A SKETCH OF THE VEGETATION OF THE CRADLE MOUNTAIN, TASMANIA,

and

A CENSUS OF ITS PLANTS.

By

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1. INTRODUCTORY.

Excepting some references in articles in the public press, no account of the flora of the Cradle Mountain, other than those of Weindorfer and the writer, appear to have been published. As far as one can ascertain, descriptions of the vegetation of the Tasmanian mountains have been, generally speaking, extremely few and incidental, and, with one exception, floristic only. Moreover, no list aiming at completeness of the plants of any individual mountain appears to have yet been made, Miss L. S. Gibbs's enumeration of species referring to all the mountain summit plateaux visited by her.

Although the writer has paid several visits to the Cradle Mountain, his stay there on any particular occasion has never been sufficiently prolonged to enable him to discriminate other than the more obvious of the plant associations, and this paper must accordingly be taken as nothing more than a preliminary or reconnaissance survey.

The locality here dealt with lies in Lat. 41° 40′S., about 70 miles due south from Burnie on the North Coast, and is reached from that port by rail, via Railton, to Sheffield, and thence by road, through Wilmot, Moina, and the Middlesex Plains.

2. TOPOGRAPHIC.

The Cradle Mountain, 5,069 feet, and its neighbouring elevations, the Barn Bluff, 5,114 feet, and Mount Brown, 4,607 feet, remnants of a dolerite sill, stand upon the north-western corner of the great Central Plateau of Tasmania, here about 4,000 feet above sea level. The three elevations are all more or less broken up into columnar masses, and the northern side of the first named, especially, is fringed with talus. On the southern, eastern, and northern sides the plateau has been shaped by glacial action into cirques, and cut into deep gorges by the branches of the Forth River, which discharges at Leith on the north coast. On the western side it has been scored by the branches of the Fury, a tributary of the Pieman River, which runs to the West Coast. Numerous lakes and tarns of glacial origin lie at various elevations. The largest of these, the Dove Lake at 3,150 feet, is rather more than a mile long and nearly 200 feet deep. The Crater Lake at 3,400 feet is almost half as long and somewhat deeper. Other notable areas of water are Lake Rodway at about 3,000 feet, Lake Wilkes on a shelf above Dove Lake and Lake Lilla, close to and at nearly the same elevation as the last named (3,125 feet).

The results of glacial action are everywhere apparent. Of the several cirques which have been bitten into the plateau, that on the southern side of the Cradle Mountain, and on the floor of which Lakes Flynn and Rodway are situated, is considered to be the finest example. This, according to Dr. Benson, once contained ice one thousand feet deep. What is described by him as a beautiful *roche moutonné* hill lies between the outlets of Lake Lilla and Dove Lake, and on the top of this are perfect examples of the removal of masses of rock by the plucking action of moving ice, leaving hollows now occupied by lakelets. There are moraines to the east

of the Cradle Valley, extending across the Dove River. Near the junction of this with the Valley creek there are hummocks amongst which are small pools.

Quoting Dr. Benson—"the four main formations in the "vicinity of Cradle Mountain and Barn Bluff are the Pre-"Cambrian schists and quartzites, the Permo-Carboniferous "conglomerates, sandstones, and mudstones, the Cretaceous "dolerite of the three highest elevations and the Pleistocene "glacial deposits."

That weathering is very actively taking place is evidenced by the frequence of stone fields and rock falls and by the numerous streams of broken rock of all sizes—stone runs, shingle slips, and gravel slides—making their way down the steeper slopes, few only having been stabilised by vegetation. The surface of the area, in short, is diversified to a very high degree.

3. CLIMATIC CONDITIONS.

Meteorologically the Cradle Mountain station would seem to belong to the West Coast district, but it is at present included in that of the Central Plateau. Precipitation records have been kept by Mr. Weindorfer at *Waldheim*—elevation about 3,000 feet—since 1918, and thermometric readings since 1919, and are as follow:—

Month.	Average Temperatures. Seven Years.							Averages for Eight Years.		
	Dry Mean	Wet Mean	Mean Max.	Mean Min.	Abs. Max.	Abs. Min.	Grand Mean	Hum.	Rainy Days	Precipitation.
January ..	52.6	49.8	63.1	39.8	86.0	27.0	52.1	80	17.6	616
February	55.5	52.4	66.3	41.8	91.0	29.0	54.0	82	14.4	557
March ..	49.4	47.9	58.7	37.7	77.0	25.0	48.2	90	19.4	678
April	45.7	44.8	53.8	35.6	74.0	26.0	44.7	90	17.7	739
May	41.2	40.3	48.3	33.5	62.0	21.0	40.8	88	20.3	1012
June	37.9	37.3	44.0	32.2	56.0	20.0	38.1	94	24.3	1243
July	36.5	35.7	42.7	30.0	59.0	20.8	36.3	93	24.1	1248
August ..	37.5	36.5	44.7	29.9	58.0	18.0	37.3	95	24.4	1047
September	40.4	39.3	48.8	32.0	66.0	21.0	41.8	91	23.0	1095
October ..	45.3	42.7	54.6	33.7	80.0	23.0	44.2	76	23.1	1025
November	50.2	45.9	60.0	35.2	85.0	25.0	47.7	67	19.9	831
December	52.7	49.2	62.9	38.3	89.0	27.0	50.6	75	19.2	655
Average ..	45.4	43.4	54.0	35.0	91.0	18.0	44.6	85	247.4	107.16

The records reveal a range of temperature of 73 (18 August, 91 February), and that the temperature may fall below freezing point in any month of the year. The wet mean, 43.43 (52.4 in February, 35.7 in July), shows a range of 16.7, as compared with 12 at Cape Sorell on the West Coast.

Precipitation is high (134.69 inches in 1924, 98.14 in 1918); the wettest months are the winter, 35.48 inches—though the highest record for any month, 23.21 inches, was in May, 1923—and the driest the summer, 14.06 inches, the lowest record for any month being, however, but .56 inch in April, 1923. The number of wet days ranged from 274 in 1924 to 220 in 1918. Snow may fall in any month, the average number of days when it occurred being 38—winter 16, summer 2.5. The ground at the lower levels, however, is rarely covered for more than a few days together, the subsequent rains usually leading to its quickly melting. The yearly average of frosty days is 144 (winter 62.4, summer 10.1).

Humidity is high (August 95, November 67) with a range of 28%, and may be compared with that of Kiandra, 4,640 feet, where it is 92% in June, the highest on the mainland.

The prevailing winds, the Roaring Forties, are from the west, 54.5 days, south-west 53.4, north-west 36.9 days. Those from the south 34 days, north-east 27, north 12.5, east 6, south-east 5 days.

The average of totally overclouded days is 196.

4. HUMAN AND ANIMAL INFLUENCES.

Skin hunters have visited the Cradle Valley and its vicinity for many years, and the button-grass has frequently been fired by them. Stock from the Middlesex Plains have rarely penetrated so far, but lately a few sheep and a horse or two have been depastured in the valley. They have, however, made very little impression on the vegetation, and the only alien plant so far noticed is the sorrel, *Rumex acetosella*, L.

Animals indigenous to the locality are the wombat, *Phascolomys ursinus, var. tasmanicus*, Lord, Bennett's wallaby, *Macropus ruficollis, var. bennettii*, Waterh., the rufous-bellied wallaby, *Macropus billardieri*, Less., the brush or black opossum, *Trichosurus vulpecula, var. fuliginosus*, Ogilby, the ringtail 'possum, *Pseudochirus cookii, Des.*, the tiger cat, *Dasyurus maculatus*, Kerr, the common native cat, *Dasyurus viverrinus*, Shaw, the platypus, *Ornithorhynchus anatinus*, Shaw, and the porcupine, *Echidna aculeata*, Garnot. The firstnamed is the most often seen and is responsible for many well-defined and well-graded tracks, which, though narrow, facilitate one's progress, especially in the more scrubby parts.

Rabbits have not yet been seen in the locality.

5. THE PLANT ASSOCIATIONS.

(i.) Forest.

Forest growth, varying in height, density, and composition, discontinuously covers most of the slopes and the heads of the streams.

(a) The *Athrotaxis-Nothofagus* Forest. This is a closed forest, ranging between 50 and 70 feet in height, occupying the higher slope of the north-western side of the Cradle valley, excepting the cirque near its upper end. Below it ends with striking abruptness, but above, as the crest of the plateau is neared, it dwindles in size until its members merge into the low subalpine scrub of Hounslow Heath.

The dominant species is *Athrotaxis selaginoides*, which occasionally attains a height of 100 feet and a stem diameter of six feet. *Nothofagus cunninghamii* is less frequent and here does no more than rival it in height, though elsewhere it may grow to twice the size. *N. gunnii*, the only deciduous tree in the island, is abundant, shrubby in habit, not often exceeding 20 feet. The other chief constituents, which with the deciduous beech may be said to compose the second story, are *Atherosperma moschatum, Phyllocladus rhomboidalis, Pittosporum bicolor, Telopea truncata, Drimys aromatica, Trochocarpa gunnii*, and *Archeria eriocarpa* More or less confined to the lower border are *Leptospermum lanigerum, var. montanum, Olearia pinifolia, Richea pandanifolia*, and *R. scoparia*, and in the outskirts are *Polystichum aculeatum, Histiopteris incisa, Oxalis magellanica*, and *Libertia pulchella*. Excepting an abundant growth of liverworts and mosses in the wetter places there is practically no ground flora. The trunks of the *Athrotaxis* are often thickly-clad with the russet-coloured *Hymenophyllum malingii*, and less abundantly with *H. wilsonii* and *Polypodium billardieri*. On fallen logs, with cryptogams, *Uncinia riparia* occurs occasionally.

(b) In the immediate vicinity of *Waldheim*, intervening between (a) and the grassland of the lower slope of the valley, on a surface which is in part rocky and much drier, is a narrow fringe of more open forest with many shrubs of varying height and some herbaceous plants. Here the members of several associations intermingle and four layers of vegetation can be plainly distinguished.

The tallest story is composed of *Eucalyptus muelleri* with *Athrotaxis selaginoides* (in pyramidal form), *Richea pandanifolia, Leptospermum myrtifolium, Nothofagus gunnii*, and an occasional *Pittosporum* and *Phyllocladus* from the adjacent forest. The next layer, of the taller shrubs, is mostly made up of epacrids—*Cyathodes acerosa, Trochocarpa, T. gunnii, Richea scoparia, R. sprengelioides*—with *Drimys, Olearia pinifolia*, an odd tussock of *Gahnia psittacorum* and stunted *Eucalyptus coccifera*. Constituents of the dwarf subalpine scrub almost entirely form the third story, these being *Boronia citriodora, Epacris microphylla, E. serpyllifolia, E. lanuginosa, Oxylobium ellipticum, Leucopogon ericoides, Bauera, Pimelea, Calostrophus lateriflorus*, and a few plants of *Diplarrhena*. In the lowest layer are *Hibbertia procumbens*, forming flat mats, with large yellow flowers, the spreading *Leucopogon collinus* and *Tetracarpæa*, with not infrequently *Lagenophora billardieri, Stylidium, Oxalis, Libertia*, and *Senecio pectinatus*. Here also, of some half dozen ferns, *Blechnum penna-marina* and *Gleichnia* are most noticeable.

(c) *Eucalyptus-Athrotaxis Forest.*—On the eastern side and southern end of the Dove Lake a very close mixed forest extends from the water's edge to a varying distance up the steep slopes, gradually fading out in the shallow gullies. At the head of the lake it appears to attain its greatest density, and under its shelter reaches the level of the plateau. It is more complex than (a) but perhaps less so than the growth at *Waldheim*. Judging from portions traversed at both ends and a distant view of its main extent, the most prominent species are *Eucalyptus muelleri* and *Athrotaxis selaginoides* away from the lake, and *A. cupressoides* near the waterside. These seem to be scattered throughout in small clumps, though the *Eucalyptus* is more abundant and somewhat exclusive along the watercourse coming from Lake Wilkes. *Nothofagus cunninghamii* is also a leading constituent. The species next in order of tallness are *Leptospermum lanigerum, Richea pandanifolia, Nothofagus gunnii, Eucryphia billardieri, Cenarrhenes nitida, Anodopetalum biglandulosum, Persoonia gunnii, Archeria eriocarpa, Cyathodes acerosa, Drimys, Monotoca elliptica, Archeria serpyllifolia*, and *Oxylobium ellipticum*. In the few open spaces the most notable species are *Pimelea linifolia, Gaultheria hispida, Tetracarpæa tasmanica, Bauera, Olearia persoonioides*, and *Blandfordia*.

(d) *Eucalyptus-Nothofagus* Forest.—On the steep slope leading from the eastern side of the Crater Lake towards

the plateau another type, of low, open forest, exists. Here the surface is very rough and covered with broken rock, ranging in size from large boulders to gravel. Much of the surface is bare of vegetation, which, as might be expected, is strikingly xerophytic. *Eucalyptus coccifera*, about ten feet high, often with many stems branching from near the ground, is the dominant species. *Nothofagus cunninghamii* and *Phyllocladus* are taller but scattered and less frequent, but *Nothofagus gunnii* is more common. Finding a holding ground among the rocks are bushes, often very thickset, of *Orites revoluta, O. acicularis, Richea sprengelioides, R. scoparia, R. acerosa, Cyathodes straminea, C. acerosa, Epacris serpyllifolia*, and *E. lanuginosa*, all extremely sclerophyllous, *Microcachrys* and *Podocarpus, Oxylobium, Coprosma billardieri, Ozothamnus backhousii, O. ledifolius, Bæckea*, and *Drimys*.

In a lower story *Boronia citriodora, Bellendena, Bauera, Hibbertia*, and *Euphrasia brownii* are not infrequently present, and sparsely scattered are also *Tetracarpæa, Exocarpus, Luzula, Olearia persoonioides*, and *O. ledifolia*. In such an unfavourable station even the rare occurrence of *Blandfordia* and *Diplarrhena* was quite unexpected. *Blechnum capense, var. procera* was the only fern noted.

Another piece of forest on the eastern shore of Lake Lilla, which was, however, only passingly studied, contained, in addition to species mentioned as occurring in the others, *Banksia integrifolia, Telopea, Aristotelia, Acacia mucronata, Drymophylla, Sprengelia, Gaultheria hispida*, and *Townsonia viridis*.

Two other forms of low *Eucalyptus* forest occur towards the head of the Cradle valley. The one, on a surface covered with broken rock with very little visible soil, is close set and almost without ground flora. The other is more open, less tall, the trees with broader canopies, and is filled in mainly with a thick growth of *Bauera*.

These appeared to be the most obvious of the tree associations. Doubtless others can be recognised, but enough has been said to show their great variety, due to differences of substratum, slope, aspect, and exposure.

(ii.) The Dwarf Subalpine Scrub.

This is a very well-defined unit, prevailing mostly in the lower end of the valley, both on the flats and on the rising ground between the streams going to feed the Dove River.

It also occurs in patches in the grassland and ascends the slopes of the plateau where, at about 3,700 feet, it meets outlying cushion plants. It generally exists as a thickset growth about a foot or eighteen inches high. The most characteristic and frequent species composing it are *Boronia citriodora, B. rhomboidea, Melaleuca squamea, Oxylobium ellipticum, Bæckea lepticaulis, Epacris microphylla, E. serpyllifolia*, all now and again locally dominant, with *Hibbertia procumbens, Euphrasia brownii, Stylidium, Epacris lanuginosa, Hypolæna lateriflora, Casuarina distyla, Leptospermum rupestre, Sprengelia, Pultenæa subumbellata*, and *Comesperma*. Others less frequent are *Bellendena, Pimelea linifolia, Campynema, Xyris, Patersonia, Bossiæa, Thelymitra venosa*, and *Prasophyllum fuscum*. Not rarely it becomes mixed with the *Gleichenia-Restio* combination.

(iii.) The Gymnoschœnus (Button-grass) Association.

Gymnoschœnus adustus, with long, slender, rigid leaves and stems up to 5 or 6 feet long, in densely tufted form, associated with a number of smaller species, occupies much of the wet, sour ground in the valley. It is a very extensive plant association in Tasmania, covering several hundred square miles of what is popularly known as button-grass country. Being very inflammable it is frequently fired and is here often seen as blackened stumps. It is always greatly dominant. *Xyris, Hypolæna lateriflora, Cladium capillaceum, Sprengelia, Deyeuxia quadriseta, Carpha, Campynema, Abrotanella, Comesperma, Astelia* (in mats), *Drosera arcturi, D. binata, D. peltata, Claytonia, Scævola, Actinotus bellidioides, A. suffocata, Halorrhagis micrantha, Luzula, Patersonia, Diplarrhena*, and *Utricularia*, which are most frequently noted in its company, play a very secondary part in the make up.

On the ground between the burnt stumps, an invasion of plants from neighbouring associations is taking place. Most of these are from the Dwarf subalpine scrub, but others, not or only rarely found there, are *Mitrasacme montana* and *Rubus* in little mats, *Bauera, Gentiana, Lagenophora, Celmisia, Helichrysum pumilum, Senecio pectinatus, Pentachondra pumila, Leptospermum myrtifolium, L. lanigerum, Poa cæspitosa*, and *Gleichenia*. With the regrowth of the dominant species many of these will not persist, but doubtless a combination differing from that ordinarily seen will result.

(iv.) The Gleichenia-Restio Association.

Another combination of plants occupying wet ground, especially in a zone along the edge of the forest in the Cradle valley and separating it from the grassland, consists almost entirely of *Gleichenia dicarpa*, here only a foot or so in height, with *Restio australis* and *R. complanatus*. Within it are occasionally found mats of *Astelia* and large mounds of *Sphagnum*.

(v.) The Subalpine Meadow Association.

Grassland covers the lower slopes of the Cradle valley, more particularly on the northern side. It is mainly composed of *Poa cæspitosa* in close tussocks, with a comparatively insignificant admixture of other grasses, such as *Hierochloe fraseri, H. rariflora, Microlæna tasmanica, Deyeuxia spp.*, and the allied *Carpha, Cladium capillaceum*, and *Luzula*. Here the composites, *Celmisia* and *Helichrysum lucidum*, are abundant, and *Helichrysum scorpioides, Leptorrhynchus squamatus, Podolepis, Craspedia*, and *Erigeron* somewhat less so. *Diplarrhena* is locally abundant and *Gentiana* and *Stylidium* scattered but frequent. Where the tussocks are not so overwhelmingly dense, or the growth is shorter, numerous smaller plants, such as the *Rubus, Herpolirion, Xanthosia dissecta, Viola hederacea, var. Sieberi, Daucus, Coprosma moorei, Lagenophora, Acæna sanguisorbe, Halorrhagis micrantha, Hydrocotyle hirta*, and also the taller *Ranunculus hirtus* and *Prasophyllum fuscum* are not infrequent.

Zonation is very plainly seen on the northern side of the valley. Above, at about 3,900 feet, the dwarf subalpine scrub of Hounslow Heath meets and merges with the *Athrotaxis-Fagus* forest, there thinned out and dwindled in height; then comes the forest (b), bordered by *Gleichenia-Restio*, and finally the grassland, which runs to the stream-side, edged with *Helichrysums, Ozothamnus, Olearias, Leptospermums, Boronias, Richeas, Bæckea, Bellendena*, and others.

(vi.) Aquatic and Bog Plants.

Several plants affecting the wetter situations have already been mentioned, for both the *Gymnoschœnus* and the *Gleichenia-Restio* associations are those of wet ground. Other such associations or communities will surely be discriminated later. Without attempting to do so here, it will be sufficient to mention *Isœtes* growing submerged to a depth of about two feet in Dove Lake and Lake Lilla, *Scirpus fluitans* and *S. inundatus* submerged or floating, *Myriophyllum pedunculatum, Utricularia, Cladium, Carex gaudichaudiana*, and *C. inversa* in water or on the bottoms of dried-up pools, and *Drosera arcturi, D. binata, Claytonia, Brachycome cardiocarpa, Trithuria*, and *Forstera* in muddy places—the last only along the edge of Dove Lake for about a chain or so, and *Epilobium billardierianum* from sphagnum cushions. Just outside the valley near the Dove River *Gunnera cordifolia* occurs in wide mats.

A riparian community is perhaps discernible, for *Athrotaxis cupressoides* prefers the waterside, *Blandfordia* is generally present there, the *Olearias, O. obcordata, O. persoonioides, O. floribunda, O. pinifolia*, and *O. stellulata, Ozothamnus backhousii, O. hookeri*, and *O. gunnii* seem to be found more often bordering streamsides than elsewhere, and this is perhaps also the case with such smaller plants like *Rubus, Hydrocotyle, Viola, Oxalis, Halorrhagis micrantha*, and *Acæna sanguisorbe*. In addition, many plants from neighbouring associations like *Richea pandanifolia, Drimys, Nothofagus gunnii, Leptospermums* from the forest, *Boronia citriodora* and *B. rhomboidea, Bellendena, Bæckea*, and other members of the subalpine scrub as well as *Cyathodes acerosa, Richeas*, and *Orites* are not seldom in the same situation.

(vii.) The Subantarctic Fell-field.

The plateau on which the Cradle Mountain, the Barn Bluff, and Mount Brown rest is about 4,000 feet above sea level, and is divided into two main parts by the Fury Gorge, the head of which closely approaches the southern end of the ridge of the Cradle Mountain. On the northern side the formation is Pre-Cambrian and the surface is greatly diversified. Broken rock, from large boulders to coarse gravel and sand, covers a large part of it. Areas of bare rock are frequent. Where the surface is level a thin layer of soil is found, but only in the shallow depressions, bounded by low outcropping rock, is it of any depth, and here perhaps remains more or less moist under all weather conditions. The soil is dark and tenacious and mixed with coarse white sand. From the plateau many steep rock falls and gravel slides run down, some of them stabilised by vegetation.

On the further or southern side of the Fury Gorge sandstone prevails; the surface is more level, and where boulders

occur they are often in the form of a natural pavement. The soil is much lighter, of a yellowish or buff colour, finer in texture, and more friable.

Judging from the records kept at *Waldheim*, which is in a rather sheltered position and about 1,000 feet lower, it can be safely concluded that the climatic conditions on the plateau are more severe. Precipitations must be greater, probably as high as at Mount Read a little to the south-west, where the average is more than 120 inches, humidity higher, snowfalls more frequent and persistent, and the mean temperature lower. The surface also is fully exposed to the force of the strong, prevailing westerly winds.

In spite of the greater moisture and humidity, however, and because of the greater evaporation from lower atmospheric pressure, more intense insolation and unrestricted wind action, aridity sometimes results, certainly in the summer months, when, the thinly covered rock slopes allowing a quick run-off, the thin veneer of soil can be broken up into dust after a short spell of fine weather.

The nature of the substratum and the climatic conditions—the habitat—have resulted in that peculiar type of vegetation known as the fell-field, a fundamental unit seemingly without parallel on the mainland, and presenting the following characteristics: — A discontinuous and strongly xerophytic vegetation with a rather varied flora, often of stunted growth—nanism—which, except in sheltered places or amongst boulders, is generally not more than about eighteen inches high and often much less. The "cushion" or "bolster," or perhaps more appropriately, the "boulder" growth form. The rarity of bulbous or tuberous species and the almost entire absence of annuals. The frequence of tufted plants, forming mats. Rosette plants not, however, numerous. The scanty branching of several woody species, carrying tufts of sclerophyllous foliage at the ends of their branches. The prostrate, espalier form in some species, forming elfin-wood. Leaves, with few exceptions, entire, usually small, erect or appressed, coriaceous or ligneous, rigid and pointed, round or tightly rolled, shining or more or less densely felted with hairs.

The Bolster Plants.—The most striking feature of the plateau vegetation is due to the presence of four plants—*Dracophyllum minimum* (Epac.), *Donatia novæ-zelandiæ* (Stylid.), *Ewartia meredithæ*, and *Pterygopappus lawrencii* (Comps)—which have developed the bolster growth-form. Sometimes one or another of them, especially the two first

named, occupy quite wide areas, more particularly in the shallow wet depressions already referred to, where the bolsters may measure two or three feet across and may stand up perhaps a couple of feet, at places surrounded by bare muddy soil or at others closely hedged in by low scrub which perhaps not infrequently ultimately overwhelms and supplants them. On flat or sloping rock surfaces all the species tend to a more extensive and flatter or matlike form, but still with a more or less rounded contour. In these situations too they seem to lose their exclusiveness and two, three, or all of them may combine to form one large shallow bolster as much as three yards across. Often very pleasing patterns are produced by the interweaving of the sage and russet colours of the composites with the dark green of the two other species, the smoothness of contour being always preserved. These four plants, and especially the *Donatia* and *Dracophyllum*, afford very perfect examples of epharmonic convergence.

Many of the bolsters act, like the stems of the tree ferns in the gullies at a lower altitude, as seed-beds for other plants, and several small epacrids like the *Pentachondra*, *Sprengelia*, *Cyathodes adscendens*, and *Leucopogon collinus*, as well as *Drosera arcturi*, *Celmisia*, *Gleichenia*, *Calostrophus*, *Oreobolus*, and others may be found growing from their surface. The cryptogams *Dicranium billardieri* and *Rhacomitrium pruinosum* are also not uncommonly found on them.

Dracophyllum minimum, F. v. M.—Bolsters green, very hard. Leaves lanceolate, appressed, imbricate, pointed, sheathing at the base. About 24 were counted in a rosette and 35 of these were found to occupy a square inch of the surface. Lobes of the corolla tube white, obtuse, spreading and not removed from the surface. This species is close to *D. muscoides* of New Zealand, where eighteen occur. One also is in Australia, five in New Caledonia, and one in Lord Howe Island.

Donatia novæ-zelandiæ, Hook.—Bolsters dark green, very hard, not strongly domed like the preceding but indistinguishable from it without very close scrutiny. For this reason it is difficult to say which is more prevalent, but taken together they are much more abundant than the two composites. Leaves, like those of the *Dracophyllum*, entire, imbricate, and about two lines long but more linear, shining, and dotted, blunter and broadening towards the base, where they are invested with woolly hairs. Some 50 or 60 compose each rosette, 22 of which were counted occupying a square inch of

the surface. The flowers are also white, solitary, terminal, and sessile, the lobes rather obtuse and less spreading, and are said to open a little earlier. Stout adventitious roots are to be found coming off at right angles from the stems just below the surface and ramifying amongst the branches which still retain their dead leaves. This species also occurs in New Zealand and one other in southern Chili.

Ewartia meredithæ (F. v. M.).—Bolsters softer, less domed, and of a pleasing russet grey colour. The leaves are oblong or rather spathulate, woolly at the base. There are from 12 to 18 in each rosette, and from 25 to 45 of these fill the space of a square inch. The flowers are solitary and terminal, white or pink, and when open the white, spreading bracts lie on the surface, but as the seeds ripen the stalks lengthen until they stand out perhaps three-quarters of an inch or more. There are two other species in Tasmania, one of which is found on the mainland, where there is yet a fourth.

Pterygopappus lawrencii, Hook.—Perhaps less common than the last. Tends to make flatter, harder, and less prominent growths of a grey green or sage colour. Leaves from ½ to one line long, broadly cordate, imbricate, hairy on the inner surface and minutely mucronate. About 12 form the rosette and as many as 125 of these can be counted within the area of one square inch. The flowers are solitary, terminal, very minute, without spreading bracts, at first sessile, but the pedicle lengthens later. This species is monotypic and endemic.

Centrolepis monogyna, Benth., is the only other plant forming a very dense growth, which in this case is rounded and from two to twenty inches in diameter.

The bolster plants are not entirely confined to the plateau, occurring also on the moraine to the east of the Crater Lake, sparingly and in small size at the edge of Hounslow Heath, just across the Cradle valley, and as still smaller plants sparsely scattered along the western side of Dove Lake, close to the water.

The bolster growth form would appear to possess many advantages. The plant so composed is proof against the strongest wind pressure—it is as immovable as the rocks on which it may grow. By the closeness of its surface and the nature of its leaves its interior is wind-free and transpiration is reduced to a minimum. Moisture being retained, the interior remains comparatively warm and is not subject to such changes of temperature as affect plants of different

habits. The dead leaves and branches are not shed and lost to the plant, but remain in its interior, undigested probably for a long period, and in the meantime serving the purpose of holding moisture. Eventually, it may be after years, when their disintegration does take place, they become available for its nourishment, and thus the plant lives largely on its dead self, having achieved what seems to be the most economical of all possible arrangements. These plants, moreover, impress one as being of great age, probably rivalling many forest trees in this respect.

The extreme density of some of these bolsters can be imagined when it is stated that while no traces were left on stepping from one to another of them, as both Cunningham and Pennell record in the case of similar plants in South America, the writer found it necessary to drive his heel into the surface of the *Dracophyllum* and the *Donatia* bolsters with some force before making any impression.

The filling material within the bolsters was not investigated.

Rosette, Tufted, and Mat-forming Plants.—Although a few only of the plateau plants, such as *Dichosciadium ranunculaceum*, *Oreomyrrhis andicola*, both with hirsute, divided leaves, strong tap roots and mainly confined to pockets of soil in crevices of the dolerite, *Abrotanella*, *Anemone*, *Lagenophora*, *Helichrysum milligani*, *H. pumilum*, and the *Plantagos*, form distinct rosettes, the great majority of the herbaceous species are tufted. *Ourisia*, a dolerite plant, *Stylidium*, *Ranunculus gunnianus*, *Poa*, *Drosera arcturi*, *Erigeron*, *Senecio*, *Gentiana*, the *Actinotus*, *Luzula*, and *Geranium* usually form individual tufts. Others, by branching below ground, or by close association, form mats. The most remarkable of these mats are formed by *Astelia*, which often covers wide spaces with its close-set tufts of large, coarse, pointed leaves. These are densely felted at their base and, like those of the bolster plants, appear to decay very slowly and most effectually hold water against any possible aridity. Other mat-forming species, small and generally occupying wet ground, are *Herpolirion*, *Claytonia*, *Gratiola*, the *Mitrasacmes*, the *Cotulas*, *Oreobolus*, *Diplaspis*, and *Caltha*. The last named, so far noted only in one particular wet gully, there joins with the *Diplaspis* in covering closely several square yards of the surface, both being very stunted in growth and scarcely rising above it.

Aciphylla, a deeply rooted, dolerite plant, branching above ground, makes dense but not hard mats with its

finely divided, light green leaves, and the *Rubus* and *Hibbertia* may be placed in the same category.

The *Orites*, *Pentachondra*, the *Cyathodes*, *Sprengelia*, *Richea scoparia*, *R. sprengelioides*, *R. acerosa*, *R. gunnii*, *Coprosma nitida*, *Olearia ledifolia*, *O. persoonioides*, and the boulder plants are examples of those carrying sclerophyllous leaves mostly confined to the ends of the branches.

The low scrub of the plateau is composed of several members of that occurring in the valley with others not seen there, such as *Olearia ledifolia*, *Helichrysum backhousii*, *Richea acerosa*; and of the conifers, *Microcachrys*, *Phærosphæra*, *Podocarpus*, and *Fitzroya*, which are however rather exclusive, more local and taller—up to four feet or so—except in exposed parts, where they may grow in prostrate or espalier form for many feet.

Among large rocks and on the boulder-falls are found varying combinations of these woody plants, growing in larger dimensions with *Coprosma nitida*, *Persoonia*, *Fagus gunnii*, the smaller *Pimelea sericea*, and *Cyathodes straminea*.

In the more open areas, away from the scrub, the most conspicuous plants are *Celmisia*, *Senecio*, *Helichrysum milligani*, *H. pumilum*, *Stylidium*, *Veronica nivea*, *Euphrasia collina*, and *Anemone*, this last also seen in flower amongst the prostrate pines.

Colonies of the attractive *Milliganias*, with leaves similar to the *Astelia* but much longer, grow widely in close and exclusive association in certain secluded places.

6. A COMPARISON.

A comparison of the floras of the Cradle Mountain and the mountains of the mainland is of considerable interest. While, as might be expected, there is great likeness between those of the lowlands on each side of Bass Strait, on the highest elevations the differences are many and striking.

Of the 282 species listed for the Cradle Mountain 91, or more than 32%, are unknown on the mainland; 85 of these are strictly confined to the island, and the others—*Hymenophyllum malingii*, *H. peltatum*, *Hierochloe fraseri*, *Gaultheria antipoda*, *Pernettya tasmanica*, and *Donatia novæ-zelandiæ*—are found elsewhere only in New Zealand.

Twenty-two genera—*Prionotes*, *Anodopetalum*, *Tetracarpæa*, *Agastachys*, *Bellendena*, *Milligania*, *Pterygopappus*, *Cenarrhenes*, *Microcachrys*, and *Athrotaxis*, all exclusively Tasmanian—and *Campynema*, with only one other species in New Caledonia—*Archeria* and *Townsonia*, both confined to Tasmania and New Zealand—*Donatia*, *Forstera* (*Phyllachne*), *Ourisia*, and *Pernettya*, to these places and South America—*Phyllocladus* to New Zealand and Borneo, and *Fitzroya* to Chili—*Anemone crassifolia*, the only representative of the genus in Australasia—*Œnothera*, which has thirty species in America, and *Gunnera*, with a wider range than any of the preceding, South Africa, Java, Sandwich Islands, New Zealand, and South America—are not represented in Australia.

Four other alpine genera occurring in other parts of Tasmania, but not yet known at the Cradle Mountain—*Gaimardia*, *Chlorophyton*, *Hewardia*, and *Thismia*—are also absent from the mainland.

Nothofagus gunnii, the deciduous beech, has its nearest ally in Fuegia. On the other hand, only two Australian alpine genera—*Seseli* and *Wittsteinia*—are missing from Tasmanian mountains.

While, according to Stirling, not more than one tenth of peculiarly Australian plants occur in the Alps at altitudes above 2,000 feet, about 70% of the 190 endemic plants of Tasmania are confined to mountain situations or descend to lower levels only at the west and south-west coast.

As Kosciusko appears to be the sole mountain in Australia whose plants have been more or less thoroughly recorded, an individual comparison may be made with it. Of its 310 species only 86, or 27%, are common with those at the Cradle Mountain, and taking those above tree level—130 at the latter and 103 at Kosciusko—42 are found in both. Of the eight conifers at the Cradle Mountain seven are endemic, only the *Podocarpus* being represented at Kosciusko.

At the Tasmanian mountain *Epacrids* are a very prominent feature, 31 species (18 endemic) with six *Richeas*, as compared with 15 at Kosciusko with one *Richea* and six others common to the two. Composites number 39 (12 endemic), as against 47 at Kosciusko. Nine *Proteaceæ* occur at each place, none common, and seven of the Cradle Mountain species are endemic. Four of the five Eucalypts are peculiar. Leguminous plants are remarkably few, five only, all Australian, and the *Oxylobium*, which is very abundant, is the only one of the 21 occurring at Kosciusko.

Finally, there are the four plants at Cradle Mountain having the solid bolster or cushion habit which is xerophytic, and, although not unknown in hot, arid, desert places, is generally the outcome of conditions prevailing in high altitudes and low latitudes, attaining its greatest development on the mountains of South America, in Fuegia, the sub-antarctic islands, and New Zealand.

My best thanks are due to Mr. Leonard Rodway, who determined the mosses, hepatics, lichens, and some others, and to Mr. Gustave Weindorfer—to whom I am indebted for the meteorological records—for revising the census and for the great assistance he gave me on my several visits to *Waldheim*.

CENSUS.

	FOREST.				Subalpine Scrub.	Gymnocarpous Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
	a	b	c	d					
HYMENOPHYLLACEÆ.									
Hymenophyllum									
malingii, Hook.	a	...	a	...	...	...	...	...	...
tunbridgense (L.), Sm.	f	...	...	...	...	...	...	...	...
peltatum (Poir), Desv.	o	...	...	...	...	...	...	...	...
marginatum, H. & G.	...	...	...	...	...	...	...	r	...
POLYPODIACEÆ.									
Polystichum aculeatum (L.), Schott	o	o	o	o	...	...	...	...	...
Asplenium flabellifolium, Cav.	r	...	...	...	...	...	...	...	...
Blechnum									
capense (L.), Schl., *v. procera*	o	o	f	o	...	...	...	...	...
penna-marina (Poir), Kuhn	o	o	f	o	...	...	...	...	r
Histiopteris incisa (Thunb.), J. Sm.	o	...	...	...	...	...	...	...	...
Polypodium billardieri (Willd.), Chr.	f	f	f	...	...	...	...	...	...
GLEICHENIACEÆ.									
Gleichenia dicarpa, R. Br.	...	o	...	...	f	f	o	...	f
LYCOPODIACEÆ.									
Lycopodium									
scariosum, G. Forst.	r	r	r	...	...	...	r	...	r
laterale, R. Br.	...	...	...	...	...	o	...	...	r
clavatum, L.	...	...	...	...	...	o	r	...	...
selago, L.	...	...	...	...	...	...	...	...	o
ISŒTACEÆ.									
Isœtes lacustris, L.	...	...	...	...	...	...	...	o	...
TAXACEÆ.									
Pherosphæra hookeriana, Archer	...	...	...	...	...	...	...	...	o
Podocarpus alpinus, R. Br.	...	...	...	o	...	...	...	...	f
Microcachrys tetragona, Hook.	...	...	...	o	...	...	...	...	ld
Phyllocladus rhomboidalis, Rich.	o	o	o	o	...	...	...	...	o
PINACEÆ.									
Athrotaxis									
cupressoides, Don.	...	...	o	...	...	...	...	...	...
selaginoides, Don.	d	...	o	...	...	...	...	...	...
laxifolia, Hook.	vr	...	...	...	...	...	...	...	...
Fitzroya archeri, B. & H.	...	...	...	o	...	...	...	...	o

	FOREST.				Subalpine Scrub.	Gymnocarpous Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
	a	b	c	d					
GRAMINEÆ.									
Microlæna tasmanica, Hook.	...	...	...	...	...	...	f	...	...
Hierochloe									
redolens, R. Br.	...	...	...	...	...	o	o	...	r
rariflora, Hook. f.	...	...	...	...	...	...	o	...	...
fraseri, Hook.	...	...	...	...	...	...	o	...	...
Echinopogon ovatus, Beauv.	...	...	...	...	...	...	r	...	...
Amphibromus nervosus (R. Br.), Hook. f.	...	...	...	...	...	...	r	...	...
Calamagrostis									
filiformis (Forst.), Pil.	...	...	...	...	...	...	o	...	...
rudis, Steud.	...	...	...	...	...	...	o	...	...
quadriseta (Lab.), Spreng.	...	...	...	...	...	...	o	...	...
Pentapogon quadrifidus (Lab.), Baill.	...	...	...	...	...	...	o	...	...
Danthonia pauciflora, R. Br.	...	...	...	...	...	...	o	...	...
Poa cæspitosa, G. Forst.	...	o	...	o	f	o	d	...	o
Agropyron pectinatum, Beauv.	...	...	...	...	...	...	...	...	...
CYPERACEÆ.									
Scirpus									
inundatus (R. Br.), Poir.	...	...	...	...	...	...	...	o	...
fluitans, L.	...	...	...	...	...	...	...	o	...
crassiusculus (Hook. f.), Benth.	...	...	...	...	...	...	...	...	o
cernuus, Vahl.	...	...	...	...	...	...	...	...	o
antarcticus, L.	...	...	...	...	...	...	...	...	o
Heleocharis sphacelata, R. Br.	...	...	...	...	...	...	...	r	...
Carpha alpina, R. Br.	...	...	...	...	...	o	a	...	o
Cladium capillaceum, C. B. Clarke	...	...	...	...	o	o	a	...	...
Gahnia psittacorum, Lab.	...	o	o	o	...	...	...	...	...
Gymnoschœnus adustus, Nees.	...	...	o	o	f	d	...	...	...
Oreobolus pumilio, R. Br.	...	...	...	...	...	...	...	...	a
Uncinia									
riparia, R. Br.	o	...	...	...	...	...	...	...	...
compacta, R. Br.	o	...	...	...	...	...	...	...	...
Carex									
gaudichaudiana, Kunth.	...	...	...	...	...	...	...	o	vr
inversa, R. Br.	...	...	...	...	...	...	o	...	...
pumila, Thunb.	...	...	...	...	...	...	o	...	...
RESTIONACEÆ.									
Lepyrodia muelleri, Benth.	...	...	...	...	...	...	f	...	...
Restio									
australis, R. Br.	...	...	...	...	f	f	f	...	o
complanatus, R. Br.	...	...	...	...	f	f	f	...	o
Hypolæna									
lateriflora, Benth.	...	f	...	...	a	f	o	...	f
fastigata, R. Br.	...	...	...	...	o	...	...	...	o
CENTROLEPIDACEÆ.									
Centrolepis monogyna, Benth.	...	o	...	...	...	...	...	...	f
Trithuria filamentosa, Rod.	...	...	...	...	...	...	...	...	r
XYRIDACEÆ.									
Xyris operculata, Lab.	...	...	...	...	f	f	...	...	

	FOREST.				Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
	a	b	c	d					
JUNCACEÆ.									
Luzula campestris, DC.	...	o	...	f	...	o	f	...	f
Juncus									
pauciflorus, R. Br.	...	...	...	...	...	...	o	...	...
capillaceus, Hook.	...	...	...	...	...	...	o	...	...
communis, E. Mey.	...	...	...	...	...	...	...	o	...
LILIACEÆ.									
Herpolirion novæ-zelandiæ, Hook. f.	...	r	...	...	...	o	f	...	r
Blandfordia marginata, Herb.	...	...	r	o	...	...	...	...	r
Astelia alpina, Banks & Sol.	r	r	r	f	...	f	...	...	a
Drymophila cyanocarpa, R. Br.	...	r	o	...	...	...	...	...	...
Milligania									
densiflora, Hook.	...	...	...	...	...	...	...	...	la
longifolia, Hook.	...	...	...	...	...	...	...	...	f
lindoniana, Rod.	...	...	...	...	...	...	...	...	f
Dianella tasmanica, Hook. f.	...	...	...	...	...	...	...	...	...
AMARYLLIDACEÆ.									
Campynema lineare, Lab.	...	...	...	...	o	f	o	...	f*
IRIDACEÆ.									
Diplarrhena moræa, Lab.	...	o	...	f	...	f	la	...	o
Libertia pulchella, Spreng.	f	o	f	o	r	...	...	...	...
Patersonia glauca, R. Br.	...	...	...	...	o	o	...	...	...
ORCHIDACEÆ.									
Townsonia viridis (Hook. f.), Schlech.	r	...	...	...	...	...	...	...	...
Corysanthes pruinosa, R. Cunn.	...	r	...	...	...	...	...	...	...
Caladenia angustata, Lindt.	...	r	...	...	...	...	...	...	...
Thelymitra									
venosa, R. Br.	...	...	...	...	...	f	o	...	...
cyanea, Lindl.	...	...	...	...	...	f	o	...	...
Pterostylis									
nutans, R. Br.	...	...	...	...	...	...	r	...	...
cycnocephala, Fitz.	...	...	...	...	...	...	r	...	...
Prasophyllum									
fuscum, R. Br.	...	...	...	...	...	f	f	...	...
brevilabre, Hook. f.	...	...	...	...	...	...	r	...	...
Chiloglottis gunnii, Lindl.	...	r	...	...	...	...	...	...	...
CASUARINACEÆ.									
Casuarina distyla, Vent.	...	o	...	o	f	...	...	...	...
FAGACEÆ.									
Nothofagus									
gunnii, Hook.	a	f	f	f	...	...	...	...	o
cunninghamii (Hook. f.), Oers.	a	o	f	o	...	...	...	...	...
PROTEACEÆ.									
Agastachys odorata, R. Br. (f. in Sutton's Gorge)	...	...	r	...	...	...	...	...	...
Bellendena montana, R. Br.	...	...	...	o	a	...	...	...	o

*Another in New Caledonia.

	FOREST.				Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
	a	b	c	d					
Cenarrhenes nitida, Lab.	...	...	f	o	o	...	...	...	o
Persoonia gunnii, Hook.	...	...	f	f	o	...	...	...	o
Orites									
acicularis, R. Br.	...	...	o	f	o	...	...	...	f
revoluta, R. Br.	...	...	...	f	o	...	...	...	f
Hakea acicularis, R. Br., *var. lissosperma*	...	...	o	...	...	...	...	...	...
Telopea truncata, R. Br.	o	o	o	...	o	...	...	...	o
Banksia marginata, Cav.	...	...	o	...	...	...	...	...	...
SANTALACEÆ.									
Exocarpus humifusa, R. Br.	...	...	...	o	r	...	...	...	o
PORTULACACEÆ.									
Claytonia australasica, Hook. f.	...	...	...	...	...	f	o	o	o
CARYOPHYLLACEÆ.									
Colobanthus billardieri, Fenzl.	...	...	...	...	...	...	...	...	o
Scleranthus biflorus, Hook. f.	...	...	...	...	...	...	r	...	...
RANUNCULACEÆ.									
Anemone crassifolia, Hook.	...	...	...	...	...	...	...	...	o
Ranunculus									
gunnianus, Hook.	...	...	...	...	...	...	r	...	o
hirtus, Banks & Sol.	...	...	...	...	...	...	f	...	...
lappaceus, Sm.	...	...	...	...	...	...	f	...	...
var.	...	...	...	...	...	...	...	...	r
Caltha introloba, F. v. M.	...	...	...	...	...	...	...	...	la
WINTERANACEÆ.									
Drimys aromatica, F. v. M.	a	o	a	o	o	...	...	...	o
MONIMIACEÆ.									
Atherosperma moschatum, Lab.	o	...	o	...	...	...	...	...	...
CRUCIFERÆ.									
Cardamine									
dictyosperma, Hook.	...	...	...	...	...	...	...	...	o
hirsuta, L.	...	...	...	...	...	...	a	...	...
radicata, Hook.	...	...	...	...	...	...	...	...	r
DROSERACEÆ.									
Drosera									
arcturi, Hook.	...	...	...	...	...	f	...	f	f
binata, Lab.	...	...	...	...	...	f	...	r	...
peltata, Sm.	...	...	...	...	...	f	o	...	...
pygmæa, DC.	...	...	...	...	...	...	r	r	...
PITTOSPORACEÆ.									
Pittosporum bicolor, Hook.	o	r	o	...	...	...	...	...	...
Marianthus procumbens, Benth.	...	...	...	...	...	...	r	...	...
Billardiera longiflora, Lab.	r	...	...	...	...	...	...	...	...

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
SAXIFRAGACEÆ.									
Tetracarpæa tasmanica, Hook.	...	f	o	f	o	...	...	...	o
Bauera rubioides, Andr.	...	o	o	f	f	o	o	...	...
MYRTACEÆ.									
Eucalyptus									
muelleri, Moore	...	f	o	f	f	...	...	...	...
vernicosa, Hook.	...	...	...	...	r	...	...	...	...
gunnii, Hook. f.	...	r	...	...	...	...	...	...	...
coccifera, Hook.	...	f	o	f	f	...	...	...	...
amygdalina, Lab.	...	...	...	...	...	...	r	...	...
Leptospermum									
myrtifolium, Sieb.	...	...	...	o	f	o	...	...	f
lanigerum, Sm. *var. montanum*	o	o	o	o	o	...	...	...	...
scoparium, R. & G. Forst.	...	o	o	...	f	r	r	...	o
rupestre, Hook.	...	...	...	o	o	...	...	...	o
Melaleuca squamea, Lab.	...	...	f	f	ld	f	...	...	f
Bæckea leptocaulis, Hook.	...	f	f	f	ld	r	...	...	f
CUNONIACEÆ.									
Anodopetalum biglandulosum, Cunn.	...	...	f	...	...	...	...	...	...
EUCRYPHIACEÆ.									
Eucryphia billardieri, Spach.	...	...	o	r	...	...	...	...	...
ROSACEÆ.									
Rubus gunnianus, Hook.	...	o	...	o	o	f	f	...	o
Acæna sanguisorba, Vahl. *v. montana*	...	...	...	...	...	...	o	...	...
Acæna sanguisorba (type)	...	...	...	...	...	...	o	...	...
LEGUMINOSÆ.									
Oxylobium ellipticum, R. Br.	...	f	f	f	ld	o	...	...	f
Pultenæa									
subumbellata, Hook.	...	...	...	...	f	o	f	...	...
juniperina, Lab.	...	...	...	...	r	...	...	...	...
Bossiæa cordigera, Benth.	...	...	...	...	o	o	r	...	...
Acacia mucronata, Willd.	...	...	o	o	...	...	...	...	r
GERANIACEÆ.									
Geranium									
dissectum, L.	...	...	...	...	...	...	f	...	o
sessiliflorum, Cav.	...	...	...	...	...	...	o	...	...
Pelargonium australe, Willd.	...	...	...	...	r	...	...	...	...
OXALIDACEÆ.									
Oxalis magellanica, G. Forst.	o	o	o	o	...	r	r	...	o
RUTACEÆ.									
Boronia									
citriodora, Hook.	...	...	...	f	ld	o	...	...	f
rhomboidea, Hook.	...	...	...	f	ld	o	...	...	o
polygalifolia, Sm.	...	...	...	...	r	r	...	...	...
Eriostemon oldfieldii, F. v. M.	...	...	...	...	r	...	...	...	...
Phebalium billardieri, A. Juss.	...	...	...	...	r	...	...	...	...

	FOREST. a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
TREMANDRACEÆ.									
Tetratheca pilosa, Lab.	...	...	...	...	o	r	...	...	...
POLYGALACEÆ.									
Comesperma retusum, Lab.	...	...	...	...	o	f	...	...	...
ELÆOCARPACEÆ.									
Aristotelia peduncularis, Hook.	...	...	r	...	...	...	...	...	...
DILLENIACEÆ.									
Hibbertia procumbens, DC.	...	f	...	a	a	o	o	...	r
GUTTIFERÆ.									
Hypericum japonicum, Thunb.	...	...	...	...	...	...	...	...	o
VIOLACEÆ.									
Viola hederacea, Lab., *var. Sieberi*	...	...	...	...	...	o	f	...	...
THYMELÆACEÆ.									
Drapetes tasmanica, Hook.	...	...	...	...	r	...	...	...	r
Pimelea									
linifolia, Sm.	...	o	o	...	o	o	r	...	...
sericea, R. Br.	...	...	...	o	...	...	...	...	...
ŒNOTHERACEÆ.									
Epilobium									
billardierianum, Sm.	...	...	...	...	...	...	...	o	r
alpinum, L.	...	...	...	...	...	...	...	...	r
glabellum, G. Forst.	...	...	...	...	...	...	r	...	...
junceum, G. Forst.	...	...	...	...	...	...	...	r	...
Œnothera tasmanica, Hook.	...	...	...	...	...	...	...	vr	...
HALORRHAGIDACEÆ.									
Halorrhagis									
depressa, Walp.	...	...	...	...	...	...	f	...	...
tetragyna (Lab.), Hook. f.	...	o	...	...	...	...	o	...	...
micrantha (Thunb.), R. Br.	...	...	...	...	...	f	f	...	...
Myriophyllum pedunculatum, Hook. f.	...	...	...	...	...	...	...	r	...
Gunnera cordifolia, Hook.	...	...	...	...	...	...	...	o	...
UMBELLIFERÆ.									
Hydrocotyle hirta, R. Br.	...	...	...	...	...	o	f	o	o
Actinotus									
bellidioides, Benth.	...	...	...	...	f	f	f	o	...
suffocata, Rod.	...	...	...	...	f	f	f	o	r
moorei, Rod.	...	o	...	...	...	...	r	r	r
Dichosciadium ranunculaceum (F. v. M.), Domin.	...	...	...	...	...	...	...	...	f
Diplaspis cordifolia, Hook.	o	...	...	...	...	...	...	o	f
Oreomyrrhis andicola, Endl.	...	...	...	...	...	...	...	...	o
var. argentea, Hook.	...	...	...	...	...	...	...	...	r
Aciphylla procumbens, F. v. M.	...	...	...	...	...	...	...	...	o
Daucus brachiatus, Sieb.	...	...	...	...	...	...	r	...	...
Xanthosia dissecta, Hook. f.	...	...	...	...	...	...	f	r	...

r

	FOREST.								
ERICACEÆ.	a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
Gaultheria									
hispida, R. Br.	...	r	o	o	...	...	...	...	...
antipoda, Forst.	...	...	...	...	...	...	...	...	o*
Pernettya tasmanica, Hook.	...	...	...	...	...	...	...	...	r*
EPACRIDACEÆ.									
Pentachondra pumila, R. Br.	...	...	...	...	...	f	...	...	f
Trochocarpa									
disticha, Spreng.	...	o	...	...	...	...	...	...	...
thymifolia, Spreng.	...	o	o	o	...	...	...	...	...
gunnii, Benth.	f	o	f	...	...	...	...	...	...
Cyathodes									
dealbata, R. Br.	...	...	...	...	...	...	...	...	f
straminea, R. Br.	...	...	...	f	...	...	...	...	f
adscendens, Hook.	...	...	...	...	...	...	...	...	f
acerosa, R. Br.	...	f	f	f	f	...	...	...	o
Lissanthe montana, R. Br.	...	f	o	f	...	...	r	...	o
Leucopogon									
collinus, R. Br.	...	f	o	f	...	...	...	...	o
ericoides, R. Br.	...	f	o	f	...	...	...	...	o
milligani, Rod.	...	...	...	...	...	...	...	...	o
Monotoca									
scoparia, R. Br.	...	...	r	...	r	...	...	...	...
empetrifolia, R. Br.	...	...	...	...	...	...	...	...	...
Archeria									
eriocarpa, Hook.	a	o	a	...	...	...	...	...	...
serpillifolia, Hook.	...	...	o	...	o	...	...	...	o
hirtella, Hook.	...	...	...	...	...	...	...	...	r
Prionotes cerinthoides, R. Br.	...	...	...	...	...	...	...	...	...†
Sprengelia incarnata, Sm.	...	o	o	f	f	f	o	...	f
Dracophyllum minimum, Hook.	...	...	...	...	...	...	...	...	ld
Epacris									
exserta, R. Br.	...	...	...	...	...	...	...	...	r
impressa, Lab., *v. ruscifolia*	...	...	...	...	f	...	...	...	...
lanuginosa, Lab.	...	f	o	f	f	...	...	...	...
microphylla, R. Br.	...	f	o	f	f	...	...	...	...
serpyllifolia, R. Br.	...	...	o	f	f	o	...	...	...
heteronema, Lab.	...	...	...	...	...	...	...	...	...
myrtifolia, Lab.	...	...	...	...	o	...	...	...	r
Richea									
sprengelioides, F. v. M.	o	o	o	f	o	...	...	...	f
acerosa, F. v. M.	...	...	...	...	...	...	...	...	o
gunnii, Hook.	...	...	...	...	...	o	...	...	...
scoparia, Hook.	f	f	a	a	o	...	...	...	a
dracophylla, R. Br.	...	r	...	...	...	...	...	...	...
pandanifolia, Hook.	f	f	f	f	o	...	...	...	r
LOGANIACEÆ.									
Mitrasacme									
montana, Hook.	...	...	...	...	f	...	o	...	o
archeri, Hook. f.	...	...	...	...	...	...	...	...	f

*Also in New Zealand.

†Tr. R.S. Tas., 1887.

	FOREST.								
	a	b	c	d	Subalpine Scrub.	*Gymnoschoenus* Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
GENTIANACEÆ.									
Gentiana montana, Forst.	...	...	...	...	o	o	f	o	f
SCROPHULARIACEÆ.									
Gratiola nana, Benth.	...	...	...	...	...	...	o	...	...
Veronica									
gracilis, R. Br.	...	...	...	...	...	...	o	...	...
nivea, Lindl.	...	...	...	...	...	...	...	...	o
calycina, R. Br.	...	r	...	...	...	...	r	...	...
Euphrasia									
cuspidata, Hook.	...	...	...	...	f	...	f	...	o
collina, R. Br.	...	...	...	f	f	...	o	...	f
Ourisia integrifolia, R. Br.	...	...	...	...	...	...	...	...	r
LENTIBULARIACEÆ.									
Utricularia dichotoma, Lab.	...	...	...	...	...	o	...	o	...
PLANTAGINACEÆ.									
Plantago									
brownii, Rapp.	...	...	...	...	r	r	r	...	o
tasmanica, Hook. f.	...	...	...	...	r	r	r	...	o
gunnii, H.	...	...	...	...	...	...	...	...	r
varia, R. Br.	...	...	...	...	...	...	r	...	...
RUBIACEÆ.									
Coprosma									
moorei, Rod.	...	r	...	...	...	r	r	...	...
nitida, Hook. f.	...	o	...	f	f	...	...	...	f
billardieri, Hook.	...	...	...	...	...	...	...	...	...
repens, Hook. f.	...	...	...	...	...	...	...	...	o
Asperula oligantha, F. v. M.	...	o	...	...	...	o	o	...	...
CAMPANULACEÆ.									
Wahlenbergia									
gracilis, A. DC.	...	...	...	...	...	o	o	...	...
saxicola, A. DC.	...	...	...	...	...	...	...	...	r
STYLIDIACEÆ.									
Stylidium graminifolium, Swartz.	...	f	o	a	a	o	o	...	f
Forstera bellidifolia, Hook.	...	...	...	...	...	...	...	r	...†
Donatia novæ-zelandiæ, Hook.	...	...	...	...	...	...	...	...	ld*
GOODENIACEÆ.									
Scævola hookeri, F. v. M.	...	...	...	...	o	f	o	...	...
COMPOSITÆ.									
Olearia									
persoonioides, Benth.	...	...	o	o	r	...	...	...	...
myrsinoides, F. v. M.	...	r	...	...	...	...	r	...	...
obcordata, Benth.	...	...	...	o	o	...	...	o	...
floribunda, Benth.	...	...	...	...	...	...	r	...	...
pinifolia, Benth.	o	f	o	o	...	...	...	o	o
stellulata, DC.	...	...	...	...	...	...	o	...	...
ledifolia, Benth.	...	...	...	r	...	...	...	...	f

†Lakeside.

*Also in New Zealand.

	FOREST.				Subalpine Scrub.	Gymnoschœnus Association.	Subalpine Meadow.	Aquatics and Bog Plants.	Fell-field.
	a	b	c	d					
Celmisia longifolia, Cass.	...	f	o	f	o	o	a	...	f
var. saxifraga	...	...	...	...	...	...	...	...	f
Erigeron pappochroma, Lab.	...	...	...	...	...	r	f	...	f
Lagenophora billardieri, DC., *v. montana*	...	f	...	...	...	o	f	...	r
Brachycome									
scapiformis, DC.	...	...	...	...	...	...	o	...	...
stricta, DC.	...	...	...	...	...	...	o	...	...
cardiocarpa, F. v. M.	...	...	...	...	...	...	...	r	...
Cotula									
alpina, Hook. f.	...	...	...	...	...	...	...	...	o
reptans, Benth.	...	...	...	...	...	...	...	...	o
australis, Hook. f.	...	...	...	...	...	...	o	...	o
Abrotanella scapigera, F. v. M.	...	...	...	...	...	o	...	...	f
Craspedia richea, Cass.	...	...	...	...	...	...	o	...	...
Podolepis acuminata, R. Br.	...	...	...	...	...	...	o	...	...
Leptorrhynchus squamatus, Less.	...	...	...	...	...	...	o	...	...
Helipterum incanum, DC.	...	...	...	...	...	...	r	...	...
Helichrysum									
lucidum, Henck.	...	...	...	...	...	r	a	...	r
var. albidum, DC.	...	...	...	...	...	...	...	...	r
leucopsidium, DC.	...	...	...	...	...	...	r	...	r
milligani, Hook.	...	...	...	...	...	...	...	...	a
pumilum, Hook.	...	...	...	...	...	o	...	...	a
scorpioides, Lab.	...	...	...	...	...	o	o	...	...
Oxothamnus									
ledifolius, *Hook.*	...	...	...	f	o	...	...	...	a
thyrsoideus, DC.	...	...	...	...	r	...	...	...	...
backhousii, Hook. f.	...	...	...	o	o	...	...	...	o
obcordatus, DC.	...	...	...	...	o	...	...	...	...
hookeri, Hook.	...	...	...	o	...	...	o	o	...
gunnii, Hook.	...	...	...	...	...	r	...	...	...
Gnaphalium									
alpigineum, F. v. M.	...	...	...	o	...	...	...	...	o
japonicum, Thunb.	...	...	...	...	...	...	o	...	...
Pterygopappus lawrencii, Hook.	...	...	...	...	...	...	...	...	a
Ewartia									
planchoni (Hook.), Beauv.	...	...	...	...	...	...	...	...	r
meredithæ (F. v. M.), Beauv.	...	...	...	...	...	...	...	...	ld
Senecio									
pectinatus, DC.	...	...	...	...	...	...	...	...	a
var. ochroleuca	...	...	...	...	...	...	...	...	f
var. leptocarpus	...	f	f	...	...	...	...	...	...
Erechtites prenanthoides, DC.	...	...	...	...	...	...	r	...	...
Microseris scapigera (Forst.), Sch.	...	...	...	...	...	...	o	...	...

a abundant. f frequent. o occasional. r rare. vr very rare.

d dominant. ld locally dominant.

MOSSES.

Dicraneæ.

Dicranium
billardieri, Schw.
pungens, J. Hook.
Ceratodon purpureus, Bridel.

Grimmieæ.

Grimmia symphyodon.

Orthotricheæ.

Orthotrichum luteum, Mitt.
Macromitrium aurescens, Hampe.
Orthodontium sulcatum, Hook.

Bartramieæ.

Bartramia halleriana, Hedwig.
Conostomum pusillum, J. Hook.

Bryeæ.

Bryum binium, Schreber.
Leptostomum inclinans, R. Br.
Rhizogonium novæ-hollandiæ, Bridel.
Leptobryum pyriforme, Hedwig.

Hookerieæ.

Hookeria obscura, Mitt. (?)

Neckereæ.

Ptychomnion aciculare, Lab.

Hypneæ.

Hypnodendron comosum, Lab.
Hypnum
cupressiforme, C. Muell.
crinitum, Hook.

Polytricheæ.

Polytrichum commune, L.

Sphagneæ.

Sphagnum australe, Mitt.
Braunia humboldtii, Schimp.

HEPATICS.

Sendtnera scolopendra, Nees.
Polyotis magellanicus, Gottsche.
Plascochila annitina, Lindley.
Marchantia polymorpha, L.

Lepidozia
pendulina, Nees.
lævifolia, P. Taylor.
Leperoma scolopendra, Nees.
Jungermannia colorata, Lehmann.
Chaloscyphos
cymbuliferus.
tridentatus, Mitt.
Gollschea pinnatifolia, Nees.

LICHENS.

Sphærophoron corallioides, Pers.
Cladonia
retipora, Floecke.
fimbriata, Schoerer.
macilenta, Hoffman.
coccifera.
delicatula.
leptophylla.
Stereocaulon proximum, Nylander.
Usnea barbata, Acharius.
Sticta
freycinetii, Delise.
billardieri.
Parmelia
pertusa.
tiliacea, Ach.
Lecidea geographica, Sch.

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