

dicular. The most common is *Coprosma tenuifolia*, 6 ft. or so in height. *Myrtus pedunculata*, sometimes more or less prostrate, plays a most important part amongst the lowest shrubs, but it also occurs as a small tree with a slender trunk. Lianes and epiphytes are scarce. Young plants of *Nothofagus Menziesii* are abundant in the undergrowth, which, generally speaking, is of an open character (Photo. No. 12). The floor is copiously furnished with dead beech-leaves, and in places there are quite bare patches. The ferns, even at 2,000 ft. altitude, play no very important part, nor are ferns in general much in evidence. *Polypodium novæ-zealandiæ* is, however, frequent in many places, both as an epiphyte and creeping over fallen trees, and *Leptopteris superba* is common, but still not nearly so abundant as in the upper taxad forest. The beautiful flowering shrub *Alseuosmia macrophylla* is common, especially on the dry mounds beneath the beech-trees. Altitude, of course, changes the relative abundance of the species, but no further details are necessary, as the formation is not one of much moment in the National Park, and the description of the *N. Menziesii* zone will serve for that of its upper part.

Besides the southern and western Ruapehu forest, there are considerable areas of the same formation in the lower parts of the deep river-gorges of the eastern portion of the plateau, as, for instance, that of the Oturere.

(g.) THE TOTARA FOREST OF TONGARIRO.

Quite a small belt of forest, a portion of a much larger area, occurs within the precincts of the park. This is especially noteworthy because the beeches (*Nothofagus*) are altogether absent, the formation having the thin-leaved totara (*Podocarpus Hallii*) as its leading tree. Notwithstanding the altitude of this piece of forest, many of the trees are 50 ft. or more tall, and such may have trunks, usually short, and averaging perhaps 3 ft. in diameter. The trees grow either in moderately close clumps or are distant half a chain or more. The forest is fairly open, this being due in part to the incursions of the horses and cattle of the Natives. The second tier of plants consists of small trees—e.g., *Drimys colorata*, *Melicope simplex* (not noted elsewhere in the park), *Pseudopanax crassifolium*, *Nothopanax simplex*, *N. arboreum*, *N. Colensoi*, and an occasional *Dacrydium Colensoi*. Beneath these is a fairly close undergrowth in which *Drimys colorata* is easily the dominant plant, while on the forest-floor its seedlings, large and small, are excessively abundant. *Coprosma tenuifolia*, *C. fœtidissima*, and *Myrtus pedunculata* are also present. From the above it may be seen that this formation is rather of a montane than subalpine character.

This forest has been in part destroyed by a lava-stream from Te Mari, and portions quite separated now from the main body extend high up the mountain in sheltered places, merging finally into subalpine scrub. Such a piece of forest, at about 4,000 ft. altitude, is made up of low trees of *Podocarpus Hallii*, *Phyllocladus alpinus*, and broadleaf (*Griselinia littoralis*), and is related to the *Phyllocladus* scrub or low forest described under another head.

The low trees may be 20 ft. or so tall. They frequently lean a good deal out of the perpendicular. Such a formation may have either the *Podocarpus* or the *Phyllocladus* dominant. The undergrowth consists of *Drimys colorata*, *Nothopanax Colensoi*, *Coprosma tenuifolia*, *C. microcarpa*, *C. fœtidissima*, *Suttonia divaricata*, *Aristotelia fruticosa*, *C. parviflora*, *C. cuneata*, *Pittosporum Colensoi*, and abundance of *Myrtus pedunculata*. On the ground are large breadths of *Hymenophyllum multifidum* and the great moss *Polytrichum dendroides* (not intermingled), plenty of *Uncinia cœspitosa*, and an abundance of *Astelia montana*. *Viola filicaulis* is also a characteristic feature.

(h.) THE FOREST OF HAUHUNGATAHI (Photo. No. 30).

This I examined in only one part of the mountain—namely, on its northern side—nor am I sure that this particular part comes in the suggested new boundaries of the park. But it seems interesting to include here some account of this forest, as nothing has previously been published regarding it.

On its exterior, where bounded by the Waimarino Plain, is a narrow belt of low trees and shrubs, consisting of *Pittosporum Colensoi*, *Nothopanax Colensoi*, *Veronica salicifolia*, *Cordyline indivisa* (see Photo. No. 16), *Drimys colorata*, *Melicetyus lanceolatus*, *Suttonia divaricata*, *Dacrydium Colensoi*, small *Libocedrus Bidwillii*, small *Podocarpus Hallii*, *Coprosma lucida*, and an abundance of the woolly tree-fern, *Dicksonia lanata*.

Between the steep face of the mountain and the grassy plain (steppe) is a flat piece of forest with numerous moderate-sized trees (3 ft., but more frequently less, in diameter) of rimu (*Dacrydium cupressinum*) much scattered, miro (*Podocarpus ferrugineus*), totara (*P. Hallii*), and some cedar (*Libocedrus Bidwillii*).

The undergrowth is dense, and consists of the following: The tree-fern *Dicksonia lanata*, in extreme abundance, and forming an almost continuous mass through the forest—indeed, it is the striking feature of the formation; *Nothopanax arboreum*; *Coprosma Colensoi*; *C. tenuifolia*; *Myrtus pedunculata*; *Drimys colorata*; *C. fœtidissima*; *C. grandifolia*; *Elæocarpus Hookerianus* (its juvenile form); *Rapanea salicina*; *Carpodetus serratus*; *Phyllocladus alpinus*; *Griselinia littoralis*; *Aristotelia racemosa*; *Brachyglottis repanda*; *Weinmannia racemosa*; *Alseuosmia macrophylla*; *Schefflera digitata*; *C. parviflora*; *Pseudopanax crassifolium*. The ferns are *Hymenophyllum pulcherrimum*, abundant on tree-trunks; *Blechnum Pattersoni*, extremely abundant on the floor; *Asplenium bulbiferum*; *Polystichum vestitum*; *Hymenophyllum multifidum*; *H. flabellatum*; *H. dilatatum*; *Leptopteris hymenophylloides*; *L. superba*; *Asplenium flaccidum*; *Blechnum capense*.

As one ascends the rimu-trees get much fewer in number, and the *Libocedrus*, on the other hand, increase greatly, while a few tooth-leaved beech (*Nothofagus fusca*) enter in, the forest-trees at 3,400 ft. being *Libocedrus Bidwillii*, *N. fusca*, and *Podocarpus Hallii*. Regarding the forest at an altitude of 3,600 ft., my notebook says, "Here is a sort of combination of subalpine scrub and