

The Vegetation of Awarua Plain.

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(Plate 1.)

WHAT is known as Awarua Plain is a swampy bog covering many thousand acres. The Invercargill-Bluff railway runs through it on the western side for probably ten miles of its length. The depth of peat shows it to have been a large lagoon formed probably by the sinking of the land and the blocking up by sand dunes at the south-eastern end. The under stratum is white quartz gravel deposited by a large river which once flowed over the Southland plain. The depth of peat is five to six feet. From ditches cut for drainage can be seen stumps of a previous generation of Manuka. These are 18 inches below the present surface, some of which are 10 inches in diameter.

This swampy-bog is only a few feet above sea level, and is possibly unique in the South Island, at least in being occupied largely by subalpine plants similar to those of Southern Southland and Stewart Island. As it is now being drained and put under cultivation, I consider some record should be made of its ecological character before it is too late.

My notes of the plants growing there now and in the immediate past were made twelve years ago, before the draining had made great effect on the original vegetation. From a recent visit I find that the water has been so far drawn off that the surface has sunk in places 18 inches, leaving the cushion-plants high and dry, with the result that they are dying rapidly. Other plants depending on very damp conditions such as *Utricularia monanthos* have mostly disappeared.

The wettest parts of Awarua swampy-bog are occupied by various species of *Sphagnum*, *Oreobulus pectinatus*, *Oreostylidium subulatum*, *Drosera spatulata*, *D. binata*, *Montia fontana*, *Elatine americana*, *Var. australiensis*, and some *Microlaena Thomsoni*.

On drier ground *Donatia novae zealandiae* forms large cushions 4 feet long by 3 feet wide and 2 feet high (fig. 1). On nearly all these cushions *Pentachondra pumila* or *Cyathodes pumila* flourish as epiphytes. In addition, on this drier ground are *Gaultheria depressa*, *Pernettya nana*, *Leucopogon Fraseri*, *Dracophyllum longifolium*, and *Gunnera albiflora*.

On the upper and still drier ground *Phormium tenax* flourishes, and is now 6 or 7 feet in height. This is quite different from that species at the lower end of the swamp on the west of the Bluff railway line, which is stunted to 3 feet in height. *Leptospermum scoparium* behaves similarly (fig. 2), and on the drier ground is 8 feet high, while in the more damp places it is only 2 to 3 feet high. It is interesting to note that along most of the ditches, which are 5 feet deep, *L. scoparium* has taken a hold 15 inches down the sides of the ditch where it is dry, and is growing freely.

Where the ground is nearly at its maximum dryness *Danthonia Raoulii* var. *rubra* 5½ feet high has taken a good hold, and is now covering acres.

Except *Gleichenia circinata* and *G. dicarpa*, *Lindsaya linearis*, and *Schizaea fistulosa*, the other ferns do not grow far from the ditches. *Hypolaena lateriflora* fills up a good deal of space between the cushion plants. A number of other plants not mentioned above are found on the fringes of the swampy-bog in places that have been dry for some time.

LIST OF SPECIES OF THE AWARUA PLAIN.

- FILICES.
Lindsaya linearis.
Pteridium esculentum.
Histiopteris incisa.
Blechnum pracerum.
 — *Banksii*.
Polystichum vestitum.
Schizaea fistulosa.
Gleichenia circinata var. *Alpina*.
 — *microphylla*.
Ophioglossum pedunculosum.
- LYCOPODIACEAE.
Lycopodium volubile.
 — *ramulosum*.
- GRAMINEAE.
Poa Colensoi.
Danthonia Raouli var. *rubra*.
 — *semiannularis*.
Microlaena Thomsoni.
- CYPERACEAE.
Carpha alpina.
Oreobolus pectinatus.
- RESTIONACEAE.
Hypolaena lateriflora.
Leptocarpus simplex.
- JUNCACEAE.
Juncus lampocarpus.
- LILIACEAE.
Astela Cockaynei.
Phormium tenax.
Herpolirion novae zelandiae.
- IRIDACEAE.
Libertia ixioides.
- ORCHIDACEAE.
Prasophyllum Colensoi.
Thelymitra longifolium.
 — *uniflora*.
- PORTULACACEAE.
Montia fontana.
- DROSERACEAE.
Drosera binata.
 — *spathulata*.
- ROSACEAE.
Acaena Sanguisorbae.
 — *microphylla*.
- RHAMNACEAE.
Discaria toumatou.
- ELATINACEAE.
Elatine americana var. *australiensis*.
- VIOLACEAE.
Viola Cunninghamii.
 — *flicauale*.
- THYMELAEACEAE.
Pimelea prostrata.
- MYRTACEAE.
Leptospermum scoparium.
- ONAGRACEAE.
Epilobium nerterioides.
- HALORAGIDACEAE.
Halorrhagis uniflora.
Gunnera albocarpa.
 — *prorepens*.
- ERICACEAE.
Gaultheria perpleza.
 — *depressa*.
Pernettya nana.
- EPACRIDACEAE.
Pentachondra pumila.
Cyathodes empetrifolia.
 — *pumila*.
Leucopogon Fraseri.
Dracophyllum longifolium.
- LENTIBULARIACEAE.
Utricularia monanthos.
- GENTIANACEAE.
Gentiana lineata.
- STYLIDEACEAE.
Donatia novae-zelandiae.
Oreostylidium subulatum.
- COMPOSITAE.
Helichrysum bellidioides.
Cassinia vauvilliersii.
 — *fulvida*.
Celmisia gracilentia.
Gnaphalium luteo-album.



FIG. 1.—Cusions of *Donatia novae zelandiae* in flower on Awarua Bog, intermixed with sphagnum moss.



FIG. 2.—Dwarf area of manuka (*Leptospermum scoparium*) on Awarua swamp land.