SOME PLANTS OF CAMPBELL AND ENDERBY ISLANDS

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INTRODUCTION

The subantarctic islands of New Zealand are clothed in mystery and drama. Cockayne (ed. Godley 1967) has written: "Lands of mist and sleet and hail, of fierce squalls born in the icy south; cruel, rock-bound coasts, scenes of brave men's death or fierce struggles with the angry sea; lands of brown hills, enclosed by thick woods, weird and grotesque - in very truth goblin forests, patrolled and sentinelled by uncouth monsters of the deep; such impression may our far-off subantarctic island give at first." However, he adds: "A closer view, and scenes more pleasant greet the traveller."

In the first week of March 2004, I joined a voyage organised by Heritage Expeditions to the Subantarctic under the leadership of Rodney Russ. We were able to land on both Campbell Island and Enderby Island, the most northerly of the Auckland Islands. Although it was relatively late in the flowering season, a number of the so-called megaherbs and other plants were still in bloom. This article describes some of the more conspicuous plants that we noticed during our days on land.

GENERAL NATURE OF THE FLORA

Campbell Island lies 700km south-southeast of Bluff at 52° 35′ south. No trees grow on Campbell Island, apart from an isolated Sitka spruce (*Picea sitchensis*) planted by the shore of Perseverance Harbour, but the Auckland Islands being more northerly, stretching between 50° 30′ and 50° 55′, have coastal belts of southern rata (*Metrosideros umbellata*). With less shrub and more tussockland, Campbell Island proved a better proposition for pastoral farming than the Auckland Islands, and sheep farming continued until 1935. Four thousand sheep and a few cattle were then abandoned. Later, in 1970 and in 1984, dividing fences were erected to restrict the destruction of the vegetation by the sheep, with the last wild sheep being removed in 1990. Norway Rats were eradicated in 2001, making Campbell Island the largest island in the world to be so cleared. Likewise, Enderby Island has suffered from introduced animals, having been roamed by cattle, first as castaway

food and then as farm stock; French Blue rabbits were also released. The island is now clear of these animals, as well as mice which were eradicated as a result of the rabbit-poisoning programme. Removing all these pests has enabled the vegetation to regenerate in both islands, although the present balance is undoubtedly somewhat modified compared with the distribution of species prior to human occupation and disturbance.

Both the Auckland and Campbell Islands rise from a submerged plateau of New Zealand's continental landmass (O'Connor 1999). The basement rocks are similar to those of Fiordland and Westland. The islands themselves are built up from piles of lava flows. Campbell Island is the remnant of a shield volcano, rising to 569 m at Mount Honey, being eroded on the exposed western flank, with dykes intruding through older rocks. The eastern lava flows and the sea inlets remind me of the Banks Peninsula, while the peat moorland of the interior is more reminiscent of a Scottish Western Isle, such as Mull. Enderby Island, by contrast, is rather low-lying, with moraine gravels and sands from earlier glacial activity that have overlain the lava flows. Small basalt cliffs form its northern shoreline.

The climate of these islands is maritime, cool and humid, with no large swings in temperature. Campbell Island has 330 rain days per year, mostly falling as misty rain or in squalls. The annual sunshine is 16% of the maximum possible hours. The temperature was 9 °C on our arrival in Perseverance Harbour, slightly above the mean annual temperature of 6 °C. Wind gusts exceeding 35 knots (63 km/h) occur on at least 100 days annually at Beeman Point (O'Connor 1999). Enderby Island is slightly milder, and has more sunshine than the main Auckland Island.

Most plants clearly show affinity with the New Zealand mainland, the shrubland of *Coprosma, Dracophyllum and Myrsine* species on Campbell Island being an example. The shoreline hebe (*Hebe elliptica*), which was flowering sparsely, extends from New Zealand across Fuegia to the Falkland Islands, while a few species, such as the rush *Juncus scheuchzeroides*, are fully circumpolar. However, about one-third of the species are endemic to New Zealand's southern islands, with some of them, notably those of the endemic genus *Pleurophyllum* (the rib-leaved daisies) being very distinctive. The emperor daisy (*P. speciosum*) exhibits two of the outstanding features of these plants: large leaves and highly coloured flowers. It is thought that such leaves might be adaptated to the weak sunlight and generally overcast

skies, in that they provide more extensive "solar collection panels" for photosynthesis. Curiously, on the other hand, one might speculate that the development of flower colour is the response to the more intense ultraviolet radiation at these southerly latitudes. Shielding of *Pleurophyllum* petals hinders their colour development (Given 2004 *ers.. comm.*), while ultraviolet radiation is known to cause yellowing of dried softwood (Boyce, 2003). Even an adventive cranesbill (*Geranium* sp.) near the Beeman Point Meteorological Station had flowers that appeared to be of a deeper hue than those of its mainland counterparts. The reasons for the size and flower colour of the endemic plants are a matter for further research.

Editor's note: In line with Roger's suggestion about leaves as 'solar panels', I have measured leaf temperatures up to 15°C higher than air temperatures in *Pleurophyllum speciosum* (Wardle 1991). A problem with Roger's ultraviolet radiation hypothesis as an explanation of coloured flowers, though, is that 'the higher the latitude the less solar UV and in evolutionary terms the ozone hole/depletion is very recent and spasmodic. Whether flowers do respond to increased UV by deeper colours is debateable. There is some evidence that there could be more yellow flavonoids biosynthesised but at the same time these colourants could be more rapidly bleached by the UV' (Gerald Smith, Industrial Laboratory, Wellington, pers. com.). In some of the southern species with coloured flowers (e.g. in *Gentiana*), a proportion within populations have white flowers (Godley 1982).

CAMPBELL ISLAND

On the first day we disembarked at the Beeman Point wharf, taking the 4 km boardwalk to the Col-Lyall Saddle. The immediate area around the wharf and meteorological station (now unmanned) is clothed mainly in introduced grasses and weeds, but the modified vegetation soon gives way to dense shrubland dominated by the 'grass trees' *Dracophyllum longifolium* and *D. scoparium*, weeping mapau/matipou (*Myrsine divaricata*) and *Coprosma* species such as the hair-fringed *C. ciliata*. The shrubland attains 5 m in height in places, and extends to about 180 m above sea level. Seen beside the boardwalk was a flowering specimen of the "Macquarie Island cabbage" (*Stilbocarpa polaris*), one of the "megaherbs", with large fleshy leaves. The

species is palatable to stock, so its abundance and distribution have been much reduced.

This zone gives way to uplands, which once supported tall snow-tussockland of *Chinochloa antarctica*, now recovering from the earlier grazing. The ground is peaty, with cushion bogs in places. The spectacular bog lily, *Bulbinella rossii*, larger than its mainland relatives, was well past flowering, and its fleshy leaves were beginning to die back, but some stems retained seeds. Swathes of the deep yellow, poker-like flower heads can be a striking sight in November. A colony of the orchid *Waireia stenopetala* was noted in one cushion bog. This has a cap-like dorsal sepal, yellowish green with brown blotches, which arches over the rest of the flower, somewhat like the common *Chiloglottis* orchid. Hooker in his *Flora Antarctica* (1844) considered it to be a *Thelymitra* at first, noting that it had some features in common with *Chiloglottis*, but as an afterthought placed it as *Lyperanthus antarcticus* where it stayed until 1999, when it was put into a new monotypic genus (St George 1999).

The three rib-leaved daisies have altitudinal preferences. The silver giant daisy (*Pleurophyllum hookerii*) with its "felted" leaves is found in the peat moor above about 300 m, as is the emperor daisy (*P. speciosum*). The flowering stems of the latter rise to about 750 mm, and bear numerous 50 mm-diameter capitula with purple disc florets and paler ray florets. These daisies were still blooming in spectacular herbfields where it formed extensive patches in the peat. They seem able to colonise disturbed areas in the peaty uplands now that grazing has ceased. The third of these daisies, the stagshorn giant daisy (*P. criniferum*), grows at lower altitudes, has taller flower stalks (to about 1.5 m), and purplish-brown capitula with no ray florets. This plant had finished flowering at the time of our visit. At intermediate altitudes, hybrids between the stagshorn and emperor daisies occur.

The endemic *Hebe benthamii*, a straggly plant with deep blue flowers, had mostly finished flowering. The endemic, blue-flowered forget-me-nots *Myosotis antarctica and M. capitata*, which grow on rocky outcrops, were not seen but neither is common.

During the second day we explored the coastal areas around the upper reaches of Perseverance Harbour. By the shore at Tucker Cove, the waist-

high tussock *Poa littoralis* was flourishing. I also noticed the sedge *Carex trifida,* which grows in my garden in Christchurch. Near the Sitka spruce already mentioned, another introduced plant is flax (*Phormium tenax*), growing in healthy clumps near the water's edge. The shoreline hebe (*Hebe elliptica*) was bearing a few white flowers.

The track over a small, low peninsula crosses a mossy peat bog. This is home to small plants such as *Phyllachne colensoi* and *Pratia angulata.* There are a few isolated specimens of the small Antarctic gentian (*G. antarctica*), with magenta-tinged, cup-shaped flowers, but none were open. Another endemic plant in this area is the Campbell Island daisy (*Damnamenia vernicosa*). Its rosettes of leaves and its flower stems appear very similar to those of the mainland mountain asters (*Celmisia* spp.), but it has purplish capitula with white ray florets.

ENDERBY ISLAND

We landed in Sandy Bay, and took a route of about 8 km around the island. There is no track, apart from an initial boardwalk across the centre of the island and an informal track through the southern scrubland. The boardwalk goes through a "goblin forest" of stunted rata (*Metrosideros umbellata*) which was still flowering, and to judge from the carpet of fallen crimson stamens, it had been a good year for floral display. With only a slight rise in altitude, rata becomes progressively dwarfed until it forms a moorland of small woody plants mixed with *Ozothamnus* (syn. *Cassinia*). At this time of year rata was bearing the new season's canopy of bluish-magenta leaves. At one portion of the southern coast, the rata forest is protected on the seaward side by *Mysine divaricata*, with some specimens and the edge rata looking decidedly weather-beaten. The area had probably been significantly modified by past grazing.

The boardwalk ends in a coastal sward of low plants between extensive areas of bog lily and a broad-leaved carrot, *Anisotome latifolia* This latter is a megaherb with chest-high umbels of mauve-tinted flowers, that is flourishing now that grazing has ceased. On the other hand, the abundance of bog lily probably results from past grazing, as this plant is unpalatable to stock. Between the patches of megaherbs, there are small flowering plants like *Pratia angulata* and colonies of elegant gentian (*Gentiana concinna*).

Each gentian has numerous, magenta cup-shaped flowers which, though closed, gave a colourful cast to the sward.

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Pleurophyllum speciosum