

The tier of ferns and small shrubs rising a few feet above the ground owes an extreme physiognomic importance to the presence in excessive numbers almost everywhere, and sometimes pure for many yards at a time, of the common hard fern (*Blechnum discolor*). This fern has a trunk a foot or two tall, crowned with thirty or more shining rather dark-green fronds, which, semi-erect, close, and curving outwards, form a leafy vase, at the bottom of which dead vegetable matter collects, each leaf some 3 ft. in length and 5 in. broad. The plants grow so closely that the fronds touch, the ground being altogether hidden. Sometimes these colonies are not pure, the long hard fern (*Blechnum capense*) being abundant. To this same tier belong the smaller shrubs, the slender little-branched *Coprosma Colensoi* being common everywhere, and the dense *C. rhamnoides*, with small brownish leaves and in its season red with the small drupes, is fairly common.

The many prostrate and rotting trunks mentioned above offer a favourite station for mosses, liverworts, and filmy ferns, and these are present in almost indescribable profusion, accompanied by luxuriant growths of *Luzuriaga marginata*, *Nertera depressa*, and several creeping ferns, especially *Polystichum adiantiforme* and *Polypodium diversifolium*.

But the forest as a whole is far from being as open as just described, and the space between the tree-trunks is more or less closely filled by a few small trees or tall shrubs of slender habit. Especially are the graceful twiggy bushes of the hupiro (*Coprosma foetidissima*) dominant, whose three or four long naked branches arch downwards through the weight of the numerous thin but stiff leaf-bearing twigs covered closely with their pale-green leaves. Along with this tallest undergrowth are multitudes of tree-ferns, especially *Dicksonia squarrosa*, whose slender dark-coloured trunk is covered above with remains of former leaf-stems, but below is a mat of aerial roots overgrown frequently with a rich covering of filmy ferns (*Trichomanes venosum*, *Hymenophyllum flabellatum*, and *H. ferrugineum*), and many seedlings of the kamahi (*Weinmannia racemosa*), and various bryophytes—e.g., *Rhizogonium novae-hollandiae*, *R. distichum*, *Hymenophyllum Phyllanthus*, and other *Hymenophyllum*-like liverworts.

In many parts of the forest *Coprosma foetidissima*, the rimu and kamahi trunks, and colonies of *Blechnum discolor* alone meet the eye, and were all the other species removed the general physiognomy would remain unchanged. All the same, many of the other forest plants will be present, and probably within the limits of an acre the greater part of the species could be collected. In many places, too, there is abundance of the other forest trees or shrubs, and when these are present in quantity the pale-green leaves and arching twiggy habit of *C. foetidissima* no longer dominates. The most important of these other low trees or shrubs are — *Nothopanax Edgerleyi*, *N. simplex*, *Pseudopanax crassifolium* (especially its juvenile form), *Schefflera digitata*, *Carpodetus serratus*, *Coprosma lucida*, and in some localities *Myrtus pedunculata*. In the forest near Port Pegasus, *Dacrydium intermedium* invades the association. *Leptospermum scoparium* is also more or less scattered through many parts of the forest. Near the sea, and sometimes ascending almost to the subalpine region, is a certain amount of *Senecio rotundifolius*. *Dracophyllum longifolium*, too, may invade the forest proper. Thus, when the last-mentioned two species, which differ so much in colour and form of leaf and in general habit, replace the more typical undergrowth, the general physiognomy is strikingly changed.

It has been pointed out that epiphytes play comparatively little part in the Stewart Island forest, and that the tree-trunks are frequently bare of other plant-life. All the same, such coverings are not wanting, by any means. The beautiful translucent drooping filmy fern, *Hymenophyllum dilatatum*, is frequently extremely conspicuous, especially on the irregular bases of the kamahi (*Weinmannia racemosa*), where it may be accompanied by *Polystichum adiantiforme* and *Polypodium diversifolium*. The long pendant fronds of *Asplenium flaccidum* hang from many trees, and here and there are the swinging tassels of *Lycopodium Billardieri*, a foot or two in length. Masses of the orchid (*Dendrobium Cunninghamii*), with its grasslike leaves, are frequent on rata boughs especially, and the two epiphytic *Earinas* are common throughout the forest. Mantles of bryophytes hide the bark—e.g., *Rhapidostegium cerviculatum*, *Stereodon chrysogaster*, *Rhapidostegium leptorrhynchium*, and two species of *Leucobryum* on the bases of the trunks. The lycopod, *Tmesipteris tannensis*, is not, as in the northern forests, confined to the trunks of tree-ferns, but pushes its rhizome of several inches in length amongst the humus of the tree-bases and of rotting logs, its condition being saprophytic rather than epiphytic.

The vegetation of gullies is of a special character. The taller trees are frequently quite absent. *Coprosma foetidissima* is no longer dominant, but there is a much greater mixture of small trees, whose growth is more irregular and stems more moss-clad than in the level forest or gentler slopes. Tree-ferns abound (Photo No. 19), *Hemitelia Smithii* is commoner and the trunks of *Dicksonia squarrosa* are altogether hidden by the multitude of the reddish fronds of *Hymenophyllum ferrugineum*. The ground is covered thickly with bryophytes of many kinds. Moss and liverwort cushions made up of *Dicranoloma Billardieri* and *Plagiochila gigantea*, 1 ft. or 2 ft. in height, are plentiful in the forests of the west and south, and one may step from cushion to cushion. The boulders of a stream may be green with the great thick thalli of *Monoclea Fosteri*. The crape-fern (*Leptopteris superba*) forms extensive colonies, the fronds on short massive trunks of pyramidal shape, and 1 ft. 6 in. or more tall. Specially characteristic of the gullies are close entanglements of the black stems of the supplejack (*Rhipogonum scandens*). Steep banks are clothed with fronds of *Blechnum capense* 3 ft. or much more in length, and where especially shaded and moist may be great colonies of the dark-coloured *Blechnum Patersoni*. Also *Leptopteris hymenophylloides*, *Blechnum fluviatile*, *B. lanceolatum*, and *B. nigrum* are more specially ferns of the gullies.

(β.) Affinities of the Association.

The *Dacrydium-Weinmannia* association of Stewart Island resembles very closely indeed the forest on the Bluff Hill, distant some twenty miles, the species and physiognomy being almost identical. *Dacrydium intermedium* does not occur in the Bluff forest, but it is merely an occasional constituent