

## (b.) Port William.

The dunes here are quite low. Their covering differs in character to any I am acquainted with in New Zealand. There is a continuous growth of the sand *Coprosma* (*Coprosma acerosa* var. *arenaria*),\* not forming its characteristic isolated wiry cushion-like bushes, but making a low continuous mat-like growth. With it is great abundance of prostrate *Pimelea Lyallii*, much after the manner of *P. arenaria* of the mainland. The pale-leaved *Geranium sessiliflorum* forms patches sometimes several feet in extent, its leaves close to the ground, its long woody root descending very deeply, and the plant quite flat on the sand. Behind this zone of indigenous plants the dunes are covered with introduced grasses and some other plants, amongst which the parsnip (an escape from gardens) is most common. Here, too, are tussocks of *Poa caespitosa* and *Festuca littoralis*. On the sandy shore is a good deal of the succulent *Atriplex Billardieri*.

## (c.) Mason Bay.

The dunes extend along the sandy beach from the hills at its northern end to the cliffs at the south. To the north of the cliffs draining the ancient dune-complex of the interior the hills rise to more than 400 ft., separating the latter from the sandy shore, and from the recent low line of hay-cock-like dunes at their base, 6–10 ft. tall, but reaching three times that height at the north end of the beach. These foremost dunes are quite brown with the pingao (*Scirpus frondosus*), so that the sand is barely seen. There is also some sand fescue-grass (*Festuca littoralis*). Towards the north end of the beach the dunes proper cease, but there is a belt of blown sand on the face of the conglomerate hills, and here is a broad line of the stiff club-rush (*Scirpus nodosus*), with the holy-grass (*Hierochloa redolens*) growing through it, and mixed with it the wild celery (*Apium prostratum*) and the sea sow-thistle (*Sonchus littoralis*). In many places *Brachycome Thomsoni* comes right to the front, mixed with *Cotula Traillii*, and bushes of prostrate *Veronica elliptica*, 6 in. tall or less, and 1 ft. or so across, are dotted about.

The green-leaved *Acaena novae-zealandiae*, mats of the silvery *Pimelea Lyallii*, and the yellowish-brown creeping *Coprosma acerosa* are abundant. Higher up on the steep face of the conglomerate rock, but also where there is plenty of sand, is an abundance of *Aciphylla intermedia*, but only 4–6 in. tall, with semi-horizontal leaves, making pale-green patches. Close to the shore is a zone of plants consisting of the stiff club-rush (*Scirpus nodosus*) (dominant), the shore spleenwort (*Asplenium obtusatum*), *Gnaphalium luteo-album*, and *Geranium sessiliflorum*.

Proceeding along the shore to the south of the creek alluded to above, a belt of dunes about a mile in width abut upon the forest-clad hills behind. They are much damaged by the wind, being quite blown away in places, with long lanes opened out 2 chains or more in width, from the level of which the individual hills or ridges are 18–20 ft. in height. Frequently, but at some distance from the shore, their hollows are full of dense and almost impassable scrub of the puheritaiko (*Senecio rotundifolius*) chiefly. The pingao (*Scirpus frondosus*) is the chief plant occupying the summits of the dunes. Near the shore the New Zealand spurge (*Euphorbia glauca*) is common, its green contrasting with the colour of the sand. Small dunes are occasionally quite fixed by the close mat of *Pimelea Lyallii*.

At the south end of the bay the dunes are in many places quite stable, and have evidently been sown with various introduced grasses, &c.—e.g., cocksfoot (*Dactylis glomerata*), white-clover (*Trifolium repens*). Here, too, the yellow toadflax (*Linaria vulgaris*) has become naturalised.

On the landward side of certain parts of the high dune the sand is unstable, and moves downwards by the action of gravity, after the manner of the stones of an alpine “shingle slip.” In such places is a rather curious assemblage of plants, much of the shingle-slip character, namely: The xerophytic moss *Racomitrium lanuginosum*; the blue-bell (*Wahlenbergia saxicola*), with unusually thick leaves; a species of wood-rush (*Luzula*), *Craspedia uniflora* var. *major*, the narrow-leaved snowberry (*Gaultheria perplexa*), *Aciphylla intermedia*, *Pimelea Lyallii*, and *Coprosma acerosa*, none of which, excepting the last named, are to be expected as dune plants.

Where the sand is backed up on to the coastal hills are many dense, silvery patches of a variety of *Raoulia australis*, 5–6 in. in diameter, stunted *Scleranthus biflorus*, *Luzula campestris* var., *Gentiana saxosa*, and stunted *Poa caespitosa*.

## The Dune Forest.

This is quite a low growth, being only some 15–20 ft. tall. The trees are often semi-horizontal, and rarely erect. On the trunks are *Polypodium grammidioides*, in very large tufts; *Lycopodium varium*; *Hymenophyllum sanguinolentum*, with its fronds 6 in. or more in length; *Earina mucronata*, *Polypodium diversifolium*, *Hymenophyllum dilatatum*, and many seedlings of the trees, &c. The dominant tree is the broadleaf (*Griselinia littoralis*), its thick leaves being suitable for the dry soil, just as they favour the epiphytic life in the rain-forest. The other trees are: *Rapanea Urvillei*, *Aristotelia racemosa*, *Nothopanax simplex*, *Carpodetus serratus*, *Pittosporum Colensoi*, *Fuchsia excorticata*, *Dracophyllum longifolium*, *Pseudopanax crassifolium*, and *Metrosideros lucida*.

There is usually but little undergrowth, but in some places this is abundant, and consists of *Coprosma rhamnoides*, *C. foetidissima*, *Nothopanax simplex*, and young *Carpodetus serratus*. On the open floor, where the forest is sheltered—i.e., in the gullies—are large breadths of the umbrella-fern (*Gleichenia Cunninghamii*); in other places plenty of *Blechnum discolor*, and much fine *Polystichum vestitum*, on tall trunks; and again elsewhere *Polypodium diversifolium*, *Asplenium bulbiferum*, *Pterostylis graminea*, *Corysanthes triloba*, *Nertera depressa*, and *Blechnum capense*. *Rubus australis*, *R. schmidelioides* and var. *coloratus*, *R. subpauperatus*, and *Muehlenbeckia complexa* are fairly common lianes in the gullies. In some parts the southern rata (*Metrosideros lucida*) is abundant, and its dark green stands out in contrast to the general lighter green of the flat forest-roof.

\* This is the type of Allan Cunningham's *C. acerosa*, and if the var. *brunnea* be considered a species—a course I am adopting in my sand-dune report—then the var. *arenaria* would be synonymous with the specific name.