

The arid alpine garden of Inland Marlborough

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Half-way between Christchurch and Wellington the plane passes directly over the highest point in New Zealand outside of the Southern Alps, the 2885 m Mt Tapuaenuku, on the Inland Kaikoura Range. To the east, in the valley of the Clarence, you can clearly see a geological fault line separating these mountains of shattered greywacke from the lower limestone hills forming the Chalk Range. As the land was uplifted during the Kaikoura Orogeny, the streams cut downwards forming chasms and gorges on the flanks of the main range. Many cut right through the limestone, polishing the hard layers of the walls to a pearly lustre. Calcareous rocks are a special feature of this area, for they are generally rare in the mountains of New Zealand. Before the limestone was deposited though, volcanic magma had extruded into the older greywacke as it accumulated. The highest peaks of the range are now criss-crossed with dykes of solid igneous rock, which weather to talus of a pinkish colour studded with large semi-pervious crystals.

Hottest and driest

These mountains thrust up into one of the hottest and driest regions of New Zealand. Blenheim, 60 km away, is the sunniest place in New Zealand, yet it receives only about 660 mm of rain per year, half that of Wellington for example. No wonder then a visitor would bake in the mountain gorges, but for the funneling of valley wind, the afternoon shade and the continual seepage of moisture from crannies in the rock walls. Yet in winter the gorges freeze solid for weeks. The low rainfall has an important effect during the winter too. Insufficient snow falls to build ice glaciers, despite the altitude, and the high slopes have only a relatively short period when they are blanketed with snow against the daily cycle of rock-shattering freeze and thaw. These conditions generate vast amounts of rock talus, with some chunks as big as houses, to accumulate as moving tongues of debris. These resemble the moraines of true glaciers, similar to those which must have formed these high basins during the Ice Ages.

A landscape transformed

The early colonial explorers of this land remarked on the absence of trees and we can probably attribute this in large measure to Polynesian burning. We know from breaking open surface rocks and measuring the thickness of the outside weathered layer or rind — just as on a mature cheese — that many lower slopes have been unvegetated for several hundred years.



Helichysum coralloides resembles coral, as its name suggests. It is confined to Marlborough. Photo: P Williams

However, one striking erosion feature of the inland Clarence has a more recent origin. Late last century Marlborough was smitten by a rabbit plague, aggravated by burning and overgrazing of the native tussock grasses. In the area now called "The Desert", run-off stripped the bared topsoil completely and carved into the deeply weathered mudstone below. Kanuka has only slowly re-colonised, to form a sparse woodland. These are the most inland stands of tall trees in the Clarence valley.

The only extensive areas of forest are in the north-east. Mountain beech is the main species, but there may be broadleaf, putaputaweta, lancewoods, coprosmas and other shrubs. Nearby, on limestone screes of the Chalk Range and as far south as the Branch river, are woodlands of Hall's totara, which evoke thoughts of North American mountains. At higher altitudes, Hall's totara grows in gullies with mountain lacebark which produces masses of large white blossoms in the spring. Alas, the fires and introduced animals of the Europeans have pushed this beautiful mountain tree back into small relict pockets. Scattered individuals and dead trunks amongst the montane scrub, hint at a more glorious past.

Perched on ledges and shady faces in the gorges, are more diverse forests of broadleaf, akiraho (*Olearia paniculata*), small-leaved kowhai, three finger, lancewood, and the rarer fierce lancewood. In these sites, and riverbeds where sheep and cattle are excluded, large bushes of pink broom (*Notospartium carmichaeliae*)

grow. In the Jordan valley at the northern end of the range there are groves of weeping broom (*Chordospartium stevensonii*) which has pendant sprays of pinkish, lavender flowers. These two are endemic to north-eastern South Island; but they are in the same family as the more familiar, introduced, yellow-flowered broom. Until recently these brooms all grew together along stream banks and bluffs over quite a wide area. However farm development and the scorched earth practice of weed spraying from helicopters has now forced the native brooms to back into these mountain strongholds.

Pride of Marlborough

The daisy family holds pride of place for species confined to north-eastern South Island. Most of them are seen in summer, spotting the bony landscape with yellow blooms. On the coast, or walking up a rocky gorge, you would first meet the shrubby Marlborough rock daisy (species of *Pachystegia*), with thick leathery leaves and large globular flowers of typical daisy form. On nearby stable bluffs or gravels you would come across masses of the low shrub *Brachyglottis monroi* with wavy-margined leaves and covered in bright yellow flowers. Amongst the riverbed boulders could be low cryptic plants of *Helichrysum depressum*, looking deceptively like bits of stranded driftwood. Several other species of woody *Helichrysum* similarly have small leaves with glossy outer surfaces and hairy undersurfaces