

On the damp ground beneath the kanuka (*Leptospermum ericoides*) which grows near the shore, there were such plants as monkey musk (*Mimulus guttatus*), mint, lesser stitchwort (*Stellaria graminea*), *Pratia angulata*, buttercup (*Ranunculus repens*), hyssop loosestrife (*Lythrum hyssopifolia*), *Eleocharis acuta*, and *Cardamine*. Plants growing here but not usually seen about Wellington were *Viola lyallii*, *Gunnera strigosa* and *Ranunculus acer*.

The Mosses of South Westland

W. M. Martin

A branch of New Zealand botany which only recently has received the attention it deserves, is that of bryology which is concerned with the mosses and hepatics now known to exceed one thousand species; but there still remain vast areas of which practically nothing is known. One of these is South Westland, where, in the space of less than a week, the writer recently collected no fewer than 130 species in close proximity to the Fox and Franz Joseph glaciers, mostly at levels below the subalpine zone.

As will be noted in every locality in New Zealand, most of the mosses will be found to be common and widespread, while others, rare or absent over wide areas, will have a strong local development. This applies to South Westland; and, as is usual, the mosses of the forest floor, of the vertical tree trunks, of the branches, of shrubs in the open, of rocks, of stream-beds, or of soils in the open will in general be distinct, though the commonest species are rarely restricted to a single substratum. On the present occasion time did not permit attention to the hepatics, which, however, are equally worthy of investigation.

The climate is such that the forest trees often carry a heavy burden of epiphytes—mainly mosses and filmy ferns—growing in great luxuriance. Even from a speeding motor-car the pendant tresses of *Weymouthia* and *Papillaria* are conspicuous, hanging as trailing festoons from twigs and branches. Two species of each are common, pale cream in the former case, golden in the latter; slender in one species, rather robust in the other. No less conspicuous is pincushion moss (*Leptostomum inclinans*) forming cushions sometimes of massive proportions on the trunks and limbs of trees exposed to full sunlight, and heavily studded with setae and spore-capsules which form the "pins." A hepatic that necessarily attracts attention especially on Mt. Hercules, where it blankets the shady roadside banks in a mantle of pink or red, is *Isotachis lyallii*. Nearby I found *Ditrichum cardotii* (?).

On wet forest soils near the Franz Joseph Hotel one meets many mosses of which the commonest are *Atrichum muelleri*, *Hypnoden-*

dron arcuatum, *Sciadocladus menziesii*, *Mniodendron comosum*, *Thuidium laeviusculum*, *Eriopus cristatus*, and wherever pools form *Drepanocladus fluitans* and frequently *Sphagnum antarcticum*, *Mnium rostratum*, *Hypopterygium filiculaeforme* or *Pterygophyllum quadri-farium*. On consolidated tracks *Eurhynchium praelongum* is common, though till recently this British moss was deemed rare in New Zealand, and possibly an introduced species. It is definitely indigenous for I have found it in many localities in both the South Island and Stewart Island as a member of an indigenous community.

On the drier soils on the slopes of Alex Knob, the mosses differ. Commonest on stones or on exposed roots or on bare earth are such as *Echinodium hispidum*, *Camptochaete gracilis*, or *Lembophyllum clandestinum*. On soils exposed by recent slips various mosses belonging to the Polytrichous and Bartramiaceus mosses (hair mosses and apple mosses) are common. Most conspicuous of the epiphytic mosses on the trunks of trees or tree-ferns is the endemic *Cryptopodium bartramioides*, bronze or green in colour, and commoner in Westland than elsewhere in New Zealand.

Forest lianes usually have *Trachloma planifolium* with flattish fronds of dark green commonly suffused with a silvery sheen and bearing tufts of buds or gemmae near the tips. Its commonest associate is *Hypopterygium concinnum*, a pale feathery moss with delicate fronds.

Branches of small trees commonly have an association peculiar to themselves in which one here meets the rather uncommon *Bellia nervosa* and the slender *Tetraphidopsis pusilla*, both monotypic endemic genera, together with *Neckera hymenodonta*, easily recognised by its transversely undulate leaves, *Cryphaea tenella*, *Calypogon mnioides*, which, published statements to the contrary, is an abundant fruiter, and occasionally *Sauloma tenella*, *Fabronia australis* or *Dichelodontium nitidum*.

Most interesting of all was the discovery of *Ephemeropsis trentepohlioides* at its most southerly station to date. This moss is peculiar in that the sporophyte grows directly from the protonema, so that there is no leafy gametophyte stage at all. Unlike its tropical congener, this moss is not epiphyllous, but grows on the bark of twigs and small stems. *Dicnemon semicryptum* is even more common in South Westland than *D. calycinum*, and *Sematophyllum macrosporum* was noted.

Shrubs on moraine such as *Carmichaelia* or *Olearia* carry an abundant growth of Orthotrichaceous mosses—*Macromitrium*, *Orthotrichum*, *Ulota*, and *Zygodon*. Of these *O. graphiomitrium* and *O. beckettii* are the most plentiful, whereas *Macromitrium* spp. are the more common on the branches of small trees in the same area.

Mosses everywhere abundant on submerged rocks in forest streams include water fork-moss (*Fissidens rigidulus*) and the dark

green *Thamnum pandum*. *Mnium rostratum* and even *Bryum blandum* are common associates.

Vertical rock faces near the glacier terminals carried large, golden blankets of *Rhacocarpus australis*, a moss with a circumpolar distribution, and smaller, but exceedingly numerous patches or tufts of *Rhacomitrium crispulum*. These were also abundant on morainic boulders, as were *Brachythecium plumosum* and *B. salebrosum* and in places *B. rutabulum*. On gritty soils *Bryum laevigatum*, *Ceretodon purpureus*, and the rare *Anomobryum harriottii* were plentiful. Less common was *Erythrophyllum recurvirostris* (*Didymodon rubellus*). In rock crevices another uncommon moss, growing luxuriantly, was *Anoetangium bellii*.

The subalpine areas were not investigated, but Alex Knob was ascended to 3000 feet and the moss giant, *Dendrologotrichum dendroides*, came in strongly at 2300 feet. Much interesting research remains to be carried out on the whole of the Southern Alps and trampers are invited to forward any mosses collected in these more or less inaccessible stations.

Recent Publications

New Zealand, 1826-1827, from the French of Dumont d'Urville.

An English translation of the *Voyage de l'Astrolabe* in New Zealand waters with an introductory essay by Olive Wright. Wingfield Press for Olive Wright. 30/-.

Water Plants, by Ruth Mason, with illustrations by Nancy M. Adams; Post Primary School Bulletin, Vol. 4, No. 12. A limited number of copies are available from the author, Botany Division, 8 The Terrace, Wellington.

The Botanical Explorers of New Zealand, by Rewa Glenn, with colour plates by Elizabeth Johnston. A. H. & A. W. Reed, Wellington. 10/6.

Introduced Mammals of New Zealand. An ecological and economic survey, by K. A. Wodzicki. D.S.I.R. Bulletin No. 98. 12/6.

The Invasion of New Zealand by People, Plants and Animals: The South Island, by Andrew Hill Clark. Rutgers University Press, New Brunswick, 1949. \$6.00.

The Poisonous Plants in New Zealand, by H. E. Connor, illustrated by Nancy M. Adams. D.S.I.R. Bulletin No. 99. Paper, 3/3; quarter bound, 4/-.