

the Solanders. The Snares probably might be included here also, but for the presence of a more marked subantarctic facies, its special plant formations, and the occurrence of *Poa litorosa*, *Stilbocarpa robusta*,* *Aciphylla acutifolia*, *Colobanthus muscoides*, and *Olearia Lyallii* (if this latter is not identical with *O. Colensoi*). The Snares' flora, indeed, forms a connecting-link between that of Stewart Island and the subantarctic province proper. Also, a plea might be urged for adding the Bluff Peninsula to the Stewart Island district, since its flora and formations have a well-marked Stewart Island stamp (presence of coastal moor, as on Dog and Centre Islands, rimu-kamahi forest, coastal-rock vegetation, presence of *Olearia angustifolia*, and *Myosotis albida*).

The number of species and more or less well-marked varieties of spermatophytes and pteridophytes recorded in this report is 491. Of these, only nineteen, of which three are varieties, are endemic to Stewart Island, the remainder, with one or two exceptions, belonging to the southern floristic province outside of the Stewart Island district. One hundred and six of the latter also occur in the subantarctic province.

The affinities of the flora beyond New Zealand are given in detail in Part VII (2). Here we are concerned chiefly with the plants of the southern and subantarctic floristic provinces.

2. EVIDENCE REGARDING LAND-CONNECTION WITH THE SOUTH ISLAND.

(a.) *In favour of Land-connection.*

From the geological side, the evidence of former land-connection with the South Island, Foveaux Strait being dry land, is very strong—the very shallow sea, nowhere deeper than 336 ft., and in places only 72 ft. in the centre of the strait; the numerous granite islands; the affinities of certain rocks to those of western Otago; the drowned river-valleys of Stewart Island; the glaciation of Mount Anglem, probably due to elevation; and zoological evidence brings further proof in the presence, *inter alia*, of certain earthworms and flightless or semiflightless birds identical, or nearly so, with those of the South Island.

When we turn to the botanical evidence,† there is much that is contradictory. Further light is needed on various points—e.g., the plants of southern and western Otago are insufficiently known; we know little as to the means by which certain seeds could travel, or what is their salt-water-resisting capacity. In favour of land-connection is the presence on the mainland of 467 plants out of a total of 491; the rimu-kamahi forest being similar to that of the Bluff Hill, and most closely related to that of part of the Longwood Range; the maritime rock plants being almost identical on both sides of Foveaux Strait; the coastal scrub, although not quite the same, being very similar to that of the west-coast sounds; the resemblance between the mountain vegetation and that of the Longwood Range; the species being nearly all identical with those of the Southern Alps, while all those formerly thought to be specially characteristic of Stewart Island go far to the north, *Liparophyllum Gunnii* even reaching to the volcanic plateau of the North Island.

(b.) *Against Land-connection, or Contradictory.*

If Foveaux Strait had always formed a barrier, there is no doubt but that Stewart Island would have had a fairly rich flora. A large proportion of New Zealand plants are well adapted for bird-carriage, and many others can travel by means of wind. Also there is a powerful current from the north to the west coast of the island, as evidenced by the pumice, logs of *Nothofagus*, &c., cast up on the beach at Mason Bay. Nor can any one now question the extreme efficacy of carriage by sea-currents, wind, and birds with the evidence afforded by Krakatoa, which, at about the same distance as Stewart Island from other land, has during twenty-five years gained a plant-population of 137 species, its surface in 1883 being absolutely barren (see Ernst, 33A).

(a.) *Characteristic Genera or Species absent from Stewart Island.*

A further examination of the flora reveals some curious contradictory facts regarding its relation with the flora of the southern floristic province and the theory of land-connection with the South Island. If one genus more than any other might be expected, had land-connection existed, it would be the subantarctic *Nothofagus*,‡ so abundant on parts of the Longwood Range, and a constituent of the mixed forest of Western Otago; yet it is altogether absent. Also, the following genera or species common in the southern floristic province are wanting: *Hoheria*, *Carmichaelia*, *Sophora*, *Gaya*, *Phyllocladus*, *Hedycarya*, *Podocarpus totara*, *Leptospermum ericoides*, *Melicope*, *Pennantia*, *Oxalis*, and *Pimelea arenaria*.

(b.) *Anomalies of Distribution on the Outlying Islands of the Group.*

Further, in order to draw any final conclusions regarding increase or decrease of the Foveaux Strait land-areas, it is necessary to examine the flora of the adjacent small islands—viz., the various mutton-bird islands, Dog Island, Centre Island, the Solanders, and perhaps the Snares, and the Bluff Peninsula (virtually an island) might be added. The result of such an examination is that we find—(1) That the floras of all these are closely related ecologically and floristically to that of Stewart Island; and (2) that the following occur on some of these islands, *but not on Stewart Island itself nor on the mainland of the South Island*: *Senecio Stewartiae* (mutton-bird islands, Snares, and Solanders); *Urtica*

* *Stilbocarpa robusta* comb. nov. = *Aralia Lyallii* Kirk var. *robusta* Kirk in "Students' Flora," p. 216, 1899.

† Botanical evidence can never be nearly so strong as zoological, since it may always be urged that any special plant might have arrived by wind, bird, or water carriage, &c.

‡ Fig. 250 in Schimper's "Plant Geography" shows a Stewart Island view where the forest is described as "beech forest," the trees so called being really the southern rata (*Metrosideros lucida*), and in the background rimu-kamahi forest.