

Chatham Islands for protecting both private covenanted reserves and DoC land against stock. We all saw this to good effect at Rangaika and Awatotara.

### 10 January 2009

The morning flight to Auckland went ahead as planned, ending a second great visit to the Chatham Islands under the auspices of the Auckland Botanical

Society. Although this group had more varied interests than those attending the first trip, all found much to fascinate them and left the island more knowledgeable about the natural history of this wonderful outlier of New Zealand. We highly recommend Miskelly (2008) as a comprehensive reference on the Chatham Islands' geology, flora and fauna.

#### Acknowledgements

Our thanks to Peter de Lange for helping with some plant identifications and for the use of his working list of Chatham Islands plants.

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## RUAHINE RANGE SIXTUS LODGE CAMP, APITI, 15-20 JANUARY 2009

Mike Wilcox (editor)

#### TEAM RUAHINE

Jessica Beever, Ross Beever, Jan Butcher, Colleen Crampton, Chris Eckford, Leslie Haines, Shelley Heiss-Dunlop, Marcel Horvath, Helen Lyons, Juliet Richmond, John Rowe, Stella Rowe, Alison Wesley, Diana Whimp, Mike Wilcox, Maureen Young



Fig. 1. The group at Sixtus Lodge. Photo: Ross Beever.

#### PROGRAMME SUMMARY

**15 January 2009:** The advance party travelled from Auckland to Sixtus Lodge in Manawatu District, via Mangaweka with dinner at Apiti Tavern. Two magnificent white fir (*Abies concolor*) trees adorn the main road into Apiti.

**16 January 2009:** We visited the Margot Forde Arboretum, local tracks around the Cone River, the

fossil cliffs, and glow worm caves along Limestone



Fig. 2. Cone Creek, with Sixtus Lodge. Photo: Ross Beever.

Creek. The Cone River below the lodge has a nice patch of red beech (*Nothofagus fusca*) forest, several old remnant trees of *Olearia virgata* subsp. *centralis*, and plentiful lacebark (*Hoheria sexstylosa*), while the highly distinctive daisy *Anaphalioides subrigida* grows on the papa roadside banks.

Margot Forde was a scientist at the Grasslands Division, DSIR, Palmerston North, until her death on 23 June 1992 at the age of 57. She was much involved in setting up the Sixtus Lodge, and for 10 years she was a member of the Ruahine Forest Park Advisory Board. As M.B. Ashwin she contributed to Flora Vol 1 (1961) with her research on *Pygmea* (later *Chionohebe*, now *Veronica*), *Euphrasia* and



**Fig. 3. Fossil cliffs, Sixtus Lodge, Ruahines, 16 Jan 2009. Photo: M.D. Wilcox.**

*Parahebe*, and also in a major way with editorial work. She is commemorated in AgResearch's Margot Forde Forage Germplasm Centre, which incorporates NZPCN's threatened native plant seedbank set up in 2006. Margot contributed to forestry science too, with her PhD studies in the early 1960s at the University of California, Davis, on the variation in the natural populations of *Pinus radiata* in California (Forde 1966). The seed she collected was used by the Forest Research Institute to set up a pioneering experiment in the Kaingaroa Forest on genetic variation in this important commercial conifer (Thomson 2000).



**Fig. 4. Limestone cave, Sixtus Lodge, Ruahines, 16 Jan 2009. Photo: M.D. Wilcox.**

There is a firewood plantation at Sixtus Lodge of an unusual eucalypt, Wadbilliga ash (*Eucalyptus paliformis*). Mike Wilcox first introduced this species into cultivation in New Zealand in 1981. The Sixtus Lodge plantation was planted in 1984, from seedlings grown in the NZ Forest Service Nursery at Bulls (pers. comm. George Paton), from Mike's seed.



**Fig. 5. *Eucalyptus paliformis*, Sixtus Lodge, Ruahines, 18 Jan 2009. Photo: M.D. Wilcox.**

**17 January 2009:** Our first full-day walk in the Ruahine Forest Park began at the entrance from the end of Limestone Road. After crossing Coal Creek or Makiekie Creek (a tributary of the Pohangina River/Manawatu River) we followed the Shorts Track to the Ngamoko Range open tops at 1367 m, returning the same way, and then following the Loop Track down to Coal Creek, and back via Deerford Track. It was a beautiful fine day. The vegetation



**Fig. 6. Toka, from Shorts Track Ruahines, 17 Jan 2009. Photo: M.D. Wilcox.**

succession was red beech forest, horopito (*Pseudowintera colorata*) thickets, moribund kaikawaka (*Libocedrus bidwillii*), very extensive leatherwood (*Olearia colensoi*) scrub with pink pine (*Halocarpus biformis*), and open tops dominated by mid-ribbed snow tussock (*Chionochloa pallens*). The plant flowering highlights were magnificent patches of *Euphrasia cuneata*, abundant *Gentianella montana*

subsp. *ionostigma*, and locally, *Jovellana repens* and *Aporostylis bifolia*. Some shells of the snail *Powelliphanta marchanti* were seen near the Shorts Track summit.



**Fig. 7. Bot Soc group, Shorts Track summit, 1367 m, Ruahines, 17 Jan 2009. Photo: M.D. Wilcox.**

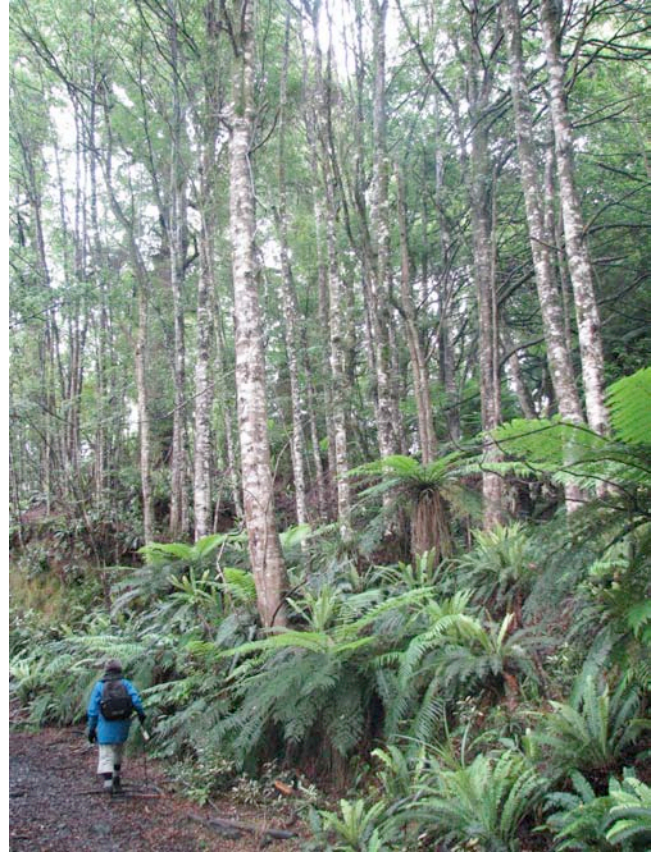
**18 January 2009:** Our second walk in Ruahine Forest Park began at the track from a side-road off Petersons Road. We crossed Umutoi Creek over a handsome, arched wooden bridge and continued on to the Alice Nash Memorial Heritage Lodge (NZ Deer Stalkers Association, Manawatu Branch). Jessica Beever spent time with the whole group showing us some of the mosses that grew beside the track. We saw *Weymouthia mollis* growing in long festoons from trees, *Pyrrhobryum bifarium*, *Dicranoloma dicarpum* with its characteristic clusters of capsules, and its untidy relative, *D. billardierei*, and *Wijkia extenuata* on rotten wood. Later we followed the track down to the Oroua River, and returned. Red beech forest predominated, and with several large hinau (*Elaeocarpus dentatus*) near the lodge. Godley's kowhai (*Sophora godleyi*) grows on the river bank.



**Fig. 8. Umutoi River bridge, Ruahines, 18 Jan 2009. Photo: M.D. Wilcox.**

**19 January 2009:** Our third walk in Ruahine Forest Park was along the Rangiwahia Track to Rangiwahia Hut, 1327 m on the Whanahuia Range. The track

begins at 800 m from the end of Renfrew Road, Rangiwahia – about a 40-minute drive north from Sixtus Lodge. It was mostly red beech forest at first, with a small stand of mountain beech above the arched bridge, and groves of cedar (*Libocedrus bidwillii*). This track was closed for 5 months in June 2004 following a series of slips. The new track around



**Fig. 9. *Nothofagus fusca*, Heritage Lodge Track, Ruahines, 18 Jan 2009. Photo: M.D. Wilcox.**

(actually “up, over and down!”) the slip was opened in November 2004. We experienced misty rain for most of the day, but interesting plants along this track



**Fig. 10. Rangiwahia Track, slip, 19 Jan 2009. Photo: M.D. Wilcox.**

included *Deschampsia tenella*, *Arthropodium candidum*, *Veronica truncatula*, *Veronica venustula*,

*Pterostylis patens*, *Aciphylla colensoi*, *Brachyglottis lagopus*, *Hypolepis millefolium* and *Hymenophyllum villosum*.



**Fig. 11. *Libocedrus bidwillii*, Rangiwahia Track, 19 Jan 2009. Photo: M.D. Wilcox.**

During our return drive we briefly stopped on Te Parapara Road to view from afar the Ian McKean Pinetum. (Tantrum 2002). Ian McKean was a local farmer dedicated to growing a collection of temperate conifers from all over the world. He started planting in 1958 and amassed over 300 species from 48 genera. The Pinetum was covenanted under the QE II Trust in 1997 and officially opened on 31 March 2000.

**20 January 2009:** People variously visited Cone River, Margot Forde Arboretum and fossil cliffs, and the camp concluded at 10 am.

## COMMENTARY ON THE VEGETATION

Mike Wilcox

The Ruahine Range extends 90 km from the Manawatu Gorge north to the Tararuarau Gorge in the north (Searell 1975). Ruahine Forest Park covers 94 000 ha (Department of Conservation 2004). The highest point is Mangaweka at 1733 m. The area we visited was on the western side in the central part of the range. Valuable references on the Ruahine flora and vegetation are Aston (1913), Elder (1965), Nicholls (1970), Ogden (1971) and Cunningham (1979). It is an area that has been subjected since 1870 to severe disturbances and modification by introduced animals (possums, deer, pigs, goats), deforestation by logging, fires, landslides and gale damage (James 1973, Cunningham 1979, Rogers & Leathwick 1997).

The lower slopes, from 400-600m, at one time carried mixed podocarp-hardwood forest, but now there are just vestiges remaining, such as in the Makiekie Scenic Reserve (which we did not visit), where large rimu (*Dacrydium cupressinum*) and totara (*Podocarpus totara*) are reported to be plentiful (Mitcalfe & Horne 2008). The dominant tree from 600-1100 m is red beech, forming pure stands of old

mature trees up to 35 m tall as well as younger, regenerated stands that have come up following wind damage. A few rimu can be seen in the lower slopes of Deerford Track near Coal Creek.

South of Coal Creek the main forest type on the mountain slopes up to 800 m was once dominated by kamahi (*Weinmannia racemosa*). Defoliation by possums took a heavy and spectacular toll on these canopy trees, resulting in dieback, death and collapse of the forest canopy. Large areas, including the lower part of Shorts Track, are now occupied just by the remaining understorey species, dominated by horopito and putaputaweta (*Carpodetus serratus*), tangles of bush lawyer (*Rubus cissoides*), glades of bush rice grass (*Microlaena avenacea*), and ferns such as *Polystichum vestitum*, *Blechnum discolor*, *Histiopteris incisa*, *Dicksonia squarrosa*, and *Cyathea smithii*, all of which are unpalatable to deer. Halls totara (*Podocarpus hallii*), miro (*Prumnopitys ferruginea*), black maire (*Nestegis cunninghamii*), hinau (*Elaeocarpus dentatus*), broadleaf (*Griselinia littoralis*) are the only other tree species we saw in these lower montane forests. Fuchsia (*Fuchsia excorticata*), pate (*Schefflera digitata*), broadleaf (*Griselinia littoralis*), and Halls totara are particularly palatable to possums and have thus been much reduced in this area at the expense of the aforementioned unpalatable species.



**Fig. 12. *Halocarpus biformis* & *Olearia colensoi*, Shorts Track, 17 Jan 2009. Photo: M.D. Wilcox.**

Two conifers – kaikawaka or cedar (*Libocedrus bidwillii*) and pink pine (*Halocarpus biformis*) – are highly characteristic of the montane forest zone of the western Ruahine Range. Cedar grows here at an altitudinal range of 1100-1250 m, but many of the old trees are dead skeletons, especially along Shorts Track on the slopes of the Ngamoko Range. The trees on the Rangiwahia Track are generally in better health, but mostly grow as scattered emergents over a low sub-canopy of mixed hardwoods. Dr Tim Martin, who did his PhD thesis on wind damage in North Island montane forests (see Martin & Ogden 2006), has observed that cedar trees c. 400 years old or more are undergoing regional senescence in the

Ruahines and Taranaki. More recent regeneration (<300 years old) is generally healthy, but dense growth of horopito seems to be suppressing further regeneration. Pink pine comes in about 1200 m, as stocky, short trees, extending to the alpine scrub above the bush line at 1350 m. It seemed to be healthy and thriving.



**Fig. 13. *Libocedrus bidwillii*, Rangiwahia Track, Ruahines, 19 Jan 2009. Photo: M.D. Wilcox.**

Leatherwood or tupari (*Olearia colensoi*) is an outstanding and impressive feature of the subalpine zone, from 1100 m to 1300 m. It smothers the western upper mountain slopes with its impenetrable, bluish-grey protective cover (Wardle, Field & Spain 1971), thriving in the cold, foggy, and windy conditions prevailing there. Over the last 30 years it has expanded its range down-slope over large areas into the zone once occupied by *Brachyglottis eleagnifolia* (which is palatable to deer) and upper montane forest (Rogers and Leathwick 1997). Associated shrubs include *Brachyglottis eleagnifolia*, *Raukaua simplex* and *Dracophyllum longifolium*, together with mountain flax (*Phormium cookianum* subsp. *cookianum*) and animal-induced expanses of the unpalatable tall montane tussock grass *Chionochloa conspicua* subsp. *cunninghamii*.



**Fig. 14. *Olearia colensoi*, Shorts Track Ngamoko Range, Ruahines, 17 Jan 2009. Photo: M.D. Wilcox.**

On the open tops of the Ngamoko Range and Whanahuia Range from 1300-1500 m, the vegetation is mostly snow tussock grassland, dominated by mid-ribbed snow tussock (*Chionochloa pallens*), with many associated herbaceous species such as *Celmisia spectabilis*, *Celmisia incana* and *Astelia nervosa*, and a few low shrubs, one especially prominent on Shorts Track being *Pimelea buxifolia*.



**Fig. 15. *Olearia colensoi*, Shorts Track, 17 Jan 2009. Photo: Alison Wesley.**

#### **ON WILLIAM COLENZO FIRST REACHING THE RUAHINE TOPS**

Mention of *Olearia colensoi* reminds us that we were very much in "Colenso Country". William Colenso made a famous crossing of the northern Ruahine Range in 1845, and wrote: "*But when at last we emerged from the forest, and the tangled shrubbery on its outskirts, on to the open dell-like land just before we gained the summit, the lovely appearance of so many and varied beautiful and novel wild plants and flowers richly repaid me the toil of the journey and the ascent - for never did I behold at one time in N.Z. such a profusion of Flora's stores! In one word, I was overwhelmed with astonishment, and stood looking with all my eyes, greedily devouring and drinking-in the enchanting scene before me. I had often seen what I considered pleasing Botanical displays in many N.Z. forests and open valleys... but all were as nothing when compared with this - either for variety or quantity or novelty of flowers - all, too, in sight at a single glance!*".

"*But how was I to carry off specimens of those precious prizes? And had I time to gather them? I first pulled off my jacket, or small travelling coat, and made a bag of that, and then... I added thereto my shirt, and by tying the neck... got an excellent bag; while some specimens I also stowed into the crown of my hat... Fortunately the day was an exceedingly fine one, calm and warm, so that I did not suffer from want of clothing. That night I was wholly occupied with my darling specimens, putting them up, as well as I could... among my spare clothing, bedding, and*

books; only getting about two hours sleep towards morning". [As quoted in Grant, P.J. 1996. "Hawkes Bay Forests of Yesterday"]

## TREES, SHRUBS AND VINES

Mike Wilcox

Apart from the already-mentioned pink pine, Hall's totara, miro and rimu, the only other conifers we saw were kahikatea (*Dacrycarpus dacrydioides*) in lowland forest remnants near the Oroua River, an occasional large matai (*Prumnopitys taxifolia*) on the track to Heritage Lodge and the Oroua River, and snow totara (*Podocarpus nivalis*) and mountain toatoa (*Phyllocladus alpinus*), the latter in particular being fairly common in the subalpine scrub zone.



Fig. 16. *Pimelea buxifolia*, Shorts Track, Ruahines, 17 Jan 2009. Photo: M.D. Wilcox.

While red beech was very prominent, and had a heavy developing seed crop (a mast year), the only place we saw mountain beech (*Nothofagus solandri* var. *cliffortioides*) was on a rocky slope above the bridge on the Rangiwahia Track. It is much more common in the northern and eastern parts of the Ruahine Range (Elder 1965). Black beech (*Nothofagus solandri* var. *solandri*) is more of a lowland tree, and is listed for the Makiekie Reserve.

Hinau, black maire and broadleaf were present in the lower montane forest. Some very big trees of hinau were seen near Heritage Lodge, and a beautiful black maire with a heavy crop of ripe fruit was much admired near the bottom of the Loop Track towards Coal Creek. Despite its earlier devastation by possums, kamahi is still present and making a comeback, for instance along Limestone Creek, while broadleaf commonly occurred on the steep slopes above the big slip on the Rangiwahia Track, and was also seen along Shorts Track. Kamahi is a resilient species that abundantly regenerates on old logs and root plates following disturbance from storm damage.

The daisy family (Asteraceae) was well represented by various shrub species. Along with *Olearia colensoi*

and *Brachyglottis eleagnifolia* in the subalpine scrub we also found mountain holly (*Olearia ilicifolia*) and *Olearia arborescens*, while *Ozothamnus vauvilliersii* was prominent in the alpine fell field. Rangiora (*Brachyglottis repanda*) and heketara (*Olearia rani*) were present at lower elevations along the tracks, and several old, gnarled trees of *Olearia virgata* subsp. *centralis* grew along the Cone River below the Sixtus Lodge. There were just a few sightings of *Helichrysum lanceolatum*.

*Coprosma* species (Rubiaceae) were seen in all habitats, ranging from the raurekau (*Coprosma grandifolia*) in river gorges and track margins at low altitudes to the tiny, herb-like *Coprosma perpusilla* with its outrageously large stamens growing on damp banks in the alpine zone. *Coprosma tayloriae* (an unpalatable species) was common on cold, frosty river flats and also in montane forest and subalpine scrub. Karamu (*Coprosma robusta*) and shining karamu (*Coprosma lucida*) were both common at lower altitudes, *Coprosma rhamnoides* was seen only near the Heritage Lodge, while mountain karamu (*Coprosma tenuifolia*) was prevalent in the montane forest. *Coprosma rugosa* has a distinct preference for open, eroding slopes, and we saw it in just such places on the walk to the Oroua River and on the lower part of the Rangiwahia Track. The malodorous stinkwood (*Coprosma foetidissima*) is another montane forest shrub, and higher up on both the Shorts Track and Rangiwahia Track we found *Coprosma pseudocuneata* and *Coprosma depressa*, and *Coprosma decurva* on the Rangiwahia tops.

The local kowhai in the district is *Sophora godleyi* (Heenan, de Lange & Wilton 2001). It is a greyish-coloured, weeping tree with a liking for papa banks. We saw a lot of it in the Oroua River area. Red mistletoe (*Peraxilla tetrapetala*) was seen on a red beech tree near Sixtus Lodge.

Of the hebes (Plantaginaceae), koromiko (*Veronica stricta*) was common on forest margins and extended into the subalpine zone along the Rangiwahia Track. The Ruahine endemic hebe (*Veronica truncatula*) was seen high up on the Rangiwahia Track (its site preference being the toe of old slips), while *Veronica venustula* was attractively in full flower on slopes below the Rangiwahia Hut. We did not see the Ruahine whipcord hebe (*Veronica tetragona* subsp. *subsimplis*) which occurs on the Whanahuia Range.

To complete our observations on trees and shrubs we will summarise by habitat the remaining species seen in the area. At low elevations such as Limestone Creek, Cone Creek and the approaches to the main tracks we recorded wineberry (*Aristotelia serrata*), putaputaweta (*Carpodetus serratus*), tutu (*Coriaria arborea*), tree fuchsia (*Fuchsia excorticata*), snowberry (*Gaultheria antipoda*), hangehange (*Geniostoma ligustrifolium*), lacebark (*Hoheria*

*sexstylosa*), manuka (*Leptospermum scoparium*), kanuka (*Kunzea ericoides*), mingimingi (*Leucopogon fasciculatus*), mahoe (*Meliclytus ramiflorus*), matipo (*Myrsine australis*), toro (*Myrsine salicina*), white maire (*Nestegis lanceolata*), kaikomako (*Pennantia corymbosa*), lemonwood (*Pittosporum eugenoides*), five-finger (*Pseudopanax arboreus*), lancewood (*Pseudopanax crassifolius*), pate (*Schefflera digitata*) and ongaonga or tree nettle (*Urtica ferox*). There was one tree of *Pittosporum colensoi* near Sixtus Lodge, but it was possibly planted.



**Fig. 17. *Pseudowintera colorata*, Shorts Track, 17 Jan 2009. Photo: M.D. Wilcox.**

Other shrubs in the montane forests and subalpine scrub were *Alseuosmia pusilla*, an erect form of *Aristotelia fruticosa* (var. *suberecta*), *Coriaria pteridioides*, pokaka (*Elaeocarpus hookerianus*), *Dracophyllum longifolium* var. *septentrionale*, *D. recurvum*, *Gaultheria depressa*, *G. macrostigma*, *G. rupestris*, narrow-leaved mahoe (*Meliclytus lanceolatus*), weeping matipo (*Myrsine divaricata*), rohutu (*Neomyrtus pedunculata*), *Pentachondra pumila*, *Pittosporum rigidum*, horopito (*Pseudowintera colorata* and *P. axillaris*), mountain five-finger (*Pseudopanax colensoi*) and *Raukaua simplex* var. *sinclairii*. Lacebark (*Hoheria sexstylosa*), more prominent at lower altitudes, was also seen as a component of the subalpine scrub on the Rangiwahia Track. We were particularly impressed with the good numbers of *Pittosporum rigidum* and *Myrsine divaricata*, and the attractive bushes of *Gaultheria rupestris*. The induced abundance of horopito has already been mentioned but deserves emphasis – it is so plentiful that the hills from a distance appear reddish in colour.

Introduced trees and shrubs were not particularly abundant in the area, the main ones of note being buddleia (*Buddleja davidii*) and tree lupin (*Lupinus arboreus*) in the bed of the Oroua River, elder (*Sambucus nigra*) on farmland near the fossil cliffs, cut-leaf blackberry (*Rubus laciniatus*) on roadside banks, and Himalayan honeysuckle (*Leycesteria*

*formosa*) and rowan (*Sorbus aucuparia*) along the track to Heritage Lodge.



**Fig. 18. *Anaphalioides subrigida*, Limestone Road, Sixtus Lodge, Ruahines, 18 Jan 2009. Photo: M.D. Wilcox.**

Of the woody climbers, three species of *Clematis* were recorded – *C. foetida*, *C. forsteri* and *C. paniculata*. The common bush layer (*Rubus cissoides*) occurred over a wide altitudinal range, while *Muehlenbeckia australis* was mainly seen at lower altitudes, as was *Rubus schmidelioides*. The climbing rata (*Metrosideros diffusa*) was in flower during our visit and we saw several fine examples sporting their characteristic pinkish blossoms. It seemed to be the only *Metrosideros* in the area. Along the Limestone Road and also near Coal Creek we found several plants of Chilean flame creeper (*Tropaeolum speciosum*), generally regarded as an invasive weed.

## DICOT HERBS

**Mike Wilcox and Juliet Richmond**

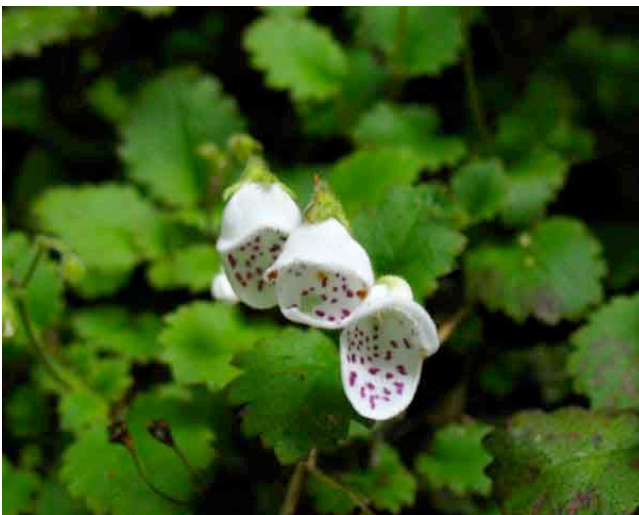
The area proved to be rich in native herbs, which were much in evidence in all habitats visited. Along forest tracks the most abundant ones were bush buttercup (*Ranunculus reflexus*), native cress (*Cardamine debilis*), *Oxalis exilis*, bidibidi (*Acaena anserinifolia*) and *Hydrocotyle elongata*. Along river banks and gorges we found some fine patches of *Jovellana repens*, river daisy (*Anaphalioides trinervis*), *Australina pusilla*, *Epilobium rotundifolium*, *Dichondra repens*, *Lobelia angulata*, *Nertera depressa*, *Oxalis magellanica*, native chickweed (*Stellaria decipiens*), and the very abundant *Urtica incisa*. Less commonly seen were *Galium propinquum*, *Nertera villosa* and *Plantago raoulii*. An exciting find on papa banks was *Anaphalioides subrigida*, in places accompanied by *Gunnera monoica*, *Lagenifera pumila*, *Senecio glomeratus*, *S. hispidulus*, *S. minimus*, *S. quadridentatus* and *Wahlenbergia violacea*. *Senecio rufigliandulosus* was seen in the Limestone Gorge, and also commonly on damp banks in the upper sections of the Rangiwahia Track. The bouldery bed of the Oroua River had green or silvery patches of *Raoulia tenuicaulis*, together with the bronzy-leaved *Epilobium*

*brunnescens* subsp. *brunnescens*, *Helichrysum filicaule*, *Lagenifera pumila*, and *Pseudognaphalium luteoalbum*.



**Fig. 19. *Gentianella montana* subsp. *ionostigma*, Shorts Track, 17 Jan 2009. Photo: M.D. Wilcox.**

The montane section of Shorts Track was resplendent in magnificent patches of eyebright (*Euphrasia cuneata*) and carpets of the gentian *Gentianella montana* subsp. *ionostigma*. On the open tops there were numerous native herbs. The daisy family was represented in damp, peaty places by the diminutive *Abrotanella fertilis*, and by *Anaphaloides alpina*, *Brachyglottis lagopus*, *Brachyscome radicata*, *Celmisia gracilentia*, *C. incana*, *C. spectabilis*, *Craspedia minor*, *Euchiton limosus* and *Euchiton ruahenicus*.



**Fig. 20. *Jovellana repens*, 17 Jan 2009. Photo: Alison Wesley.**

Three members of the carrot family (Apiaceae) were prominent in the alpine fell field. Spaniard (*Aciphylla colensoi*) was particularly abundant near Rangiwahia Hut, *Anisotome aromatica* was common nestled amongst tussock and on banks, and *Chaerophyllum colensoi* on grassy banks.

Other herbs of the montane and alpine areas were *Acaena profundeincisa* (Rangiwahia Track), *Drosera arcturi* (Rangiwahia Track), *Drosera stenopetala*

(Shorts Track), *Euchiton mackayi*, *Forstera tenella*, *Geranium microphyllum*, *Gonocarpus micranthus*, *Myosotis forsteri* (Rangiwahia Track), *Ourisia macrophylla* subsp. *robusta*, *Viola filicaulis* and *Wahlenbergia pygmaea*. *Ourisia macrophylla* subsp. *robusta* was not in flower, but was particularly common on damp slopes on the Rangiwahia Track, and also the Umutoi Creek on the way to Heritage Lodge. *Ourisia lactea* subsp. *drucei* is also known from the Ruahine Range. We did not fully get to grips with the various creeping willow herbs (*Epilobium*) on the open tops, but those known from the Whanahuaia and Ngamoko Ranges are *Epilobium alsinoides*, *E. brunnescens* subsp. *minutiflora*, *E. chlorifolium*, *E. nerterioides* and *E. pernitens*.



**Fig. 21. *Drosera arcturi*, Shorts Track, 17 Jan 2009. Photo: M.D. Wilcox.**

Common herbaceous introduced weeds in the area were yarrow (*Achillea millefolium*) on roadsides, sandwort (*Arenaria serpyllifolia*) on sand slopes at the fossil cliffs, centaury (*Centaureum erythraea*) along tracks, foxglove (*Digitalis purpurea*) along open bush tracks, wall lettuce (*Mycelis muralis*) in a range of damp, shaded habitats including gorges, river banks, and along bush tracks to the montane zone, monkey musk (*Mimulus guttatus*) in damp open places on farms, lotus (*Lotus pedunculatus*), selfheal (*Prunella vulgaris*), speedwell (*Veronica arvensis*), ragwort (*Senecio jacobaea*) and creeping buttercup (*Ranunculus repens*) along open bush tracks. There were also thistles in abundance on farmland, mostly Californian thistle (*Cirsium arvense*), Scotch thistle (*Cirsium vulgare*) and slender winged thistle (*Carduus pycnocephalus*). Catmint (*Nepeta cataria*) was seen in a few places along the track to the Oroua River, and flannel leaf (*Verbascum thapsus*) grew on sandy slopes at the fossil cliffs.

## MONOCOTS

**Leslie Haines and Jan Butcher**

The area abounded with monocots. Papa banks along Limestone Road were a good starting point, for here we found the grasses *Dichelachne crinita* and *Elymus*



scaber, blueberry (*Dianella nigra*), plentiful clumps of the handsome sedge *Machaerina sinclairii*, onion orchid (*Microtis unifolia*) and dried-off *Thelymitra* orchids. Open riverbanks had abundant toetoe (*Cortaderia fulvida*) and tall fescue (*Schedenorus arundinaceus*), while *Cordyline banksii* was seen on the steep walls of Limestone Gorge. Within the gorge a most striking plant was *Astelia fragrans*, here very robust and easily recognisable by its strong veins, together with plentiful *Uncinia ferruginea*, *Uncinia uncinata*, *Carex forsteri*, *Microlaena avenacea*, *Cortaderia fulvida*, and the orchid *Nematoceras macranthum*.



**Fig. 22. *Chionochloa conspicua*, Shorts Track, 17 Jan 2009. Photo: M.D. Wilcox.**

On the lower slopes of the Deerford and Shorts Tracks we encountered the sedges *Carex forsteri*, *Carex geminata*, *Uncinia ferruginea* and *Uncinia zotovii*; the rushes *Juncus effusus*, *Juncus tenuis* and *Luzula banksiana* var. *migrata*; the grasses *Cortaderia fulvida*, *Microlaena avenacea* and *Microlaena stipoides*; the orchids *Earina autumnalis*, *Gastrodia cunninghamii*, *Nematoceras trilobum* and *Simpliglottis cornuta* with purplish veins; and two perching asteliads, *Astelia solandri* and *Collospermum microspermum* commonly epiphytic on red beech trees.

Above the beech forest on the Shorts Track were *Chionochloa conspicua* subsp. *cunninghamii*, *Luzuriaga parviflora*, *Libertia micrantha*, *Microlaena avenacea* (very abundant), *Phormium cookianum*, *Rytidosperma gracile* and *Rytidosperma viride*. Only a

few mountain cabbage trees (*Cordyline indivisa*) were seen in the cedar forest, and these did not look healthy. A stunted version of *Astelia nervosa* was common in the leatherwood zone. At the tops amongst the celmisias were *Astelia linearis* var. *novaezelandiae*, *Carpha alpina*, *Chionochloa pallens*, *Juncus novae-zelandiae*, *Luzula banksiana* var. *migrata*, *Phormium cookianum*, *Oreobolus pectinatus*, *Schoenus pauciflorus* and colonies of the odd-leaved orchid *Aporostylis bifolia*.



**Fig. 23. *Uncinia clavata*, Rangiwahia Track, Ruahines, 19 Jan 2009. Photo: M.D. Wilcox.**

On the walk to Heritage Lodge some of the first monocots we encountered on the lower slopes were those familiar to us such as *Cortaderia fulvida*, *Cordyline banksii*, *Machaerina sinclairii* and *Microlaena avenacea*. *Collospermum microspermum* was again common on red beech. Abundant were *Astelia fragrans*, *Juncus articulatus*, *Juncus sarophorus*, *Poa anceps* and *Uncinia ferruginea* on the open tracksides, especially leading down to the Oroua River.



**Fig. 24. *Astelia fragrans*, Limestone Creek, 16 Jan 2009. Photo: M.D. Wilcox.**

The Rangiwahia Track had plenty of monocots, including orchids. In the upper cedar forest zone *Pterostylis patens* was still in flower although the majority were fruiting. Just past the waterfall was a south-facing bank richly endowed with herbaceous

plants such as *Drosera* and amongst these was *Prasophyllum colensoi*. *Pterostylis humilis* was abundant in one area in the upper forest zone at a higher altitude than *P. patens* while *P. venosa* occurred at a lower altitude than *P. patens*. *Nematoceras trilobum* was in the higher forest zone, with *Simpliglottis cornuta*. Two or three small patches of *Arthropodium candidum* were in full flower half way up the Rangiwahia Track. *Libertia ixioides* was patchy and without flowers or fruit while *L. micrantha* was in seed at a higher altitude. *Chionochoa conspicua* was less abundant than on Shorts Track. Snow tussock (*Chionochoa pallens*) was abundant above the tree line and in full flower around the hut, looking like a golden garden, and *Carpha alpina* and *Juncus novae-zelandiae* (with its prominent black seed heads) were seen between the waterfall and the hut near the treeline. Other noteworthy grasses seen were *Deschampsia tenella*, *Lachnagrostis lyallii*, *Poa anceps* and *Poa breviglumis*.



**Fig. 25.** *Chionochoa pallens*, Rangiwahia Hut, 19 Jan 2009. Photo: M.D. Wilcox.

*Carex ovalis* was common up the track along with *Juncus tenuis*. *Uncinia ferruginea* was the most common hook-sedge we encountered, but there were several others: *U. banksii*, *U. clavata*, *U. distans*, *U. involuta*, *U. "pseudoaffinis"*, *U. uncinata* and *U. zotovii*.

The unusual *Cordyline* alongside the track was identified by Ross Beever as *C. banksii* × *C. australis* growing alongside our first sighting of *C. australis* in the Forest Park. A few very healthy looking *C. indivisa* were scattered in the forest.

## FERNS & LYCOPODS

**Alison Wesley and Maureen Young,**

In the western Ruahine Range accessed from Sixtus Lodge the fern flora was particularly rich, especially in filmy ferns, although we did remark on the absence of *Hymenophyllum sanguinolentum*.

On the first morning *Blechnum triangularifolium* was seen near the fossil cliffs, and in the afternoon we explored Limestone Gorge, only a short distance from the lodge. The track required walking up the river through a cave where glowworms are visible at night. Although ferns were in abundance the major feature seemed to be wall to wall mosses of many colours. Particular ferns seen in the gorge included *Blechnum chambersii*, *Blechnum colensoi*, *Blechnum montanum*, *Leptolepia novae-zelandiae*, *Asplenium hookerianum* var. *colensoi* and *Grammitis billardierei*.

Our first major expedition was uphill to Mt Short on the Ngamoko Range via the Shorts Track. The start of the track featured shaded banks clothed in *Blechnum fluviatile*, with some colonies of *Blechnum vulcanicum*. It was clear that there was an altitudinal effect in the appearance of certain ferns as we climbed higher. The most obvious examples were that *Blechnum procerum*, *B. montanum* and *Cyathea colensoi* grew at higher altitudes. *Cyathea smithii* was the most common tree fern for a large part of the way and was well known to all. *Cyathea colensoi* was distinguished from it by its dull fronds, and by abundant golden scales arranged haphazardly on the lower stipe. It was rarely seen to have any trunk. Ferns which were clearly unpalatable to browsing animals such as goats and deer were *Polystichum vestitum*, *Blechnum discolor* and *Histiopteris incisa*. *Grammitis billardierei* was quite common along the track, mostly growing as a low epiphyte. Higher up, just before the tree line was reached, *G. magellanica* subsp. *nothofageti* was growing epiphytically on the trunk of a tree.

The fern highlight of the day was, however, the profusion of *Hymenophyllum bivalve* and our learning to recognize it. We were able to distinguish it by the toothed margins, but in contrast to *Hymenophyllum multifidum* the sori were much smaller and never at right angles to the plane of the frond. The fronds are generally slightly larger than *H. multifidum*, less prominently curled downwards and the margins more shallowly toothed. The other filmy fern not often seen by Aucklanders was *Hymenophyllum malingii* growing in clefts of the bark of *Libocedrus bidwillii*. Under the microscope it was clear that the ultimate segments are densely covered in grey or brown stellate hairs and the sori appear as green grapes protruding from the densely hairy lamina. The presence of *Leptopteris superba* was noted by many as we made our way up hill also. The clubmosses *Lycopodium scariosum* and *L. fastigiatum* were seen on the open tops on damp peaty ground.

Our second day's expedition was the track to the Heritage Hut and the side-track to the Oroua River. On this occasion three species of *Hypolepis* were identified (*H. ambigua*, *H. rufobarbata* and *H. dicksonioides*); although there was some doubt about the *H. dicksonioides* as its habitat has been described as coastal localities. Again *Hymenophyllum bivalve*

was frequently recognized. Three lycopods, *Lycopodium volubile*, *L. scariosum* and *L. fastigiatum* were noted in close proximity and their features compared.



**Fig. 26. *Hypolepis millefolium*, Rangiwahia Track, 19 Jan 2009. Photo: M.D. Wilcox.**

Our final major expedition was to Rangiwahia Hut. New ferns not previously seen were *Hypolepis millefolium*, *Asplenium flabellifolium*, *Sticherus cunninghamii* and *Dicksonia lanata*. The presence of *Hymenophyllum villosum* was also confirmed by examining a specimen with sori under a microscope, and noting the presence of hairs on the lamina as well as the absence of the crested indusia which are present on *H. sanguinolentum*. *Asplenium flabellifolium* was located on the rocky bank amongst alpine herbs.

## Mosses

Jessica Beaver

'Mosses of harsh environments', the family Pottiaceae, are my current main botanical focus. The Sixtus Lodge property proved to be harsh enough, with the dry fossil site on the limestone cliffs bearing an assortment of small, dusty mosses, with shoots between two and five mm tall. Six of the nine moss species found there belong to the Pottiaceae: species of *Barbula*, *Didymodon*, *Gymnostomum*, *Tortula*, and *Weissia*. *Didymodon australasiae* and *Weissia controversa* were also found in the highly artificial habitat of bare soil at the edges of the lawn around the Sixtus Lodge. All of the mosses found at the fossil site (listed below) are also found on soil and on rock walls around Auckland City.

Venturing further afield, we tackled the mud and steep terrain of the Ruahine Forest Park (for details see 'Programme Summary'). These places did not qualify as 'harsh environments' as far as mosses were concerned, even if they felt like it to us human visitors. Rather few Pottiaceae were found. *Weissia controversa* was seen on disturbed soil of the track-side banks in cut-over forest at lower altitudes.

*Calyptopogon mnioides*, a handsome moss with leaves characteristically twisted and undulate when dry, was present as an epiphyte in *Nothofagus fusca* forest. It was also spotted growing in the grooves of the carved lettering on a wooden DoC sign, with more plants on a horopito (*Pseudowintera colorata*) directly above. Colonisation of the sign would have been an easy journey from the horopito, whether by spores, or by the asexual gemmae which were being produced in abundance on the moss's leaves.

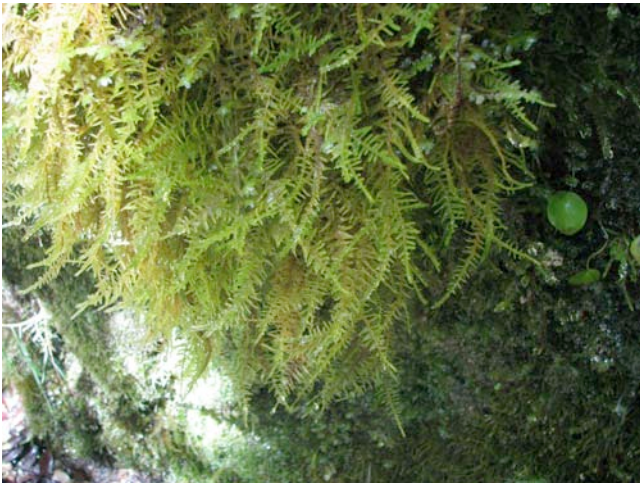


**Fig. 27. Bryophytes, Limestone Gorge, 16 Jan 2009. Photo: R.E. Beaver.**

Of particular interest to me in the Forest Park were two Pottiaceae that I am much less familiar with: *Hennediella arenae* subsp. *petriei*, and *Syntrichia rubra*. Both species could be said to be 'bristling with characters' and hence recognisable in the field. *Hennediella arenae* subsp. *petriei* (formerly known more simply as '*Tortula petriei*') has leaves which are ashy-grey when dry, with a contrasting wide yellow border at the margins. In *Syntrichia rubra* it is the red colour of the costa which is referred to in the species name. It is sharp and shortly excurrent from the leaf apex, a feature clearly seen with a hand lens. Both species were seen, bearing capsules, at elevations between 900 m and 1000 m, in *Nothofagus fusca* forest.

Of course there were a lot of other mossy delights, in addition to Pottiaceae, in the habitats we explored in

the Forest Park. Four species of *Dicranoloma* were recorded. *Dicranoloma menziesii* and *D. billardierei* are both familiar from the Waitakere Ranges, and *Dicranoloma robustum* is like a better groomed version of the rather scruffy *D. billardierei*. The fourth species, however, tripped me up. With its multiple capsules on yellow setae, I mistakenly identified it as *D. plurisetum*. When later examined more carefully, it proved to be *D. dicarpum*, which also has multiple capsules on yellow setae. In *D. dicarpum*, however, the leaves are somewhat plicate, and there are differences in the shapes of the upper lamina cells, set out quite nicely on page 47 of Beever, Allison and Child (1992).



**Fig. 28. *Cratoneurosis relaxa*, Limestone Ck, 16 Jan 2009. Photo: M.D. Wilcox.**

Spectacular stands of *Dendroligotrichum dendroides* formed a miniature forest along the Rangiwahia Hut track, at just above 1000 m elevation. Here were both male and female plants, with last season's old capsules, as well as fresh, young, developing capsules, with their beautifully sparsely hairy calyptrae. Tortured kaikawaka (*Libocedrus bidwillii*) trees were a feature here, with the filmy fern *Hymenophyllum malingii* nestling in cracks in their trunks. On closer inspection two moss species were detected nestling amongst the *Hymenophyllum*: *Rhizogonium novae-hollandiae* and *Leptotheca gaudichaudii*, both characteristic mosses of tree-fern trunks. Evidently the niche on kaikawaka is similar to a tree-fern trunk, at least from a moss's viewpoint. And for evidence of truly mossy forest, along the track to Heritage Lodge festoons of *Weymouthia mollis* draped the trees.

But all in all, the bryological high-light of the trip would have to be the exploration of the 'Glow Worm Caves', the QEII reserve near to the Sixtus Lodge and outside the Ruahine Forest Park. Deceptively hidden in the surrounding farm-land, this gem of habitat lies along the course of Limestone Stream. Running through a deep gulch some 5 m wide, and then entering a limestone tunnel which has occasional breaks in the roof, the stream emerges again into the

light and the gulch continues. Presumably this gulch is of the same geological structure as the tunnel, but with its roof long since collapsed. The vertical walls of the gulch were densely covered with luxuriant growth, primarily of bryophytes, gently irrigated by dripping water, with tufa accreting at the shoot bases. I was struck by the size of the plants, the diversity of species, and the apparent lack of disturbance to their hanging curtains. Here and there a more vigorous cascade of water ran down the wall, through clumps of the typical water-fall species, *Fissidens rigidulus*. For the most part, however, the walls provided a gentle hydroponics set-up.



**Fig. 29. *Cyathophorum bulbosum*, Limestone Creek, 16 Jan 2009. Photo: M.D. Wilcox.**

Hookeriaceae were well represented, with *Achrophyllum dentatum* particularly common. Its shoots were larger and paler in colour than I am used to, matching descriptions of the variety *robusta*. Joseph Hooker initially described this as a species, *Hookeria robusta*, from specimens collected for him by William Colenso in the "Northern Island: moist woods in the interior". *Plagiomnium novae-zealandiae* had me puzzled for a while, growing as pendulous unbranched shoots, one long one measuring 27 cm in length. Sainsbury in his Handbook (1955) gives leaves 6 – 7 mm long for *P. novae-zealandiae* – on this 'giant in the gulch' the leaves were 9 mm long. *Cyathophorum bulbosum* shoots, growing continuously irrigated on the gulch wall, measured in at 19 cm, compared with shoots epiphytic on a nearby trunk of pate (*Schefflera digitata*) attaining a mere 5 cm in length. Two forms of the highly variable *Cratoneurosis relaxa* were growing adjacent to each other on the gulch wall, one with regularly pinnate fronds and strongly recurved leaves, the other with more irregular branching and straight leaves. My field assistant was unimpressed with my suggestion that the differences could be environmentally induced (see Beever & Fife, 2008, for more examples). One form hung clear of the wall, with water passing gently down from base to apex of the shoots and dripping off the tips; the other was hugging the gulch wall more closely, and so, I suggest, its water and nutrient

relations were rather different. Clearly a case ripe for molecular-genetic analysis.



**Fig. 30. *Weymouthia mollis*, Rangiwahia Track, 19 Jan 2009. Photo: M.D. Wilcox.**

In the eastern section of the gulch beautiful pale green masses, masquerading from the distance as *Sphagnum* moss, provided a permanently water-laden substrate in which the orchid *Corybas* cf. *rivularis* was thriving. The pale green masses were found not to be *Sphagnum* at all, but to consist of huge numbers of filaments of a green alga, *Sirogonium* cf. *stricticum*, an uncommon relative of the well-known *Spirogyra* of past botany classes. Several other cryptogamic plants were luxuriant on the gulch walls, including the thalloid liverwort *Asterella tenera*, with carpocephala borne on long fragile stalks, and a species of *Megaceros*, a member of the Anthocerotae, with flat thalli hanging as ribbons.

In most regards this limestone gulch and the fossil site on the Sixtus property are similar habitats, particularly in substrate and light regime. The one greatly differing factor, water, makes for a vast contrast in the species present, and the luxuriance of their growth. Only one bryophyte was found in both sites: *Gymnostomum calcareum*. This grew as a tight sward 2 mm tall at the Sixtus fossil site, and as large lax cushions more than 2 cm tall in the limestone gulch.

In dimly lit areas at the entrance and exit to the gulch tunnel, and under the gaps in the tunnel roof, sufficient light reached for only the most shade tolerant of plants. Here was found another uncommon species, *Beeveria distichophylloides*, which I must confess to not recognising in the field! At the darkest limits, mosses *Fissidens leptocladus* and *Thamnobryum pandum* grew on the rock faces, their fronds all regimentally oriented towards the light source. Negotiating the shallow stream in the dark tunnel, while receiving occasional cold drips from the roof, took me back to the Homer Tunnel before it was opened to traffic, a journey I made on my father's shoulders.

The three lists below are of mosses recorded in the areas described above. Names follow Beever et al. (1992) with some more recently used synonyms in brackets. I am grateful to my cheerful Bot. Soc. field companions for their support, especially chief field assistant Ross Beever. Some vascular plants were identified for me by Ross, Mike Wilcox and Maureen Young, several liverworts and the hornwort by John Braggins, and the alga by Phil Novis of Landcare Research. Colleen Crampton helped me to understand the geology. Thanks to you all.

#### **Mosses on dry Limestone cliffs, Sixtus property**

*Barbula convoluta*  
*Bryum dichotomum*  
*Trichostomiopsis australasiae* (*Didymodon australasiae*)  
*Barbula torquata* (*Didymodon torquatus*)  
*Gymnostomum calcareum*  
*Schistidium apocarpum*  
*Tortula muralis*  
*Weissia controversa*  
*Zygodon menziesii*

#### **Mosses on walls of Limestone Creek gulch and tunnel**

*Achrophyllum dentatum*  
*Beeveria distichophylloides*  
*Cratoneuropsis relaxa*  
*Cyathophorum bulbosum*  
*Distichophyllum microcarpum*  
*Echinodium umbrosum*  
*Fissidens leptocladus*  
*Fissidens rigidulus*  
*Gymnostomum calcareum*  
*Hypopterygium commutatum* (*Canalohypopterygium commutatum*)  
*Hypopterygium filiculaeforme* (*Dendrohypopterygium filiculaeforme*)  
*Philonotis pyriformis*  
*Plagiomnium novae-zealandiae*  
*Thamnobryum pandum*

#### **Mosses recorded in Ruahine Forest Park**

*Achrophyllum dentatum*  
*Acrocladium cuspidatum* (*Calliergonella cuspidata*)  
*Andreaea acutifolia*  
*Andreaea subulata*  
*Atrichum androgynum*  
*Bartramia papillata*  
*Brachythecium albicans*  
*Brachythecium rutabulum*  
*Breutelia pendula*  
*Bryum billardierei*  
*Bryum blandum*  
*Calomnion complanatum*  
*Calyptopogon mnioides*  
*Calyptrochaeta brownii*  
*Camptochaete arbuscula* (*C. deflexa*)  
*Camptochaete ramulosa*

*Campylopus clavatus*  
*Campylopus introflexus*  
*Campylopus pyriformis*  
*Campylopus purpureocaulis*  
*Catagonium politum*  
*Chrysoblastella chilensis*  
*Cladomnion ericoides*  
*Cyathophorum bulbosum*  
*Dawsonia superba*  
*Dendrologotrichum dendroides (D. microdendron)*  
*Dicnemon dixonianum*  
*Dicnemon semicryptum*  
*Dicranoloma billardierei*  
*Dicranoloma dicarpum*  
*Dicranoloma menziesii*  
*Dicranoloma robustum*  
*Distichophyllum pulchellum*  
*Ditrichum difficile*  
*Ditrichum punctulatum*  
*Echinodium hispidum*  
*Camptochaete gracilis (Fallaciella gracilis)*  
*Fissidens asplenioides*  
*Fissidens curvatus var. curvatus*  
*Fissidens pallidus*  
*Fissidens rigidulus*  
*Fissidens tenellus var. tenellus*  
*Hymenodon pilifer*  
*Hypnum chrysogaster*  
*Hypnum cupressiforme*  
*Leptotheca gaudichaudii*  
*Lepyrodon lagurus*  
*Leucobryum candidum*  
*Macromitrium gracile*  
*Macromitrium helmsii*  
*Macromitrium ligulare*  
*Macromitrium longipes*  
*Mesotus celatus*  
*Mittenia plumula*

*Neckera pennata*  
*Papillaria flavo-limbata*  
*Plagiothecium denticulatum (P. lamprostachys)*  
*Pogonatum subulatum*  
*Polytrichadelphus magellanicus*  
*Polytrichum commune*  
*Polytrichum juniperinum*  
*Pseudoscleropodium purum*  
*Psilopilum australe*  
*Ptychomnion aciculare*  
*Pyrrhobryum bifarium*  
*Pyrrhobryum mnioides*  
*Racomitrium crispulum*  
*Racomitrium lanuginosum*  
*Racomitrium pruinosum*  
*Racopilum sp.*  
*Rhizogonium distichum*  
*Rhizogonium novae-hollandiae*  
*Schistidium apocarpum*  
*Sematophyllum amoenum (Rhapidorrhynchium amoenum)*  
*Sphagnum cristatum*  
*Stokesiella praelonga (Kindbergia praelonga; Eurhynchium praelongum)*  
*Tetraphidopsis pusilla*  
*Thuidium furfurosum*  
*Thuidium laeviusculum*  
*Tortula arenae subsp. petriei (Hennediella arenae subsp. petriei)*  
*Tortula rubra (Syntrichia rubra)*  
*Tridontium tasmanicum*  
*Ulota lutea*  
*Weissia controversa*  
*Weymouthia cochlearifolia*  
*Weymouthia mollis*  
*Wijkia extenuata*  
*Zygodon intermedius*

## BIRDS

**Shelley Heiss-Dunlop, John Rowe and Stella Rowe**

Below is a list of birds seen or heard during our visit:

Scientific name	Common name
<i>Acanthisitta chloris</i>	rifleman
<i>Alauda arvensis</i>	skylark
<i>Anthus novaeseelandiae</i>	NZ pipit
<i>Ardea novaehollandiae</i>	white-faced heron
<i>Carduelis chloris</i>	greenfinch
<i>Chrysococcyx lucidus</i>	shining cuckoo
<i>Circus approximans</i>	Australasian harrier
<i>Emberiza citrinella</i>	yellowhammer
<i>Falco novaeseelandiae</i>	NZ falcon
<i>Fringilla coelebs</i>	chaffinch
<i>Gerygone igata</i>	grey warbler
<i>Gymnorhina tibicen</i>	Australian magpie
<i>Hemiphaga novaeseelandiae</i>	NZ pigeon
<i>Hirundo tahitica</i>	welcome swallow
<i>Larus dominicanus dominicanus</i>	southern black-backed gull
<i>Mohoua albicilla</i>	whitehead
<i>Ninox novaeseelandiae</i>	morepork

<i>Passer domesticus</i>	house sparrow
<i>Petroica macrocephala</i>	tomtit
<i>Platycercus eximius</i>	eastern rosella
<i>Prosthemadera novaeseelandiae</i>	tui
<i>Prunella modularis</i>	hedge sparrow
<i>Rhipidura fuliginosa</i>	fantail
<i>Turdus merula</i>	blackbird
<i>Vanellus miles</i>	spur-winged plover
<i>Zosterops lateralis</i>	silvereve

## GEOLOGY & GEOMORPHOLOGY

Colleen Crampton

The walks were in and to the west of the central/south part of the western Ruahine Range in the catchments of the Makiekie Creek (which flows to the Pohangina River) and the Oroua River. The areas we visited have had a complex geological history during the last five million years (in the Pliocene and Pleistocene Epochs). This is shown in exposures of a variety of rock types and in variations in landform. Both are different from the northern North Island geology usually seen on Auckland Botanical Society trips. The Ruahine trip encountered greater effects of Quaternary earth deformation.

### Ruahine greywacke

The Ruahine Range have Jurassic period (200-150 million years ago) hard sedimentary rocks: interbedded argillites and sandstones (greywacke). In the last 5 million years there has been substantial mountain building on the tectonic plate margin where the Pacific Plate subducts under the Australian Plate. The Ruahine Range comprises block-faulted horsts which are still rising, bounded by NNE trending fault lines.

We climbed on to the greywacke rocks on three of the walks:

- on the Deerford and Shorts tracks on the Ngamoko Range;
- on the ridge where the Alice Nash Heritage hut stands;
- on the Whanahuia Range, over a slip in the Mangahuia valley and up to Rangiwahia ski hut.

Landslides and slips are a feature of many of the steep slopes above the river gorges.

### Wanganui Basin strata: limestone and papa

On the tectonic plate margin a downward warp created a large basin (Wanganui) west of the rising greywacke mountains. During the last 5 million years the basin filled with sediment eroded from the rising mountains. We traversed a range of these Pliocene and Pleistocene strata on the car journeys and the lower elevations of the walks.

**Limestone** is formed by deposition of shell-laden sediments in shallow sea water on transient

shorelines. We saw two limestone formations in the vicinity of Sixtus Lodge. The first was a fossiliferous limestone cliff visible from the lodge, perched on the edge of an eroding river terrace above Cone Creek, which is a tributary of Makiekie Creek. The strata are well-defined and include broken shell, fine gravel, sand and a resistant layer of large shells. The limestone has been described:

*"The fossil cliffs belong to the Pleistocene Wanganui Series of the Lower Nukumaruan, c. 1.3 million years old. These shallow sediments result from marine transgression, and comprise alternating beds of marine conglomerate, sand and silt, and shell beds. The fossils occur as lenses of coquina limestone crammed with shells of bivalves and univalves, many beautifully preserved and recognisable" (Carter 1972).*

The second was Limestone Creek, 700 m from Sixtus Lodge. Here, a cave has formed under a hard limestone cap layer. Part of the roof of the cave has been eroded. The glow-worms under a limestone arch and the vertical walls of dripping moss, algae and filmy ferns above the creek are spectacular.

*Papa* is the soft grey mudstone and fine sandstone deposited in the Wanganui basin. The strata have been subject to tectonic movement and to oscillating sea levels, having been alternatively above and below sea level during Pleistocene glaciations and interglaciations. The sediments form soft mudstone and sandstone known as *papa* which is prone to landsliding and is easily eroded during heavy rain particularly where forest cover has been removed. Tectonic deformation was seen in road cuttings where sediment layers are offset by faulting.

Another stratum observed (north of Coal Creek) was glacial rock debris. This was spread by ice or river from small glaciers which developed on higher parts of the Ruahine in some glacial periods. Other glacial debris may be wind blown loess. Road cuttings expose layers of volcanic material from Central North Island tephra (deposited by falling through air).

### Terrace landforms

Surface landforms include marine terraces formed by wave erosion and a series of alluvial flood plain

terrestrial terraces. These terraces reflect both oscillating sea levels and the uplift of sediments by tectonic movements associated with the plate boundary. Table Flat Road which is the access to Sixtus Lodge follows one terrace level. A flat terrace

above Fossil Cliff contrasts with the angle of dip of the fossiliferous strata. Other terraces are exposed in road cuttings or in deeply incised river valleys, e.g. before the bridge crossing on the Heritage Hut walk on Sunday.

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## Great Barrier Island field trip, 5-9 February 2009

Ewen K. Cameron (editor)

#### Introduction

Great Barrier Island (Aotea) is New Zealand's fifth largest island, covering about 28,000 ha, and is 35 km long by 18 km across at the widest point. It lives up to its James Cook "Barrier" name with sandy surf beaches on the exposed eastern coast, and sheltered harbours on the western coast, often with mangroves (*Avicennia marina*). Most of Great Barrier is rugged and is of volcanic origin, the result of andesitic stratovolcanic activity 8-15 million years ago, overlaying greywacke rocks (c.150 million years old) which form the northern part of the island (Te Paparahi) and also occur around Harataonga (Moore 2004). See Fig. 1 for place names and their location.

The island has had some 700 years of Maori settlement which would have significantly impacted the coastal vegetation, and in European times areas have been cleared for farming, forestry and mining. However, over two-thirds of the island have now been left to regenerate for many decades, and are today dominated by kanuka (*Kunzea ericoides*) successional forests, and more locally broad-leaved forest. Locally in the central part of the island conifer-dominated forests grow, and small patches of original forest have survived, the best known round the island's summit, Mt Hobson (Hirakimata, 627 m asl) at the centre of the island. Today 60% of the island is reserve land administered by the Department of Conservation