(*b.*) *Composition of the Forest.*

So far as the species are concerned, the forest-plants are denoted in the general list of species at the end of this report, while a good many details regarding the life-forms of the forest are given in the section dealing with special ecology of the plants. The following numbers give some idea of the ecological composition of the forest: Trees, 7; low trees, 16; shrubs, 14; lianes (spermophytes), 9; epiphytes (spermophytes), 5; herbaceous plants, 36; parasites (spermophytes), 1; ferns and lycopods, 52.*

As for the floristic composition of the formation, there are 139 species of spermophytes and pteridophytes belonging to twenty-nine families and sixty-three genera.†

(*c.*) *The Rimu-Kamahi Association.*

(*a.*) *Physiognomy.* (*Photos Nos.* 18, 31, 37.)

Seen from without, and at some short distance away, the association under consideration appears as a dull-coloured mass, which is relieved by the yellow-green of the straight but rather slender heads of the numerous rimu-trees (*Dacrydium cupressinum*), which are not massed together but dotted abundantly over the whole. Here and there, in some places more than in others, the dark green of a southern rata (*Metrosideros lucida*) shows up distinctly, and the greyish hue of a group of kamahis (*Weinmannia racemosa*), while where the tall trees are distant a green feathery tree-fern may project above the shrubby undergrowth.

In the interior of the association the general appearance of any particular part depends upon various causes not sufficiently understood, such as the nature of the ground, its slope, exposure with regard to sun and wind, and so on. Generally speaking, the growth is not dense, the trees are a considerable distance apart, their crowns do not touch, and, though the intervening spaces between the trunks are occupied by an undergrowth, there is usually but little difficulty in pursuing one's way except in the gullies or on their lower slopes. The actual physiognomy of the forest depends upon the presence in superabundance of quite a few plants, and, as compared with the New Zealand taxad forest in general, upon the absence or paucity of certain well-known features. Considering this latter aspect of the question first, the Stewart Island forest as a whole is less tropical in aspect than that of the northern or central floristic provinces of New Zealand, or even the related forest of the west of the South Island. The species are fewer in number; the trees, *Metrosideros lucida* excepted, are lower and with more slender trunks; lianes, *Rhipogonum* in the gullies excepted, play an inconsiderable part; epiphytic asteliads are wanting, nor are the epiphytes in general of much physiognomic importance; tree-ferns, though excessively abundant, are not usually very tall; finally, the tree-trunks are frequently almost without a covering of other plants.

The vegetation of the association may be referred to four layers—viz., The floor; a layer of the smaller ferns and seedling trees, &c.; the low trees, tall shrubs, and tree-ferns; and the tall forest-trees.

So far as the tall trees are concerned, the rimu (*Dacrydium cupressinum*) is easily dominant in the least exposed parts of the forest, and where the soil is richest. Its straight bare trunks, varying in diameter from 1–3 ft. at most, covered with a dark-coloured scaling bark, and distant a few yards, or it may be as much as 2 chains or more, rise up unbranched to a height of 30 ft. or 40 ft. Here and there through openings in the undergrowth, looking upwards, may be seen the yellowish-green heads of the rimus, with their elegant weeping habit.

The thin-barked totara (*Podocarpus Hallii*) and the yew-like miro (*P. ferrugineus*), though not uncommon, are never plentiful enough to be of physiognomic importance.

On the drier ridges the kamahi (*Weinmannia racemosa*) is frequently dominant, two or three slender whitish trunks standing side by side, and looking like independent trees, though really belonging to one moss- and fern-covered "root trunk" of most irregular form, and perhaps huge dimensions (see Photo No. 10).

In the upper forest, or on specially exposed ridges, the southern rata (*Metrosideros lucida*) is often extremely abundant, its trunk prostrate as in the Auckland Islands, semi-erect or quite perpendicular, and conspicuous through its irregularity, great size at times (see Photo No. 6), and covering of reddish-brown bark, some hanging in long strips.

The ground is extremely uneven, and this is accentuated by many fallen trees at various stages of decay, and the surface rooting of the trees, especially of *Weimannia racemosa*. The forest-floor may be bare, and covered merely with dead rimu twigs and fallen leaves, but almost always is it occupied by patches, colonies, or it may be a vast carpet of bryophytes, filmy ferns, and certain creeping spermophytes, especially the forest snowberry (*Luzuriaga marginata*), *Nertera depressa*, and *N. dichondraefolia*, the two latter being extremely conspicuous when covered with their red fruits. Occasionally there is no undergrowth above of ferns or shrubs, in which case great breadths of the delicate bright shining green *Hymenophyllum demissum* may cover the ground, or mats of liverworts and mosses (species of *Plagiochila, Aneura, Gottschea, Trichocolea, Tylimanthus, Mastigobryum, Schistochila, Mniodendron, Sciadocladus, Dicranoloma*, &c.), while in such places *Polystichum adiantiforme*, its thick fronds about 1 ft. tall, may abound. *Polypodium diversifolium* is also a common fern, forming pure colonies, and in the neighbourhood of the sea *Asplenium obtusatum* may be the dominant ground fern.

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* The cryptogams have not been sufficiently collected to allow a satisfactory estimate to be given, but more than a hundred species of bryophytes are conspicuous through their abundance or size.

† The above figures might be increased or lessened slightly according as one includes or excludes certain uncommon forest plants which really do not belong to the forest at all; in fact, statistics of this kind depend upon the opinion of the observer, and are at best but closely approximate.