(c.) *The Tawa-Towai Sub-association.*

In passing from west to east through the Waipoua Forest after crossing the Toronui Stream and getting on to the higher ground, the following gradual changes are noticed in the forest: (1.) The kauri association gives out at 1,000 ft. altitude or less. (2.) The tarairi association becomes gradually modified. (3.) The tawa enters in more abundantly, and at the same time *Weinmannia*, no longer in its juvenile form, merely a plant of the undergrowth, becomes more abundant as a tree. (4.) Finally taxads become, if not dominant, of major importance. (5.) As the altitude increases the tree-ferns change, *Hemitelia Smithii* and *Dicksonia squarrosa* replacing in great measure *Cyathea dealbata* and *Cyathea medullaris*.

Of course, this sub-association differs a good deal in various places, but an account of a few selected spots may give some idea of the whole.

The western slope of Toetoehatiko gives some notion of the composition of the class of forest under consideration. The following are some of my notes:—*

"*Beilschmiedia tawa* is an important constituent of the Toetoehatiko forest. The undergrowth varies according to whether a thicket of *Astelia-Gahnia* mixed with *Rhipogonum scandens* or merely arborescent vegetation plays a part. The tallest trees at the lower level of the mountain are *Beilschmiedia tawa*, *Podocarpus totara*, *Metrosideros robusta* occasionally, but both the two latter rarer than the first-named. Where open, the trees are straight-trunked, and there is undergrowth of the usual character consisting of *Senecio Kirkii*, *Weinmannia sylvicola*, *Alseuosmia macrophylla*, *Coprosma grandifolia*, *Melicytus micranthus*, *Rapanea Urvillei*, *Lygodium articulatum*, *Blechnum discolor*, *Blechnum Frazeri*, *Microlæna avenacea*, *Freycinetia Banskii*, *Astelia trinervia*, *Geniostoma ligustrifolium*, and the ordinary lianes of the forest. Generally speaking, the mountain vegetation is denser than on the lower slopes. Liverworts of the *Gottschea* type are plentiful, and *Hemitelia Smithii* is an important tree-fern. . . . . Further up, young *Beilschmiedia tawa* is important in the undergrowth, but not physiognomic as in some parts of New Zealand forests; also young *B. tarairi*, *Rapanea salicina* (occasionally), and *Knightia excelsa*. There are low roots all over the ground, moss- and fern-covered. *Blechnum Frazeri* and *Lygodium articulatum* are common. Here and there the trees are climbed by *Freycinetia*. Other plants noted: *Nothopanax arboreum*, *Dysoxylum spectabile*, *Olea montana*, *Cyathea medullaris*, *Schefflera digitata*, *Styphelia fasciculata*. The tree-trunks are frequently mossed. . . . . In other places the forest becomes more open. Here is, *e.g.*, a knee-deep open space of *Freycinetia*, with *Blechnum Frazeri* rising out of it for a height of one or two feet, while the ground beneath is covered with *Gottschea*. . . . . Higher up, *Ixerba brexioides* appears, the other plants continuing as before. All the way there has been abundance of *Trichomanes reniforme* and *Hymenophyllum scabrum*. . . . . Not far from the summit is a close tangle of *Rhipogonum*, some *Freycinetia*, and any amount of hygrophytic leafy liverworts. The trees are hardly more than 30 ft. tall. *Weinmannia* is dominant. Also present are *Metrosideros robusta*, *Dacrydium cupressinum*, and *Podocarpus dacrydioides*. There are large quantities of tall *Dicksonia squarrosa*. . . . . Further on, another close supplejack tangle is encountered, in which is also *Senecio Kirkii*. The floor beneath is crowded with liverworts, while filmy ferns, including *Hymenophyllum tunbridgense* and *H. flabellatum*, are on the trunks of the trees. . . . .

"The plants noted here are *Rapanea salicina*, *Schefflera digitata*, *Coprosma grandifolia*, *Metrosideros hypericifolia*, *Ixerba brexioides*, *Dysoxylum spectabile*, *Hedycarya arborea*, *Blechnum discolor*, *Polypodium diversifolium*, *Hymenophyllum tunbridgense*, *Polystichum adiantiforme*, *Lygodium articulatum*, *Asplenium bulbiferum*, *Hymenophyllum flabellatum*, *Myrtus bullata*, *Pittosporum tenuifolium*, *Griselinia lucida*, *Astelia trinervia*, *Beilschmiedia tarairi*, *Geniostoma ligustrifolium*, *Metrosideros albiflora*, *Dracophyllum latifolium*, *Melicope simplex*, *Cyathea dealbata*, *Podocarpus totara*, *Styphelia fasciculata*, *Hymenophyllum dilatatum*, *Melicytus ramiflorus*, *Asplenium lucidum*, *Beilschmiedia tawa*, *Microlæna avenacea*, *Gahnia xanthocarpa*, *Dacrydium cupressinum*, *Asplenium flaccidum*, *Nothopanax Edgerleyi*, *Histiopteris incisa*, *Rhopalostylis sapida*, *Olearia Cunninghamii*, *Pseudopanax crassifolium*, *Clematis indivisa*.† These are not all together, but at any rate they are not far distant. . . . . Much of the forest towards the River Waipoua, after crossing over the summit of Toetoehatiko, is quite open, the trees being few, while the dominant plants over large areas are the tree-ferns *Hemitelia Smithii* and *Dicksonia squarrosa*, nor are the shrubs which are present of any moment. Such trees as there are are merely dotted about here and there, and there is nothing in such a place approaching a continuous forest-roof. It looks—and the appearance of the trees justifies this idea—as if in such places as this the forest was naturally dying out—a thing which must happen in the course of events. The trees, when present, are *Dacrydium cupressinum* and *Beilschmiedia tawa*, but they are frequently in a state of decay."

Near the eastern boundary of the Waipoua Forest after leaving the rimu belt the following is an example:—

"*Dicksonia lanata* is very common, growing more than breast-high. It varies considerably as to the size of its trunk. With it is very tall *Blechnum Frazeri*. *Weinmannia sylvicola* is a very common tree, reaching a height of 60 ft. It is more slender and regular in its growth than *W. racemosa*. Its bark is pale-grey. The physiognomy is marked by tree-ferns and tree-trunks. Where the ground becomes more open is *Gottschea* on the ground, and colonies of *Blechnum Frazeri*. The shrubby undergrowth there is scanty and consists of young *Senecio Kirkii*, while young *Lygodium* may rise out of the *Gottschea* of the floor. The second tier is made up of drawn-up, slender *Weinmannia sylvicola*, with long, straight stems. Here there is no *Dacrydium cupressinum*, the tall trees being *Metrosideros robusta*, *Beilschmiedia tawa*, *Weinmannia sylvicola*,

*—These notes were taken while climbing the hill to its summit. †—These were growing associated together not far from the summit of Toetoehakito.