# SOME ASPECTS OF THE BOTANY OF CASTLE HILL BASIN

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The proposal for a town development in Castle Hill Basin moved me to gather together some factual information to present to the various interested bodies so that it would be quite clear how important the area is, botanically. In turn, I wished to make an attempt to have the botanical reserves in the area increased in size and in number to prevent inadvertent or deliberate damage by works, over-use by the public, or over-collecting by botanists.

It will be of value briefly to survey the botanical history of the Castle Hill basin. Botanical study began in the 1880s with collection by the early botanist J.D. Enys, then collection and taxonomic work by T.F. Cheeseman, T. Kirk, G.M. Thomson, L. Cockayne, A.Wall, D. Petrie and, latterly, by W.B. Brockie (Richards 1951).

Many species of plants were first described from the area and this is of special importance to the botany of New Zealand because all other plants with the same name must be referable to a specific plant specimen from the type area. A list is appended of the species or subspecies first described from the basin and for which this is the type area.

| Botanical Name: | Common Name: |
|---|---|
| Ranunculus crithmifolius subsp. paucifolius (Kirk) Fisher | Castle Hill buttercup |
| R.enysii Kirk | Enys' buttercup |
| R.depressus Kirk | |
| Caltha obtusa Cheesem. | N.Z. marsh marigold |
| Cheesemania enysii (Cheesem.) Schulz | |
| Chenopodium detestans Kirk | |
| Hymenanthera alpina (Kirk) Oliver | Whare-karara |
| Gunnera dentata Kirk | |
| Epilobium pedunculare var. minutiflorum Cock. | Pedunculate willow-herb |
| E.gracilipes Kirk | Slender willow-herb |
| Carmichaelia robusta Kirk | Robust N.Z. broom |
| C.enysii Kirk | Enys' N.Z. broom |
| Korthalsella lindsayi var. clavata (Kirk) Danser | Pygmy mistletoe |
| Gingidium enysii (Kirk) Dawson | Enys' angelica |

| Botanical Name: | Common Name: |
|---|---|
| Anisotome aromatica var. incisa (Kirk) Cheesem. | Aniseed |
| Wahlenbergia brockiei Hay | Brockie's hare-bell |
| Myosotis colensoi (Kirk) Macbride | Castle Hill forget-me-not |
| M.traversii var. cinerascens (Petrie) Moore | |
| Euphrasia laingii Petrie | Laing's eye-bright |
| Hebe glaucophylla Cock. | |
| Luzula ulophylla (Buch) Cock. & Laing | |
| Carex enysii Petrie | |
| C.inopinata Cook | |
| C.petriei Cheesem. | |
| Agropyron enysii Kirk | |
| Agrostis tenella Petrie | |
| Pyrrhanthera exigua (Kirk) Zotov | |

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## RARE PLANTS

A second matter of botanical importance is the occurrence of rare plants in the area. Most of these are on the limestone or related Tertiary rocks. It is of great importance that these plants be absolutely protected. Four of them, Ranunculus crithmifolius subspecies paucifolius (formerly R.paucifolius, see Fisher 1965), Wahlenbergia brockiei, Myosotis colensoi, and M.traversii var. cinerascens are endemic to the limestone of Castle Hill, i.e. they occur nowhere else in the world. Three other species occur elsewhere in New Zealand but are very restricted is their distribution. They are Gingidium enysii, Hebe cupressoides and Picris hieracioides.

In addition to this there are various other plant occurrences (mainly on the limestone and other Tertiary rocks) which, by reason of the restriction of species to that particular habitat (which occurs extensively at Castle Hill) or the scarcity of the plants in that particular habitat and/or the peculiar assemblage of species in an unusual setting, have extreme botanical interest. Plant species

restricted to limestone or similar rocks are not abundant in New Zealand (see Burrows 1962). Here at Castle Hill, apart from the Ranunculus, Myosotis, Wahlenbergia and Gingidium mentioned earlier, there are two others (at least): Asplenium lucidum var. lyallii (Limestone spleenwort) and Poa aciculariifolia (Needle grass). The Poa is not very abundant elsewhere in New Zealand but it is quite common at Castle Hill.

The juxtaposition of species otherwise found in widely different habitats is one of the most interesting aspects of the botany of the limestone. Apart from the species already mentioned the following list will indicate the range of plants present, and their more usual habitats. Two of these (marked *) are not on the limestone adjacent to the Castle Hill homestead, however.

| Botanical Name: | Common Name: | More usual Habitats: |
|---|---|---|
| Cotula pectinata | | windswept alpine ridge crests |
| Exocarpus bidwillii | | subalpine rock outcrops (root parasite) |
| Gingidium decipiens | Deceptive angelica | stable riverbed, scree |
| * G.geniculatum | Climbing angelica | lowland scrub |
| G.montanum | Large angelica | gorges, moist rock faces |
| Korthalsella lindsayi var. clavata | Pygmy mistletoe | on shrubs, (tiny stem parasite) |
| Lepidium sisymbrioides | | tussock grassland |
| Myrsine divaricata | Weeping mapou | wet forest near Main Divide |
| Notothlaspi rosulatum | Penwiper | subalpine scree |
| Olearia avicenniaefolia | Mangrove-leaved olearia | montane scrub, often on rock faces |
| Oreomyrrhis rigida | Stiff mountain myrrh | grassland |
| Pimelea prostrata | N.Z. Daphne | riverbed |
| * Podocarpus hallii | Hall's totara | forest |
| P.nivalis | Snow totara | subalpine scrub |
| Ranunculus insignis | Hairy alpine buttercup | alpine grassland |
| Senecio haastii | | rock outcrops |

The occurrence together of these plants on dry limestone cliffs and screes at 2500 ft. is quite remarkable, especially the presence of alpine and wet climate species. It is well worthwhile to attempt to preserve the assemblage of species.

## GENERAL FLORA OF LIMESTONE AND OTHER TERTIARY ROCKS

There are many other species present including some adventive plants which seem to prefer the limestone habitat and I am attempting to make a comprehensive floristic list for this kind of habitat in the basin. I would be very grateful for help in this respect. If anyone is willing to help with botanical fieldwork, please contact me. It is only by accumulating information in this way that a case can be made for the establishment of further botanical reserves and I hope to prepare reasonably complete lists by mid 1972, but a considerable amount of fieldwork is still required.

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## THE PRESENT RESERVE

Pending further botanical survey work in other parts of the basin, the rest of this statement refers to the existing reserve established for the protection of the Castle Hill buttercup.

After some agitation by interested botanists when it was noticed that the plant was in danger of extinction, Mr. L.W. McCaskill was instrumental in having a reserve of about 15 acres set aside in 1948 to exclude sheep, rabbits and unauthorized persons. Permission to visit the reserve must be obtained from the Commissioner of Crown Lands, Christchurch (in writing) and from the landowner, Mr. Frizzell. At the time the reserve was established, only about 32 specimens of Ranunculus crithmifolius subsp. paucifolius were still extant, (Brockie 1940, Anon 1947, McCaskill 1966). By the early 1960s (McCaskill 1958, 1966, Metcalfe 1962) the situation had much improved and the species is steadily increasing. There are now over 200 specimens in the reserve. The main reason for this was the removal of rabbits and sheep. Not only grazing, but trampling by sheep is detrimental to the habitat and the vegetation. However, Mr. McCaskill found it necessary to do some weeding round the buttercups to prevent them from being swamped by the growth of other plants. At present some other plants (Myosotis colensoi, Lepidium sisymbrioides and Gingidium enysii) are protected by the fence. However, hares are present and it is probable that better fencing is needed to exclude them. If the town development takes place it is quite clear that more substantial fencing will be required to keep out unauthorized persons.

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## EXTENSION TO RESERVE

I have made a careful examination of the area adjacent to the reserve. It may be discussed under two headings, the solid limestone and the limestone screes. In various small gullies and on ledges inaccessible to sheep there are occurrences of some of the species which it is desirable to protect (all of the shrubby species and herbs such as Ranunculus insignis and Gingidium montanum). If sheep, hares and rabbits are excluded from parts of this limestone block, which is crossed by a complex series of gullies, ledges and crevices, these species may be expected to increase. Control measures against possums may be needed. These plants, furthermore, need to be protected from collection. On the screes nearby occur most of the other plants which it is desirable to protect. (Poa acicularifolia forming a nearly pure community with some Myosotis colensoi and occasional herbs such as Cotula pectinata, Gingidium enysii and Notothlaspi rosulatum). This would be a good area for transplants of the Castle Hill buttercup. The main danger to the habitat and plants here, apart from grazing, is trampling by stock and people. The limestone screes are very loose and friable and trampling causes gross disturbance and erosion. There is a delicate balance in the survival of the open communities of Poa acicularifolia and Myosotis colensoi which occur here. If the fenceline is extended from the existing enclosure to take in a further area, virtually all of the plants will be protected. As far as I know there would be no need to reserve any more of the area near the Castle Hill homestead for botanical purposes. The fencing required would be feasible by taking a line from the present fence eastward up a gully in the solid limestone, then down another gully to its eastern side, then northward, fencing in a reasonable area of limestone scree by extending the fence to the cliff line about 55 yards east of the present north-east corner of the reserve. This would extend the reserve by about 9 acres.

I would suggest, also, that if the development takes place, consideration be given to allowing the public to view the interesting plants under controlled conditions.

As a means of safeguarding the future of the Castle Hill buttercup (and possibly some other species) I have suggested that an approach be made to the Director of Botany Division, D.S.I.R. at Lincoln and probably also to the Director of the Christchurch Botanic Garden with a view to spreading seed and seedling plants from the existing reserve to other sites. If this is done judiciously, especially into an addition to the reserve, the plants could become abundant.

At present there is a commitment by the Malvern County Council to see that the area of the reserves near the Castle Hill homestead is increased. Not only will plants be preserved by this, but so will archaeological sites, type sites for fossils and the superb scenery of the limestone tors. The fruition of this scheme will solve many of the problems of protection of the flora but we must be alert to see that it comes about and to investigate the area for other sites in urgent

need of preservation.

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## FRONTISPIECE

Mr. Cecil Dunn once more supplies the frontispiece to the Journal. This time it is a drawing of a plant formerly known as Helichrysum purdiei, now considered to be a hybrid between Helichrysum bellidioides and H.glomeratum.

Eight plants, of varying size, can be seen in the Lyttelton Reserve No. 101 on the grassy slopes below the upper cliffs. The largest plant is a flaccid shrub some two feet six inches high by two feet wide.

In late October or early November it is covered with masses of flowers similar to the illustration. Both parents grow not far from their offspring.

Cuttings of the plant root fairly easily but it has been found difficult to establish in Christchurch. The plants rapidly succumb to dryness and aphids.

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## SOME RECENT FERN RECORDS FROM BANKS PENINSULA

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It is fortunate for the present-day student that ferns and fern-allies received a great deal of attention in the early history of New Zealand botany. In the case of Banks Peninsula, detailed records by enthusiastic amateurs such as T.H. Potts and the Armstrongs ensured that we now have a fairly complete picture of the fern flora. William Martin and R.M. Laing between 1910 and 1920 continued the work started by their predecessors; from about 1920 onwards the late Professor Arnold Wall contributed to our knowledge of the ferns of the Peninsula, adding many new records. Numerous people have kindly given me recent records and I am grateful to all who have done this. It is hoped that an up-to-date census can be published eventually.

Almost a century ago T.H. Potts wrote, "the peninsula forests will probably be exterminated at no distant date" (1878, 359). His prophecy has proved to be dismally accurate and this undoubtedly accounts for the