

(C.) THE VEGETATION OF THE MOUNTAINS.

1. GENERAL.

The mountains of Stewart Island, notwithstanding the fact that the highest is only 3,200 ft., are covered with a vegetation just as truly alpine in form and species as are the highest New Zealand mountains. Mount Anglem, being about 1,000 ft. higher than are the other mountains with open ground on their summits, possesses a rather richer flora, *Ranunculus Lyallii*, *Celmisia Sinclairii*, *Veronica Laingii*, *Polystichum cystotegia*, *Archeria Traversii* var. *australis*, *Dracophyllum Menziesii*, *Carex dissita* var. *monticola*, *Helichrysum Loganii*, *Ourisia caespitosa*, *O. prorepens*(?), *O. sessiliflora*, and *Uncinia compacta* var. *caespitiformis* having not as yet been found elsewhere on the island. On the other hand, *Ranunculus Crosbyi*, *Senecio scorzonerioides*, and *Celmisia linearis* are only known, the two former from Table Hill and the latter from Rakiahua to the neighbourhood of Port Pegasus. *Abrotanella muscosa* also has only been noted on Mount Rakiahua and Table Hill.

Very few indeed of the mountain plants are confined to the mountains in Stewart Island, although they are strictly alpine or subalpine in the mountains of the North and South Islands, any open ground at about sea-level in the west or south of the island having more or less alpine species amongst its plants. More remarkable still is it that *Dacrydium laxifolium*, specially a plant of high altitudes (3,000 ft. and upwards), does not occur on the Stewart Island mountains at all, but only on certain ancient dunes at virtually sea-level.

The number of species of alpine plants in Stewart Island, so counting all species from the scrub-line upwards, is about 126, of which eight have not as yet been recorded elsewhere; but until the southern and western ranges of Otago are properly explored it is more than likely, bearing the present distribution of what were thought endemic Stewart Island plants in mind, that they will be found to be of wider range.

The mountain zone begins at about 1,500 ft.,* at which point the forest gives place first to a belt of manuka and then to the subalpine scrub, above which is the open ground, covered with low-growing herbaceous, suffruticose, or woody plants.

The peculiarities of the Stewart Island subalpine vegetation arise from the climatic conditions. These, briefly stated, are: constant wind, with frequent violent gales; excessive rainfall and extreme number of rainy days leading, together with the two following conditions, to a wet and sour, peaty soil; cloudy sky and little sunshine; low summer, but equable temperature. The above factors have a twofold significance, concerning on the one hand *distribution*, and on the other *plant form and formation physiognomy*. These matters are discussed under other heads. Here it may be pointed out that there is a curious boggy meadow made up of cushion plants; there are special wind-forms of certain species, and there are formations depending on the presence or absence of wind.

In what follows, an attempt is made for the first time to classify the mountain vegetation, a by no means easy task.

(2.) THE MANUKA (*LEPTOSPERMUM SCOPARIUM*) FORMATION (Photo No. 17).

With the increase in altitude the force of the wind becomes more intense; wind-resisting plants enter into the forest, especially the manuka, until at a height of from 1,000–1,800 ft. an almost pure belt of this small tree encircles a Stewart Island mountain, the altitude at which it appears depending upon the position of the slope with regard to the prevailing wind. With the manuka at first are mixed many of the ordinary forest plants, the small trees (*Nothopanax Edgerleyi*, *Dacrydium biforme*, *Griselinia littoralis*, &c.), and even the forest-tree *Weinmannia racemosa* making merely a shrubby undergrowth, while the rimu (*Dacrydium cupressinum*) does not exceed the manuka in stature. Where the manuka is pure, or almost so, multitudes of bare poles meet the eye, beneath which are moss cushions, yellow mosses (species of *Dicranoloma*) on the ground, together with carpets of *Lycopodium ramulosum* and a close undergrowth of *Styphelia acerosa*, green tussocks of *Gahnia procera* and prostrate mountain-pine (*Dacrydium Bidwillii*). The roof of the formation is flat, greyish in colour, and made up of small dense heads of foliage. Where the wind strikes fully, the manuka is much reduced in height, and its twisted branches bear plainly the mark of frequent gales (see Photo No. 17).

Scrub of the Lower Hills, Pryce's Peak.

At an altitude of about 900 ft. the scrub of Pryce's Peak commences. It is composed of most of the forest trees and shrubs, but the manuka (*Leptospermum scoparium*) is in much greater abundance, and there is an undergrowth of *Styphelia acerosa* in large quantity, together with *Coprosma Colensoi*, the broadleaf (*Griselinia littoralis*), *Suttonia divaricata*, *Coprosma foetidissima*, *Gahnia* tussocks and moss cushions. Higher up manuka becomes dominant, but mixed with much *Dacrydium Bidwillii*. The scrub is about 20 ft. to 25 ft. tall; the manuka rises above the general level. Within is a tangle of stems and semi-prostrate trunks. The moss cushions are almost as abundant and large as in the scrub formations of Port Pegasus (see Photo No. 5).

I examined the vegetation of no other of the lower hills, except in the south where the conditions differ, but conclude the above will be fairly typical of such altitudes, except in the south.

(3.) SUBALPINE SCRUB (Photos Nos. 26 and 27).

(a.) General.

Between the subalpine scrub proper and the manuka formation are distinct transitions, but the former is to be distinguished by the absence of *L. scoparium* as the dominant plant, and the presence of a superabundance of Colenso's daisy-tree (*Olearia Colensoi*). On hills of 1,000 ft. altitude the character

* All heights must be taken as approximate only.