lower forests.
—— nummularifolia ..	..	..	End. ..	C. S. ..	Hauhungatahi and Maungaturuturu Stream.
—— virgata	..	..	End. ..	C. S. ..	Common by streams in open country.
Celmisia incana	..	..	End. ..	N. C. S.	Hauhungatahi.
—— spectabilis	..	Cotton-plant ..	End. ..	C. S. ..	Hauhungatahi.
—— longifolia	..	..	End. ..	N. C. S.	Grass-steppe, &c.
—— —— var. graminifolia	..	..	End. ..	..	Grass-steppe and bog.
—— —— var. gracilenta	..	..	End. ..	N. C. S.	Grass-steppe.
—— glandulosa	..	Bog-celmisia ..	End. ..	C. S. ..	Bogs and wet ground.
Gnaphalium keriense ..	..	..	End. ..	N. C. S.	Banks of streams.
—— luteo-album ..	..	..	End. ..	N. C. S. Ker. Sub.	Common on edge of bush and plains.
Raoulia tenuicaulis ..	..	..	End. ..	N. C. S.	In river-beds.
Helichrysum bellidioides ..	..	Mountain-daisy	..	C. S. Ch. Sub.	Hauhungatahi and river-beds.
—— filicaule	..	..	End. ..	C. S. Ch.	Waimarino Plains.
Cassinia Vauvilliersii ..	..	..	End. ..	C. S. Sub.	Hauhungatahi and river-beds.
Brachyglottis repanda ..	Pukapuka rangiora	Rangiora ..	End. ..	N. C. ..	Lower forest.
Senecio latifolius	..	..	End. ..	N. C. S.	In gorges.
—— Kirkii	..	..	End. ..	N. C.	Ohakune, Kaitieke, and Hauhungatahi.
—— Bidwillii	..	..	End. ..	C. S. ..	Hauhungatahi.
Microseris Forsteri	..	..	Aus. ..	C. S. ..	Grass-steppe.
STYLIDEAE.					
Oreostylidium subulatum ..	..	..	End. ..	C. S. ..	Grass-steppe.
COMPANULACEAE.					
Pratia angulata	..	..	End. ..	N. C. S.	Near streams.
Wahlenbergia gracilis ..	..	..	Aus. ..	N. C. S. Ch.	Karioi Plains, near forest.
—— saxicola	..	Bluebell ..	End. ..	C. S. ..	Grass-steppe.
ERICACEAE.					
Gaultheria antipoda ..	Tumingi ..	Snowberry ..	End. ..	N. C. S.	In scrub and by rivers.
—— antipoda var. fluviatilis	..	..	End. ..	N. C. S.	Near streams.
—— —— var. depressa	..	Snowberry ..	Aus. ..	C. S. ..	Grass-steppe near forests.
—— perplexa	..	..	End. ..	C. S. ..	Bed of highland streams and edge of forest.
—— rupestris	..	..	End. ..	N. C. S.	Hauhungatahi, &c.
—— rupestris var. lanceolata	..	..	End. ..	C. S. ..	Landslip in forest near Erua.
—— fagifolia	..	..	End. ..	C. ..	Whakapapa River banks.
—— oppositifolia ..	..	..	End. ..	C. ..	Cliffs on Whakapapa River.
EPACRIDEAE.					
Pentachondra pumila ..	..	..	Aus. ..	N. C. S.	Grass-steppe.
Cyathodes acerosa	Mingi ..	..	Aus. ..	N. C. S.	Forest on highlands.
—— empetrifolia ..	..	..	End. ..	N. C. S. Sub.	Steppe.
Leucopogon fasciculatus ..	Mingimingi ..	..	End. ..	N. C. S.	Forest and scrub.
—— Fraseri	..	..	Aus. ..	N. C. S.	Grass-steppe and scrub.
Epacris alpina	..	..	End. ..	C. S. ..	Hauhungatahi and steppes.
Dracophyllum recurvum ..	..	..	End. ..	C. ..	Hauhungatahi.
—— longifolium ..	Maka ..	Grass-tree ..	End. ..	C. S. Sub.	Steep banks of rivers.
—— subulatum	Manoao ..	..	End. ..	N. C. ..	Steppes and on river-beds

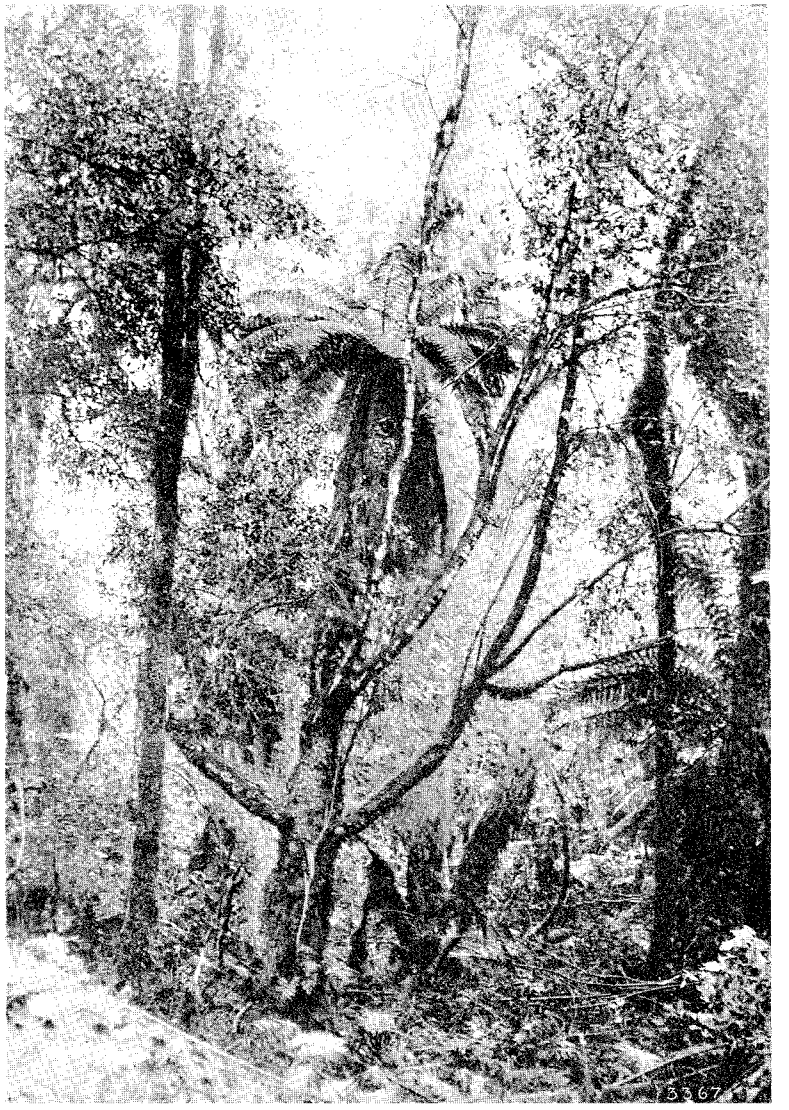
LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued*.

Natural Order and Species.	Maori Name.	English Name.	Distribution.		
			Beyond New Zealand, or Endemic.	Within New Zealand.	In the Waimarino Forest.
MYRSINEAE.					
Myrsine salicina	Toro		End.	N. C.	Forest.
—— Urvillei	Mapau, tipau	Red-birch	End.	N. C. S.	In bush near Kakahi.
—— divaricata ?			End.	N. C. S.	Forest and margin.
OLEACEAE.					
Olea Cunninghamii	Maire raunui	Black maire	Aus.	N. C.	Forest.
—— lanceolata	Maire	White maire	Aus.	N. C.	Forest.
APOCYNACEAE.					
Parsonsia heterophylla	Kaiku		End.	N. C. S.	Forest.
—— capsularis	Akakiore (?)		End.	N. C. S.	Forest.
LOGANACEAE.					
Geniostoma ligustrifolium	Hangehange		End.	N. C.	Kakahi forest.
GENTIANEAE.					
Gentiana Griesbachii		Small N.Z. gentian	End.	C. S.	Near Mangawhero River, Ohakune.
—— bellidifolia		Common N.Z. gentian	End.	C. S.	Grass-steppe, Hauhungatahi, &c.
BORAGINEAE.					
Myosotis Forsteri			End.	N. C. S.	Kaitieke Forest.
SCROPHULARINEAE.					
Calceolaria repens			End.	C. S.	Kaitieke Bush, and gorges.
Veronica salicifolia	Koromiko		End.	N. C. S.	Forest-margins.
—— laevis			End.	C.	Hauhungatahi, &c.
—— buxifolia			End.	C. S.	Hauhungatahi, &c.
—— tetragona			End.	C.	Hauhungatahi and river-beds.
—— catarractae var. diffusa			End.	N. C. S.	River-banks.
—— Hookerianum			End.	C.	Mangaturuturu River bed.
Ourisia macrophylla			End.	C. S.	Hauhungatahi and river-beds in highlands.
—— Colensoi			End.	C. S.	Bogs in highlands.
Euphrasia cuneata			End.	C. S.	Grass-steppe.
GESNERACEAE.					
Rhabdothamnus Solandri	Waioatua		End.	N. C.	In bush at Kakahi.
VERBENACEAE.					
Teucridium parvifolium			End.	N. C. S.	Banks of Whakapapa near Kakahi.
POLYGONACEAE.					
Muehlenbeckia australis			Pol.	N. C. S.	Ohakune Forest.
—— complexa	Pohuehue		End.	N. C. S.	Forests generally
—— axillaris			Aus., Pol.	C. S.	Grass-steppe.
LAURINEAE.					
Beilschmiedia tawa	Tawa		End.	N. C. S.	Lower forest.
PROTEACEAE.					
Knightia excelsa	Rewarewa	Honeysuckle	End.	N. C.	Lower forests.
THYMELAEACEAE.					
Pimelea buxifolia			End.	N. C.	Grass-steppe and Hauhungatahi.
—— laevigata			End.	N. C. S.	Grass-steppe, and scrub.
Drapetes Dieffenbachii			End.	N. C.	Hauhungatahi.
LORANTHACEAE.					
Loranthus micranthus			End.	N. C. S.	Forest at Kakahi.
—— tetrapetalus		Scarlet mistletoe	End.	N. C. S.	Ohakune beech forest and Whakapapa beech forest.
—— Colensoi		Scarlet mistletoe	End.	C. S.	Karioi beech forest.
—— flavidus		Yellow mistletoe	End.	C. S.	Beech forests at Ohakune, &c.
—— Tupeia antarctica	Pirita	Green mistletoe	End.	N. C. S.	On maire in taxad forest, Ohakune.
URTICACEAE.					
Paratrophis heterophylla	Turepo	Milk-tree	End.	N. C. S.	Lower forests.
Urtica ferox	Ongaonga	Tree-nettle	End.	N. C. S.	Near Ohakune.
—— incisa			Aus.	N. C. S.	Kaitieke Forest.
CUPULIFERAE.					
Fagus Menziesii	Tawhai	Silver-beech	End.	N. C. S.	Higher forest.
—— fusca	Tawhai raunui	Red-beech	End.	N. C. S.	Higher forest.
—— Solandri	Tawhai rauriki	Black-beech	End.	C. S.	Higher forest.
—— cliffortioides	Tawhai rauriki	Mountain-beech	End.	C. S.	Highest forest.



THE RAUKAWA (*Panax Edgerleyi*) GROWING AS AN EPIPHYTE ON THE TREE-FERN *Hemitelia Smithii*.

[*C. T. Salmon, photo.*



THE HOUHOU (*Panax arboreum*) GROWING AS AN EPIPHYTE FROM THE TRUNK OF THE TREE-FERN *Dicksonia fibrosa*.

[*C. T. Salmon, photo.*

The Rata (*Metrosideros robusta*).

[*C. T. Salmon, photo.*

LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued.*

Natural Order and Species.	Maori Name.	English Name.	Distribution.		
			Beyond New Zealand, or Endemic.	Within New Zealand.	In the Waimarino Forest.
CONIFERAE.					
Libocedrus Bidwillii ..	Pahautea, kaikawaka	Mountain-cedar	End. ..	N. C. S.	Higher forests.
Podocarpus totara	Totara ..	Totara ..	End. ..	N. C. S.	Lower forests.
——— Hallii	Totara ..	Mountain-totara	End. ..	N. C. S.	Higher forests.
——— nivalis	..	Creeping totara	End. ..	N. C. S.	Hauhungatahi.
——— ferrugineus ..	Miro, toromiro	Black-pine ..	End. ..	N. C. S.	Common in forest.
——— spicatus	Matai ..	Black-pine ..	End. ..	N. C. S.	Common in forest.
——— dacrydioides ..	Kahikatea ..	White-pine ..	End. ..	N. C. S.	Common in forest.
Dacrydium biforme ..	..	Yellow-pine ..	End. ..	C. S. ..	Hauhungatahi Forest.
——— Bidwillii	..	..	End. ..	N. C. S.	Base and on Hauhungatahi.
——— cupressinum ..	Rimu ..	Red-pine ..	End. ..	N. C. S.	Common in forest.
——— intermedium ..	..	..	End. ..	N. C. S.	Hauhungatahi.
——— Colensoi	Manoao ..	Silver-pine ..	End. ..	N. C. S.	Common in higher forest.
Phyllocladus alpinus ..	Toatoa ..	..	End. ..	N. C. S.	Common in highlands fringing forest.
ORCHIDEAE.					
Earina mucronata	..	..	End. ..	N. S. C. Ch.	Taxad forests.
——— suaveolens	..	..	End. ..	N. C. S.	Lower forests.
Spiranthes australis ..	..	..	Aus. ..	N. C. ..	Bog near Erua.
Thelymitra longifolia ..	Makaika ..	..	Aus. ..	N. C. S. Ch. Sub.	Grass-steppe.
——— uniflora	..	..	End. ..	N. C. S.	Grass-steppe and bogs.
Microtis porrifolia	..	..	Aus. ..	N. C. S. Ker.	Grass-steppe.
Prasophyllum Colensoi ..	..	..	End. ..	N. C. S. Sub.	Grass-steppe.
Pterostylis Banksii	..	Hooded orchid	End. ..	N. C. S. Ch.	Edge of forests.
——— graminea	..	..	End. ..	N. C. S.	Edge of forests.
Chiloglottis cornuta ..	..	..	End. ..	N. C. S. Ch. Sub.	Forest between railway and Ruapehu, 2,700 ft.
Adenochilus gracilis ..	..	..	End. ..	C. S. ..	Between Ohakune and Ruapehu in beech forest.
Corysanthes triloba	..	..	End. ..	N. C. S.	In gorges on banks.
——— macrantha	..	..	End. ..	N. C. S. Ch. Sub.	In gorges on banks.
IRIDEAE.					
Libertia pulchella	..	..	Aus. ..	N. C. S.	Forest, damp places.
LILIACEAE.					
Rhipogonum scandens ..	Kareao ..	Supplejack ..	End. ..	N. C. S. Ch.	In forest below 2,000 ft.
Enargea marginata ..	Puwatawata ..	..	S.A. ..	N. C. S.	Forest.
Cordyline Banksii	Tikapu whanaki	..	End. ..	N. C. ..	Makatote and other gorges
——— australis	Ti, ti-kauka, tirahau	Cabbage-tree, palm-lily	End. ..	N. C. S.	Common below 2,000 ft.
——— indivisa	Toi ..	Mountain cabbage-tree	End. ..	N. C. S.	Forest openings in highlands.
Astelia Cunninghamii ..	Puwharawhara	..	End. ..	N. C. ..	On forest-trees.
——— nervosa	..	Bush-flax ..	End. ..	N. C. S. Ch.	Common in damp forests.
Dianella intermedia ..	Turutu ..	Blueberry ..	Pol., Norfolk Island	N. C. S.	Bush gorges.
Phormium tenax	Harakeke ..	N.Z. flax ..	Norfolk Island	N. C. S. Ch. Sub.	In the lower open country.
——— Cookianum	Whaririki ..	Mountain-flax	Norfolk Island	N. C. S.	In the higher open country
Artropodium candidum ..	Rengarenga ..	..	End. ..	N. C. S.	Kaitieke and Erua Bush.
Herpolirion novae-zelandiae ..	..	..	Aus. ..	C. S. ..	Wet places in grass-steppe.
JUNCACEAE.					
Juncus vaginatus	..	..	Aus. ..	N. C. ..	Swampy forest opening. Pokaka.
——— effusus	Wiwi ..	Rush ..	Cos. ..	N. C. S.	Swampy forest openings, Pokaka, &c.
——— bufonius	..	..	Cos. ..	N. C. S.	Common in swamp.
——— planifolius	..	..	Aus., S.A.	N. C. S.	Common in swamps.
Luzula campestris	..	..	End (?) ..	N. C. S.	Swamp in forest, Erua.
THYPHACEAE.					
Thypha angustifolia ..	Raupo ..	Bulrush ..	Cos. ..	N. C. S.	In swamps.
NAIADACEAE.					
Potamogeton natans ..	..	..	Cos., temp.	N. C. S.	Stagnant water.

LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued.*

Natural Order and Species.	Maori Name.	English Name.	Distribution.		
			Beyond New Zealand, or Endemic.	Within New Zealand.	In the Waimarino Forest.
RESTIACEAE.					
Hypolaena lateriflora ..	..	..	Aus. ..	N. C. S. Ch.	Bogs in steppe.
CYPERACEAE.					
Carpha alpina	..	..	Aus. ..	N. C. S. Sub.	Common in highland bogs
Cladium Sinclairii	..	..	End.	N. C. ..	On sides of gorges.
Gahnia pauciflora	..	Cutting-grass	End. ..	N. C. ..	Hauhungatahi Forest.
——— xanthocarpa ..	..	Cutting-grass ..	Lord Howe Island	N. C. S.	Bush at Erua and Ohakune.
Uncinia caespitosa	..	..	End. ..	N. C. S.	Forest on Hauhungatahi, &c.
——— australis	..	..	End. ..	N. C. S. Ch.	Forest on Hauhungatahi, &c.
——— riparia	..	..	End. ..	N. C. S.	Forest near Erua.
——— rubra	..	..	End. ..	C. S. ..	Grass-steppe.
Carex ternaria var. gracilis ..	..	..	End. ..	N. C. S. Sub.	Boggy ground near Pokaka.
——— dipsacea	..	..	End. ..	C. S. ..	Boggy ground near Pokaka.
——— dissita	..	..	End. ..	N. C. S.	Boggy ground near Pokaka.
GRAMINEAE.					
Microlaena avenacea ..	..	Bush oat-grass	End. ..	N. C. S.	Forest near Erua.
Hierochloe redolens ..	Karetu ..	Holy grass ..	Aus., S.A.	N. C. S. Ch. Sub.	Grass-steppe, &c.
——— Fraseri	..	..	Aus. ..	C. S. ..	Grass-steppe.
Deyeuxia Forsteri	..	Toothed bent-grass	Aus., Norfolk Island	N. C. S. Ch.	Edge of bush at Erua.
Danthonia Raoulii	..	Red-tussock, snowgrass	End. ..	C. S. ..	Grass-steppe.
——— semiannularis var. setifolia	..	Desert oat-grass	End. ..	C. S. ..	Grass-steppe
Arundo conspicua	Toetoe ..	N.Z. reed ..	End. ..	N. C. S. Ch.	Up to 2,600 ft.
Poa anceps	..	Nodding plumed poa	End. ..	N. C. ..	By stream in grass-steppe.
——— caespitosa	Wi	Tussock ..	Aus. ..	N. C. S.	Grass-steppe.
——— Colensoi	..	Blue-tussock ..	End. ..	N. C. S.	Grass-steppe, Hauhungatahi.
——— Kirkii	..	..	End. ..	C. S. ..	Grass-steppe.
Agropyrum scabrum ..	..	Blue-grass ..	Aus. ..	N. C. S.	Grass-steppe.
FILICES.					
Hymenophyllum rarum ..	..	Filmy fern ..	Cos. ..	N. C. S. Sub. Ch.	Forest, on rocks or trees.
——— australe	..	Filmy fern ..	Ind., Mal., Aus.	N. C. S.	Bush at Kakahi.
——— atrovirens	..	Filmy fern ..	Aus. ..	N. C. S.	Hauhungatahi Forest.
——— pulcherrimum ..	..	Filmy fern ..	End. ..	N. C. S.	Common in forests on trees.
——— dilatatum	..	Filmy fern ..	Aus., Mal., Pol.	N. C. S. Ch. Sub.	Common in forests on trees.
——— demissum	..	Filmy fern ..	Mal., Pol.	N. C. S. Ker. Ch. Sub.	Forest.
——— scabrum	..	Filmy fern ..	End. ..	N. C. S. Ch.	Forest, on trees.
——— flabellatum ..	..	Filmy fern ..	Aus., Pol.	N. C. S. Ch. Sub.	Forest, on trees.
——— Malingii	..	Silver filmy fern	End. ..	N. C. S.	On mountain-cedar trees.
——— multifidum	..	Filmy fern ..	Aus., Pol., Mal.	N. C. S. Ch. Sub.	Forest, or shaded banks.
——— bivalve	..	Filmy fern ..	End. ..	N. C. S. Ch.	Forest, on ground or trees,
Trichomanes reniforme ..	Raurenga ..	Kidney-fern ..	End. ..	N. C. S. Ch.	In forest; rare.
——— humile	..	..	Mal., Pol.	N. C. ..	In forest, on wet rocks or banks.
——— venosum	..	..	Aus. ..	N. C. S. Ch.	In forest, on tree-ferns.
Cyathea dealbata	Ponga ..	Silver tree-fern	Mal., Pol.	N. C. S. Ch.	Forests of lowlands.
——— medullaris	Korau, mamaku	Black tree-fern	Aus., Pol.	N. C. S. Ch.	In lowland forest.
Hemitelia Smithii	..	Soft-leaved tree-fern	End. ..	N. C. S. Sub.	Forest to 2,700 ft.
Dicksonia squarrosa ..	Wheki ..	Slender tree-fern	End. ..	N. C. S. Ch.	Forest to 2,000 ft.
——— fibrosa	Whekiponga ..	Fibrous-stemmed tree-fern	End. ..	N. C. S. Ch.	Forest to 2,600 ft.
——— lanata	..	Woolly tree-fern	End. ..	N. C. ..	Forest to 2,700 ft.

LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued.*

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FILICES—*continued.*					
Davallia novae-zelandiae ..	..	..	End. ..	N. C. S.	Taxad forest throughout.
Lindsaya linearis	..	..	Aus., Pol.	N. C. S. Ch.	In swamp near Erua.
——— trichomanoides ..	..	..	Aus., Pol.	N. C. S.	In Kaitieke Forest.
Adiantum affine	..	Common maidenhair	Aus., Ker.	N. C. S. Ch.	On cliffs and river-banks.
Hypolepis tenuifolia ..	..	..	Aus., Pol., Mal.	N. C. S. Ch.	By streams in scrub; bush roads.
——— distans	..	..	End. ..	N. C. S. Ch.	Sides of bush roads.
Pellea rotundifolia	..	..	Aus., Norfolk Island	N. C. S.	In bush near Kakahi.
Pteris aquilina var. esculenta	Rauaruhe, rahurahu	Bracken ..	Aus., S.A.	N. C. S. Ch. Sub.	Common to 2,000 ft.; in scrub.
——— scaberula	..	..	End. ..	N. C. S. Ch.	Bush roads; landslips.
——— macilenta	..	..	End. ..	N. C. ..	Bush near Erua.
——— incisa	..	..	Cos. trop., Aus.	N. C. S. Ch. Sub.	By bush roads and streams.
Lomaria Patersoni var. elongata	..	..	Aus., Pol., Mal., S. Asia,	N. C. S. Sub.	Common in highland bush.
——— discolor	Petipeti ..	..	Aus., Norfolk Island	N. C. S. Ch. Sub.	Common in forest throughout.
——— vulcanica	..	..	Aus., Pol., Mal.	N. C. S.	Gorges and cliffs and river-banks.
——— lanceolata	..	..	Aus., Pol.	N. C. S. Ch.	Common in forest.
——— alpina	..	..	Aus., S.A.	N. C. S. Ch. Sub.	Grass-steppe and upper forest.
——— capensis	Piupiu ..	..	Aus., Mal., Pol., S.A., S. Africa, Trop. Am.	N. C. S. Ch. Ker. Sub.	Throughout.
——— ——— var. minor ..	..	..	..	..	Hauhungatahi and Pokaka.
——— nigra	..	..	End. ..	N. C. S.	Hauhungatahi by rill.
——— fluviatilis	Kiwikiwi ..	..	Aus. ..	N. C. S. Ch. Sub.	Common in taxad forest.
——— membranacea ..	..	..	End. ..	N. C. S.	In forest.
Asplenium falcatum ..	Petako ..	Drooping spleenwort	Aus., Pol., E. Africa, Asia	N. C. S. Ch.	In lower taxad forest.
——— lucidum	..	Shining spleenwort	Aus. ..	N. C. S.	In lower forest.
——— ——— var. anomodum	..	..	End. ..	C. ..	Limestone Cliff, Raetihi Hill, 2,800 ft., at Ohakune.
——— Hookerianum var. Colensoi	..	..	End. ..	N. C. S.	Raetihi Hill, at Ohakune.
——— bulbiferum	Maku ..	Common spleenwort	Aus., N. India, Penang	N. C. S. Sub.	In forest throughout.
——— ——— var. tripinnatum	..	..	..	..	Raetihi Hill, near Ohakune.
——— flaccidum	Rakautauri ..	Pendent spleenwort	Aus., S. Africa	N. C. S. Ch. Sub.	In forest throughout.
Aspidium aculeatum var. vestitum	..	Prickly shieldfern	Aus., S.A.	N. C. S. Ch. Sub.	In forest throughout, and by streams in scrub.
——— ——— var. sylvaticum	..	..	..	..	Forest near Ohakune.
Nephrodium glabellum ..	..	..	Aus., Pol.	N. C. S.	Forest near Karioi Village.
Polypodium punctatum ..	..	..	Aus., Pol., S.A., Asia, African islands	N. C. S.	Forest near Ohakune.
——— pennigerum ..	..	..	Pol. ..	N. C. S. Ch.	Bush throughout.
——— australe	..	..	Aus., S.A., Tristan da Cunha	N. C. S. Sub.	Bush throughout.
——— ——— var. villosum..	..	..	..	..	Bush on Hauhungatahi.
——— grammitidis ..	..	..	Aus. ..	N. C. S. Ch. Sub.	Bush throughout
——— serpens	..	..	Aus., Norfolk Island	N. C. S. Ch. Ker.	Forest-margins, on trees.
——— Billardieri	..	..	Aus., Pol.	N. C. S. Ch. Ker. Sub.	Forest throughout.
——— novae-zelandiae ..	..	..	End. ..	N. C. ..	Higher forest.
Gleichenia dicarpa	..	Bog umbrellafern	Aus., Pol., Mal.	N. C. S. Ch.	Common in bogs.

LIST OF INDIGENOUS PLANTS IN WAIMARINO FOREST—*continued.*

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FILICES—*continued.*					
Gleichenia dicarpa var. alpina	..	..	..	N. C. S.	On Hauhungatahi.
—— Cunninghamii ..	Tapuwae-kotuku	Bush umbrella-fern	End. ..	N. C. S.	In forest and by streams.
Todea hymenophylloides ..	Heruheru ..	Single crape-fern	End. ..	N. C. S.	In taxad forest throughout.
—— superba	Heruheru ..	Prince of Wales's feather, double crape-fern	..	N. C. S.	In higher forests; common.
Botrychium ternatum ..	..	Parsley-fern ..	Cos. ..	N. C. S.	In manuka scrub, Kakahi.
—— —— var. dissectum	..	..	..	N. C. S.	Edge of bush, Kakahi.
LYCOPODIACEAE.					
Lycopodium Billardieri ..	Whiri-o-Rakau-tauri	Hanging club-moss	..	Ker. N. C. S.	On trees in forest throughout.
—— fastigiatum ..	..	Alpine club-moss	Aus. ..	N. C. S. Ch. Sub.	Grass-steppe, Hauhungatahi.
—— scariosum	..	Creeping club-moss	Aus. ..	N. C. S. Ch. Sub.	Sunny banks in Kaitieke Bush.
—— volubile	Waewaekoukou	Climbing club-moss	Pol., New Cal., Aus., Mal.	N. C. S. Ch.	Edge of forest.
Tmesipteris tannensis ..	..	..	Aus., Pol.	N. C. S. Ch. Sub.	Epiphytic on tree-ferns in Kaitieke Forest.

I have throughout adopted the nomenclature and arrangement as given in Mr. Cheeseman's Manual, as that book is likely to remain for some years the chief book of reference.

I have to thank the author for his kindness in determining some of the plants that I could not myself be sure of.

E. P. T.

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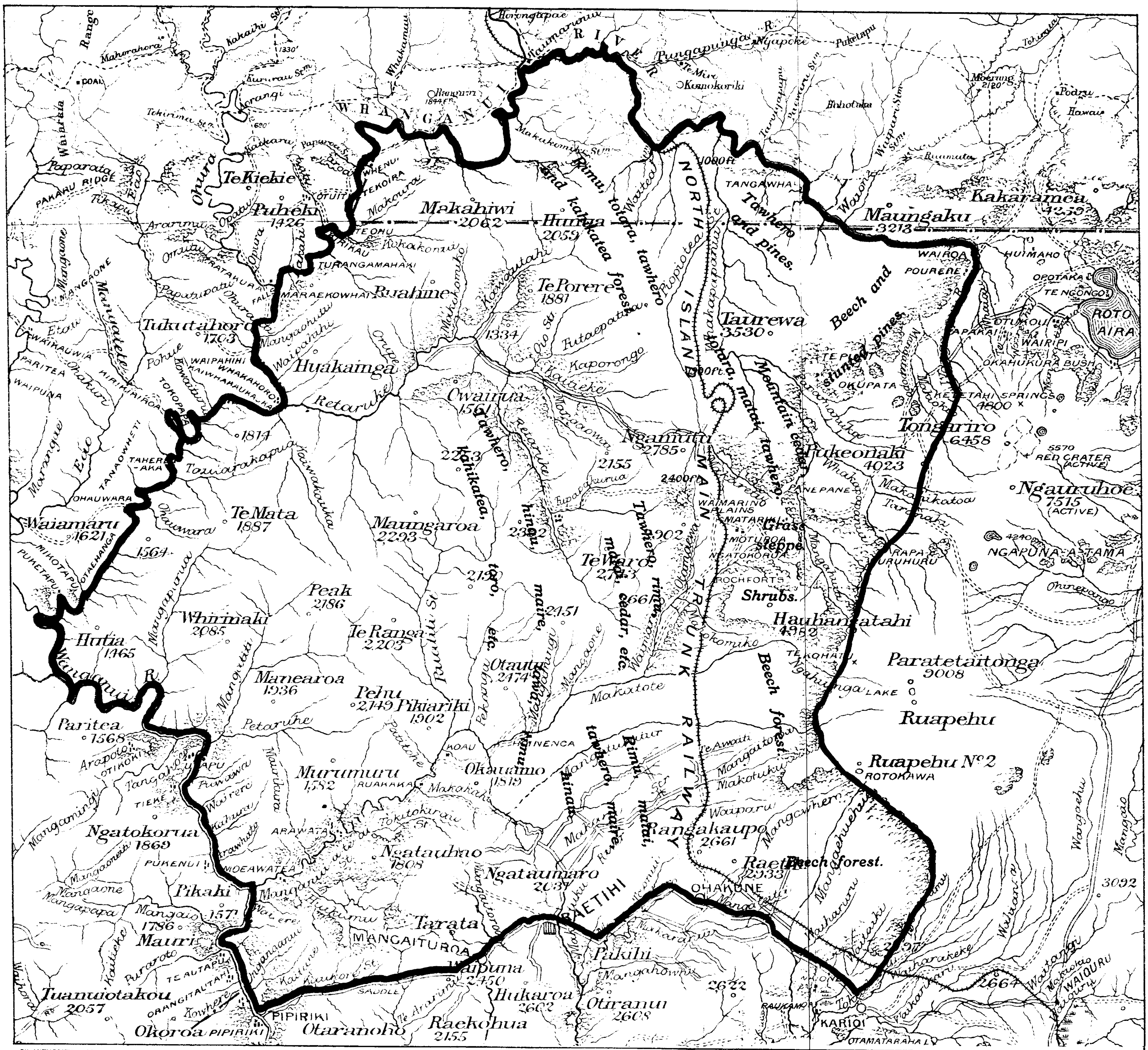

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Map showing
WAIMARINO DISTRICT.
Scale: 4 miles to an inch.