

crassifolium; (Epacridaceae) *Dracophyllum longifolium*, *D. politum*; (Apocynaceae) *Parsonsia heterophylla*; (Scrophulariaceae) *Veronica salicifolia*, *V. elliptica*, *V. amabilis* var. *blanda*, *V. buxifolia* vars. *odora* and *prostrata*, *V. Laingii*; (Stylidiaceae) *Phyllachne clavigera*; (Compositae) probably *Raoulia Goyeni*.

From the above list it may be seen how diverse are the families which exhibit the phenomenon of prolonged juvenile forms. There is no space for a discussion of this important question here, but I am preparing a full account of the subject so far as concerns the New Zealand flora. Only one or two plants are dealt with which especially concern Stewart Island.

Weinmannia racemosa (the kamahi).—The adult, which is normally a tall tree, has simple leaves, but those of the juvenile are ternate, and may remain in this condition, *the plant flowering during the shrubby stage*. The early seedling has simple leaves. The closely related *W. sylvicola* has compound leaves in the adult (see Cockayne, 25, p. 22).

Dacrydium intermedium.—The juvenile plant has drooping branches, clothed with spreading, long, narrow pointed leaves. These pass by gradations into the final adult, short, thick, rhomboid, imbricating leaves, which are closely pressed to the branch. Juvenile and adult shoots have no resemblance whatsoever. The important point is, however, that in Stewart Island the actual adult stage is not everywhere met with, and juvenile trees of the open-leaved character bear cones abundantly. To this form Kirk gave the varietal name of *gracilis* (Kirk, 55, p. 224).

Dracophyllum longifolium.—In the adult this has long erect needle-like leaves, but in the juvenile they are much broader, of spreading habit, and more or less recurved, as those of *D. Menziesii*. Juvenile plants before changing their form may reach a height of from 6–10 ft.

Nothopanax Edgerleyi, *N. simplex*.—Some juvenile forms of these two species are almost identical, having much-cut compound, digitate leaves. Similar leaves are frequent also as reversion-shoots.

Ranunculus Lyallii (the mountain-lily).—The adult has a peltate leaf, a remarkable leaf-form for the genus. The seedling has a reniform leaf. I have collected adult blooming plants in Westland with reniform leaves. *R. lobulatus* of the Kaikoura Mountains shows transitions from the reniform to the peltate, the former in that species being the normal leaf-form (Cockayne, 19A, p. 371). The blooming of heterophyllous plants at the juvenile stage is a matter of great importance, as Diels has shown, for in such cases we see new species originating before our very eyes (Diels, 30A). Formerly I have expressed the opinion that in such plants as are here under notice we have virtually two species in one and the same plant.

There are various other matters connected with the ecology of Stewart Island plants—*e.g.*, seasonal changes, pollination—but space will allow no further details in this section.

PART III.—THE PLANT FORMATIONS.

A. COASTAL VEGETATION.

1. GENERAL.

The coast-line of Stewart Island, owing to the spacious inlets cutting far into the land, possesses a length out of all proportion to the size of the island, and offers situations of all kinds with regard to sun, shade, and the prevailing winds. Generally the shore-line is rocky, but there are also extensive mud-flats bare at low water, tidal rivers, and dunes, so that a rich collection of coastal plants might be expected. There are, indeed, pretty nearly all that are to be met with in the south floristic province of New Zealand (see Cockayne, 20); and, in addition, some of these which are there extremely scarce or comparatively rare have their headquarters in Stewart Island, such as *Stilbocarpa Lyallii*, *Olearia angustifolia*, *O. Traillii*, *Brachycome Thomsoni*, *Cotula Traillii*, *Myosotis albida*, *Geranium sessiliflorum* (as a dune plant), and *Atropis novae-zealandiae*.

Apparently the coast should offer at almost any part suitable stations for any of the coastal plants, and yet some strange contradictions occur. Thus on the east coast *Olearia angustifolia*, *O. Traillii*, and *O. Colensoi** are not known to occur to the north of Paterson Inlet, though they are on its southern entrance, the Neck. *Senecio Stewartiae* and *Poa foliosa* are only recorded from the adjacent outlying islands, or, regarding the latter, from headlands near the South Cape also. *Plantago triandra* var. *Hamiltonii* was only seen by me at the southern end of Mason Bay, and yet it is a most abundant plant of Centre Island. The endemic *Celmisia rigida* is known only as yet from cliffs to the south of Mason Bay. *Aciphylla intermedia* is a plant only of the west and south. *Suttonia chathamica* is confined to Wilson Bay and the Old Neck. *Gunnera Hamiltonii* and *Azorella Cockaynei* are known only from Mason Bay.

2. DUNES.

(a.) General.

Speaking generally, the dunes of Stewart Island correspond with those of the south floristic province of New Zealand, but there are some striking and important differences, the most interesting being the presence of a flourishing forest on the sheltered side of the high dunes at Mason Bay, whereas on the mainland of the South Island there is at most a xerophytic scrub. *Pimelea arenaria*, so common on dunes throughout almost the whole New Zealand biological region, is wanting, but in its place is the usually alpine *P. Lyallii*. *Geranium sessiliflorum*, also found on dunes in Southland and on Dog and Centre Islands, but not a dune-plant usually, is common. *Sonchus littoralis*, generally a plant of coastal rocks elsewhere, is common on the Mason Bay dunes near the shore.

Usually the dunes are low and isolated, but on the west coast, at Mason Bay, they rise in places to the height of 400 ft.† and extend for a number of miles. The inland dunes are treated of under another head. With the dunes is included the vegetation of the adjoining strand.

* This is abundant on Ulva.

† According to J. W. Murdoch.