Vegetation of the Bealey River Basin.

SUPPLEMENT TO LIST OF SPECIES (1929), WITH NOTES.

ROBERT M. LAING, M.A., B.S.C., F.N.Z.Inst.,
and H. W. GOURLAY, M.Sc.

[*Received by Editor, 27th October, 1932; issued separately, May, 1934.*]

WE are well aware that the work of Drs. Cockayne and Allan has shaken to its foundations the splendid taxonomic work of Cheeseman; and that no list of species of any New Zealand district can be considered altogether satisfactory which does not take into account the presence of hybrids and epharmonic varieties. Nevertheless, it is necessary in the first place to follow to some extent Cheeseman's system if the ground is to be prepared for a fuller and more modern investigation of the area under consideration; and we have therefore in this paper in many cases identified species on the basis of Cheeseman's Flora, though we know that we are dealing with aggregate species, or with forms whose exact type is unknown. Obviously it would be impossible for us in many cases to do otherwise; for a more exact research would demand a complete study of the species dealt with in all its forms throughout New Zealand. Such a study is impracticable in a paper intended merely to form a basis of further research in a given district. We hope, however, if time and opportunity offer, to extend our work to a fuller consideration of the forms dealt with, to bring our knowledge of them as far as possible into harmony with modern taxonomic and ecological methods. We have already begun such a study in connection with the smaller-leaved species of *Pittosporum*, and it is proving exceptionally interesting.

At present we intend only to add to the list already published (1929, *Trans., N.Z. Inst.*, 59, p. 715) such species as have been identified in the district subsequently to its publication. We propose in some cases to give descriptions of forms rather than actual names that may be misleading. The attempt to force into the Procrustean bed of the Manual, a form which obviously is too wide or too narrow for such a process, can only create further difficulties for subsequent observers, since it is quite clear that some races of plants in the Pass are distinct from those found elsewhere, or at least differ in certain respects from those included by Cheeseman in his description. When, however, a name is given without comment, we consider that the plant referred to may readily be included within the four corners of Cheeseman's prescription.

Further, we have not restricted this list to the Upper Bealey River basin, but have included some species found in the watershed, only to the south of Halpins Creek. We have, however, so far not made any complete investigation of the lower area, nor of many of the valleys near the snow line. Mr Gourlay has paid much attention to the grasses, and the result is a largely extended list of these.

Species Not Hitherto Recorded.

Hymenophyllaceae.

Hymenophyllum rarum R. Br.
Rocks above Punch Bowl, 3000ft.

H. sanguinolentum Swartz.
On dry tree trunks in the forest, Halpins to settlement.

H. Cheesemanii Bak.
Rocks near Avalanche Creek, 2500ft.

Trichomanes Lyallii (?) Hook. and Bak.
Rocks near beginning of Avalanche Peak track.
Very much depauperated, and without the marginal hairs.

Polypodiaceae.

Dryopteris punctata (Thunb.) C. Christen.
Rocks by roadside, near Avalanche Peak track.
A much reduced form collected by Miss M. Finlayson.

Asplenium flaccidum Forst. f.
Rocks in forest.
A much depauperated form, usually under 25 c.m. in length, and more or less erect and rigid.

A. Hookerianum Col. forma.
Moist rocks of creeks, 2000ft.
A form approaching, but not altogether agreeing with, var. *Colensoi.*

A. flabellifolium Cav.
Rocks in bush, Lower Bealey.

Polypodium diversifolium (R. Br.) Willd.
Rocks in forest, near Lower Bealey Road.

Gramineae.

We have to thank Dr H. H. Allan for revising the grasses collected by us. Some of his notes are appended.

Hierochloe Fraseri Hook. f. var. *recurvata* Hack.
In tussock 3000 to 4000ft, south side of Punch Bowl Creek and at the top of the Pass.
Apparently quite a distinct form.

Alopecurus geniculatus L.
Swamp near Kennedy's.
The spikes are dark purplish, shorter than usual, with rather long awns.

Deyeuxia avenoides (Hook. f.) Buch.
Twin Creeks, near road.

D. avenoides var. *brachycantha* Hack.
Grass bank, north of Rough Creek.

D. Forsteri (Roem. and Schult.) Kunth. var. *Lyallii* Hack.
"Comes into the group considered by Cheeseman to be var. *Lyallii,* but is not the *Agrostis Lyallii* of Hooker."—H. H. A.

D. setifolia Hook. f.
On rocks near the White Bridge, Peg-leg Flat, and elsewhere.

Agrostis Dyeri Petrie var. *aristata* Hack. in Chees.
Roadside near settlement.

Dichelachne crinita (Forst. f.) Hook f.
A solitary specimen by the roadside near Halpins.

Trisetum antarcticum (Forst. f.) Trin.
A fairly common plant in moist tussocky places in scrub.

T. antarcticum var. *diffusum* Allan and Zotov (sp. ined.)
Mingha Valley.

Trisetum tenellum (Petrie) Allan and Zotov (sp. ined.).
Mingha River bed.
Allan and Zotov consider this variety should be raised to specific rank.

Trisetum Cheesemanii Hack.
River bed, 2500ft.

Danthonia setifolia (Hook. f.) Ckn.
River bed near settlement, Lower Bealey, Punch Bowl, and elsewhere.

Danthonia setifolia forma *minor* Allan et Zotov (sp. ined.).
Punch Bowl Creek.
With bright orange stamens. "This may be only a habitat form." H. H. A.

D. semiannularis R. Br. var. *nigricans* Petrie.
Punch Bowl Creek.

Koeleria novo-zelandica Domin.
Punch Bowl Creek.

K. novo-zelandica Domin forma.
Roadside near Halpins.
According to Dr Allan, this approaches f. *parvula* Domin, "a plant of quite uncertain status."

Poa Novae Zelandiae Hack. forma *humilior* Hack.

Shingle slip, Upper Otira.

" Has typical leaf section of *P. Novae Zelandiae* and corresponds to var. *Wallii* (Petrie in Chees.). Whether a good variety or a habitat form remains to be investigated." H. H. A.

P. Novae Zelandiae var. *subvestita* (?) Hack.

Lower Bealey.

" Differs very slightly in leaf section from typical form, makes some approach to variety *subvestita* (var. *subvestita* was collected by Cockayne on Arthurs Pass)." H. H. A.

P. anceps Forst. f.

Top of Pass.

" Has the leaf section of *P. anceps,* and comes into the South Island group included under that name by Cheeseman." H. H. A.

P. seticulmis Petrie.

McGraths Creek.

" This belongs to the unresolved *P. pusilla-seticulmis* group. It is not typical *P. pusilla,* which occurs on the moraine at the head of the Otira Gorge. We class it under *P. seticulmis* in the meantime." H. H. A.

P. pusilla Berggr.

Behind railway cottages, roadside.

P. Colensoi Hook. f.

Edwards Stream, Upper Bealey, at 4000ft, and elsewhere.

In various forms.

P. Kirkii Buch.

Bush behind railway cottages; common on the roadside near Halpins.

" This group is ill-defined, and contains a great number of forms." H. H. A.

Festuca rubra L.

Near top of Pass, possibly introduced, but it has a very wide distribution in the district.

Festuca sp.

On shingle in creeks near Kennedy's. Collected by Miss R. B. Weavers.

" A remarkable form, deserving of further study, has the leaf section of *F. erecta*! " H. H. A.

Agropyron scabrum (Lab.) Beauv.

Lower Bealey River bed, Mingha River.

Fairly common, and responding in various ways to differences in habitat.

Asperella gracilis T. Kirk.

Punch Bowl Creek.

CYPERACEAE.

Scirpus Aucklandicus (Hook. f.) Boeck.
In wet swampy ground, bush behind railway cottages.

Uncinia rubra Boott.
Lower Bealey.

Uncinia fusco-vaginata Kukenth.
Damp places by roadside.

Carex Petriei Cheesem.
Near the roadside at Halpins Creek.

Carex ternaria (Forst. f.) var. *pallida* Cheesem.
A variety closely approaching this is found in swamps at the junction of the Mingha and Bealey.

Carex Gaudichaudiana (Hook. f.) Kukenth.
Swamp at junction of Mingha and Bealey.

C. Gaudichaudiana (Hook. f.) Kukenth. var. *humilior* Kukenth.
Swamp at junction of Mingha and Bealey.

C. Raoulii Boott.
Roadside near Kennedy's.

C. Oederi Retz. var. *cataractae* (R. Br.) Kukenth.
Roadside below Halpins.
A somewhat depauperated form.

JUNCACEAE.

Luzula Traversii (Buchen.) Cheesem.
Mingha River bed.

LILIACEAE.

Chrysobactron sp.

Headwaters of the Bealey, 4500ft, and summit of the Pass, in damp, stony ground.

It is impossible to identify this with any recognised species. A description is attached.

A herb, 7 mm. to 10 mm. in diameter at the base, 35 cm. to 60 cm. high, leaves numerous, all radical, 5 mm. to 12 mm. broad, 10 cm. to 30 cm. long, concave above, broadly ensiform, gradually tapering upwards, spreading and recurved, glaucous green, obtuse to acute at the tips, fleshy, glabrous. Scape terete, usually exceeding the leaves, curved, 30 cm. to 60 cm. long, 4 mm. to 6 mm. in diameter, inflorescence corymbose, lower peduncles 2·5 to 5 cm. in length, each peduncle bearing at its base a concave, acuminate, green bract, white on the edges, 1 cm. or more in length, upper peduncles shorter so that inflorescence is a corymb 5 cm. to 7·5 cm. in length, with a

few flowers below the surface of the corymb. Flowers 12 mm. A solitary plant from the top of the Pass (3000ft) with polygamo-dioecious flowers beginning to open, was apparently not corymbose; but the flowers were in a dense raceme. The leaves were 25 mm. broad towards the base, and generally much stouter than in the Bealey Glacier plant. The flowers were also about 25 mm. in diameter when expanded. This obviously more closely approaches *C. Rossii* of the Southern Islands. Flowers 12 mm. in diameter, bright yellow, polygamo-dioecious. A few flowers are apparently perfect; but some or all of the anthers are wanting in others, and in others again the stigma is apparently undeveloped. Segments of the perianth oblong-linear, concave, obtuse, and spreading, 6 mm. to 16 mm. long, completely free. Stamens hypogynous, of the male flowers, usually shorter than but occasionally equalling the segments, ripe capsules not seen.

It is obvious that until a full collection of the chief New Zealand forms is obtained, it is inadvisable to name this form. In its polygamo-dioecious flowers it clearly belongs to the *C. Rossii-Gibbsii* group; but in its definitely corymbose inflorescence it apparently differs from both of these. It is larger than *C. Gibbsii*, but smaller than *C. Rossii.*

ORCHIDACEAE.

Pterostylis Banksii R. Br. (forma).

P. australis Hook. f. (forma).

P. graminea Hook. f. (forma).

In bush, sides of creek, 2500ft.

None of these species is typical of their representatives elsewhere. They occur in a great variety of forms impossible to classify satisfactorily. Intermediates between *P. Oliveri, P. Banksii,* and *P. graminea* are all to be found. Colenso, *Trans. N.Z. Inst.* (1883), p. 338, (1886) p. 270, (1899) pp. 488-489, (1896) p. 611, has divided the forms of this group into a number of distinct species, but till an intensive study of the varieties occurring throughout New Zealand is made, it seems scarcely worth while to discriminate more closely.

Some sketches made by Mrs Brownlee of the Arthurs Pass plants accompany this note. (Fig. 1.)

Thelymitra pachyphylla Cheesem.

In small quantity near Halpins, 2200ft.

This seems rather an unexpected locality for this West Coast plant, but the specimens exactly fit the description.

T. longifolia Forst.

Rocky ground, edge of bush, below Kennedy's.

Microtis unifolia (Forst. f.) Reichenbach.

By roadside, 2000ft.

URTICACEAE.

Urtica incisa Poir.
Scrub, Lower Bealey.

CARYOPHYLLACEAE.

Scleranthus biflorus (J. R. and G. Forst.) Hook. f.
River flats, lower Mingha.

CRUCIFERAE.

Nasturtium fastigiatium Cheesem.
Avalanche Peak, 5900ft.

Cardamine depressa Hook. f.
Rocky crevices, Upper Bealey, 4500ft.

Cardamine sp.
A species of *Cardamine* occurs on the moraines and rocks close to the snowline, which seems to be distinct from any hitherto recorded from the mainland of New Zealand. It is very close to and possibly the same as the Auckland and Campbell Island, *C. glacialis* var. *subcarnosa,* though perhaps a somewhat smaller plant. It has the same stout perennial rhizome, and somewhat fleshy habit; but the flowers are always white, and scarcely so large as those described by Cheeseman (1909, p. 399)* for the southern variety. The pods are numerous, about 2 cm. long, 1 mm. in breadth, flat above, more or less concave below, with a short style. The fruits may differ from the sub-antarctic variety in some respects, so we consider it not safe to identify the species.

PITTOSPORACEAE.

Pittosporum anomalum Lg. and Gy. (sp. ined.).
Jack's Hut and top of Pass.

P. divaricatum Ckne.
Rough Creek to Waimakariri, Edwards Stream, and Mingha.
The *P. divaricatum* of the previous list is now *P. crassicaule* Lg. and Gy. (sp. ined.). This is the true *P. divaricatum* Ckne. of the Cass.

P. crassicaule (Ckne.) Lg. and Gy. (sp. ined.).
Abundant in the forest from about 2300 to 2800ft.

ROSACEAE.

Acaena fissistipula Bitter.
Punch Bowl Creek, below the fall, 2500ft (R. M. L. and W. R. B. O.).

* Sub-Antarctic Islands of New Zealand, Vol. II.

THYMELEACEAE.

Drapetes villosa Cheesem. var. *multiflora* Cheesem.
South side of Punch Bowl, 4000ft, and elsewhere in boggy ground.

ONAGRACEAE.

Epilobium tenuipes Hook. f.
Flat at the mouth of the Mingha.

Epilobium Hectori Haussk.
Swamp in settlement (behind " Rockery Neuk ").

E. pedunculare A. Cunn. var. *minutiflorum* Ckne.
Blimit Cirque, 4500ft.

UMBELLIFERAE.

Hydrocotyle novae-zealandiae D. C. var. *montana* T. Kirk.
Swampy ground, 4000ft.

Aciphylla Lyallii Hook. f.
Bealey River bed, near settlement.

We are in much doubt as to the separateness of the Aciphyllas at Arthurs Pass. We have collected specimens from the settlement (2400ft) up to 5500ft on Avalanche Peak. The plants at the lower level must be called *A. Lyallii.* They are much stouter, their leaves are narrower, much more rigid and coriaceous, and the inflorescence longer and the spines not only more than proportionately longer, but much stiffer, than in plants from a higher altitude; and these in the main, according to Cheeseman (1906) pp. 663 and 664, constitute the differences between *A. Lyallii* and *A. crenulata.* The question therefore arises whether the low forms are not habitat states of one species. The plants become smaller as one ascends, until at 5500ft they are not more than 3 to 4 inches high. According to Cheeseman (loc. cit.), *A. Lyallii* is a plant of altitudes from 3500 to 5500ft, and *A. crenulata* is found from 2500 to 5000ft. These facts give little guidance, but Cockayne (1928) p. 302, includes *A. crenulata* with a number of high mountain species. *A. Lyallii* is believed to be found from the Rangitata Mountains to Dusky Sound, and *A. crenulata* from Mount Arthur plateau, Nelson, to the Mount Cook district. The only method of solving the problem of relationship would be to obtain seeds from different districts and grow them in the same situation, and compare the resulting plants.

It is a question whether the *A. Lyallii* of Cheeseman is the *A. Lyallii* of Dusky Sound.

Anisotome filifolia (Hook. f.) Ckn. and Lg.
Floor of bush, Edwards Stream. (Collected by Miss E. Campbell.)

EPACRIDACEAE.

Cyathodes acerosa R. Br.
Scrub, mouth of Edwards Stream, and roadside below Halpins Creek.

APOCYNACEAE.

Parsonsia capsularis (Forst. f.) R. Br. var. *parviflora* H. Carse.
Jack's Hut and Peg-leg Creek.

BORAGINACEAE.

Myosotis australis R. Br.
Creek below Kennedy's.

Myosotis sp.
Avalanche Peak, among rocks, 5000ft and upwards.
Agrees fairly well with *M. Lyallii,* but in some respects approaches *M. Monroi.* The flowers are creamy white, and the leaves markedly hispid.

SCROPHULARIACEAE.

Pygmaea ciliolata Hook. f.
Avalanche Peak, 4500ft.

LABIATAE.

Mentha Cunninghamii Bentham in D.C.
Road near Kennedy's, in very small quantities.

PLANTAGINACEAE.

Plantago Raoulii Decne.
Punch Bowl Flat and swamps behind railway settlement.

COMPOSITAE.

Lagenophora Barkeri T. Kirk.
Swamp in the settlement.

L. pumila (Forst. f.) Cheesem. var. *minima* T. Kirk.
Bealey River bed and above Rough Creek 4500ft.

Brachycome Thomsoni T. Kirk var. *polita* Cheesem.
Shade in the lower Mingha Valley, in forest.

Gnaphalium Mackayi (Buch.) Ckn.
Fell field 3000 to 4000ft.

Raoulia lutescens (T. Kirk) Beauv.
Halpins to settlement, river bed.

Cotula dioica Hook. f.
Bog in settlement.

C. dioica Hook. f. var. *crenatifolia* T. Kirk.
Swamp in bush at junction of Mingha and Bealey.

Olearia moschata Hook. f.
There are one or two specimens that would undoubtedly have been included by Cheeseman in this species, growing on the Bealey River bank above Punch Bowl Creek. Indeed, Cheeseman records it from Arthurs Pass with an exclamation mark, the specimens having

been collected by T. Kirk. Unfortunately, in the locality where it is seen, there are a number of apparently hybrid *Olearias*. *O. cymbifolia, O. ilicifolia, O. arborescens,* and *O. avicenniaefolia* also occur, and the status of *O. moschata* forms may be doubtful.

Species previously recorded, not seen by Laing and Oliver, now collected by Laing and Gourlay.

Agropyron aristatum (Petrie) Cheesem.
Shingle in creek bed, near Kennedy's.
A well-developed form, with panicled spike.

Carex Berggreni Petrie.
By roadside, Lower Bealey.
This still leaves *Deschampsia Chapmani* not recently observed.

CORRECTIONS TO PREVIOUS LIST (1929).

Lycopodium selago L. should read *L. australinum* Herter.

Cystopteris fragilis should read *C. novae-zelandiae* J. B. Armstg.

Pittosporum tenuifolium should read *P. Colensoi* Hook. f.
A few specimens only have been seen, near the mouth of Halpins Creek, and these are exactly similar to others near the Otira township which have been identified by various botanists as *P. Colensoi.* What the true *P. Colensoi* is, we, of course, do not presume to say.

Rubus australis Forst. should read *R. australis* Forst. var. *glaber* Hook. f.
The plant is not uncommon in the lower Bealey.

Pseudopanax lineare (Hook. f.) Laing and W. R. Oliver, n. comb. should read *P. Lineare* (Hook. f.) C. Koch.

Hebe salicifolia (Forst.) Pennell should read *H. salicifolia* (Forst.) Pennell var. *communis* Ckn.

Hebe vernicosa (Hook. f.) Ckn. and Allan should read *H. vernicosa* (Hook. f.) Ckn. and Allan var. *Canterburiensis* (J. B. Armstrg.) Ckn. and Allan.

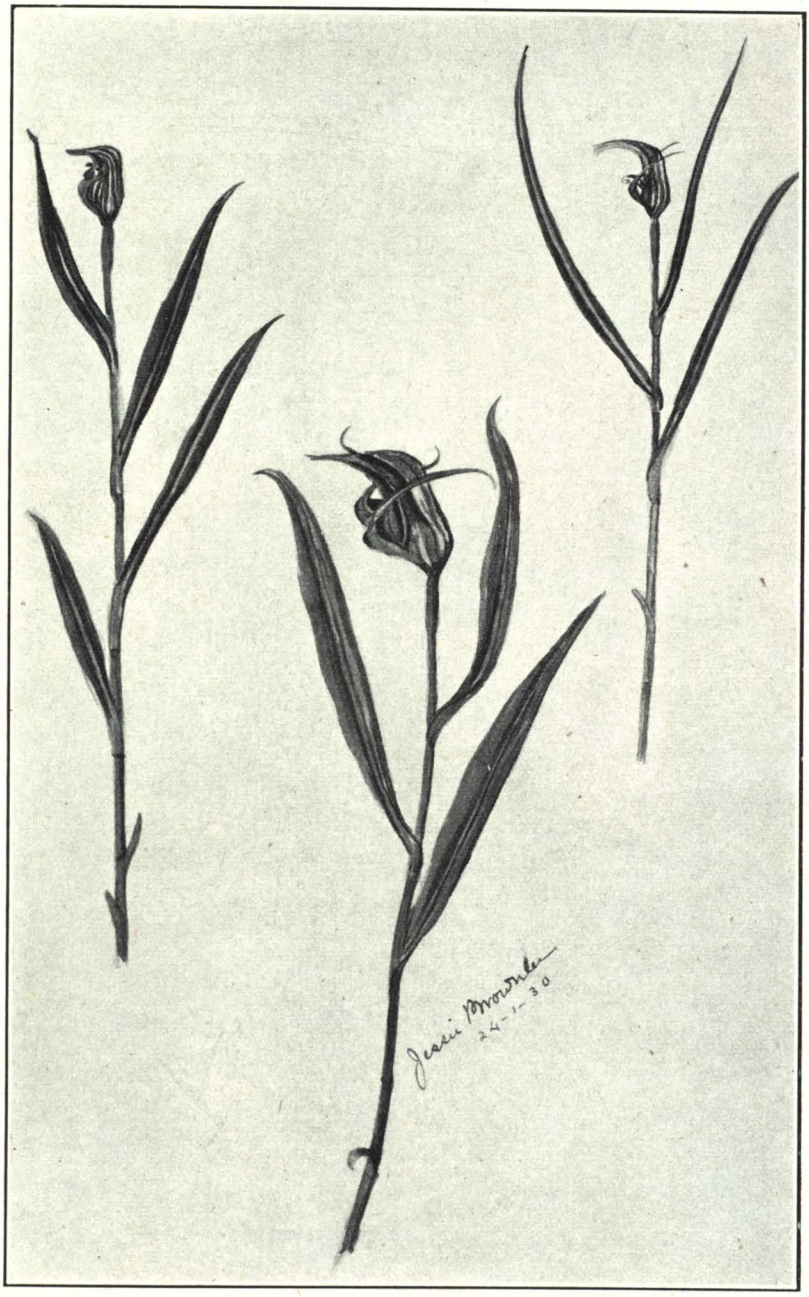
We are following Dr Cockayne's advice in this direction, though we are not quite clear about the position. Cockayne (1927), p. 30,* states var. *Canterburiensis* " is the sole variety in the vicinity of Arthurs Pass and the adjacent mountains of the Western Botanical District. It is usually smaller and more prostrate than other varieties of the species." However, we have found Hebes of this species, particularly in the Mingha Valley, in rather varied forms, some of which approach to and may be hybrids with *H. buxifolia.* What the type of *H. vernicosa* is, we do not know.

Olearia nummularifolia should read *O. cymbifolia* (Hook. f.) Cheesem.

Helichrysum microphyllum (Hook. f.) Benth. and Hook. f. should read *Helichrysum selago* (Hook. f.) Benth. and Hook. f.

---

* Cockayne and Allan *(Trans. N.Z. Inst.,* Vol. 57), Taxonomic Status of New Zealand Species of Hebe.



Three forms of Pterostylis from creek near Gaya Cottage, Arthur's Pass.

Face p. 10]