PUKETITIRI AND KAWEKA RANGE, HAWKES BAY

23- 26 January 1998

Mike Wilcox (compiler)

1. Participants (Fig.1)

Auckland Bot. Soc.: Jessica Beever, Ross Beever, Daphne Blackshaw, Quentin Blackshaw, Helen Cogle, Sandra Jones, Carol McSweeney, Juliet Richmond, Pat Seyb, John Smith-Dodsworth (Coromandel), Alison Wesley, Barbara White, Robert White, Mike Wilcox (Leader), Nancy Wilcox, Pam Wilcox.
Waikato Bot. Soc: Catherine Beard, Merilyn Merrett, Mark Smale.
Rotorua Bot. Soc.: Paul Cashmore, Chris Ecroyd, Joan Fitzgerald, Dick McMurray (Gisborne).
Wellington Bot. Soc.: Pat Enright, Tony Silbery (Eketahuna).
Invited Hawke's Bay identities: Ash Cunningham, Pat Grant, Quentin Roberts.

2. Arrangements

The group stayed near Patoka in the William Hartree Memorial Lodge, administered by the Hawke's Bay Branch of the Royal Forest & Bird Protection Society. With a combination of bunks and tents, the lodge proved to be a convenient and comfortable base for botanising in the Puketitiri district and main Kaweka Range.

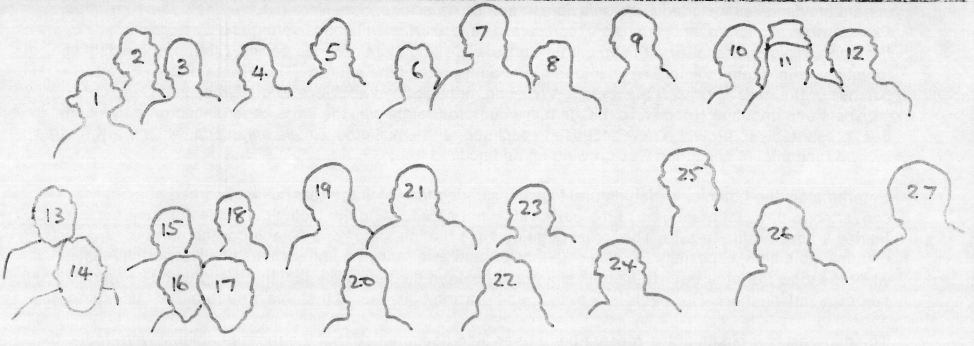
On the first full day we were joined by Pat Grant and Quentin Roberts of Havelock North. Pat has recently published a book, "Hawke's Bay Forests of Yesterday" (Grant 1996), an intriguing account of how the original Hawke's Bay forests were progressively destroyed over the past 500 years, mostly by gales and fires. Quentin used to work for the N. Z. Forest Service, involved firstly in the erosion research programme in the Kaweka Range, and then as the region's forest extension officer, advising farmers on woodlot establishment and management. On the second day, Ashley Cunningham of Bayview joined us for the whole day and was our guide for the trek up the Makahu Spur. Ash set up the Forest & Range Experiment Station at Makahu Saddle for investigating the erosion problems of the Kaweka Range, covering climate studies, erosion processes, and revegetation, and was a mine of information about the history of the area.

3. Summary and Highlights (Mike Wilcox)

Botanical excursions were made to Balls Clearing Scenic Reserve, Hutchinson Scenic Reserve, William Hartree Memorial Scenic Reserve, Little Bush, Littles Clearing, Black Birch Range, Mangatutu Hotsprings, and the Kaweka Range (12 of the group made it to the top, Kaweka J, 1724 m). Vegetation types visited included tall pure podocarp forest, red beech forest, mountain beech forest, kanuka/manuka tall scrub, red tussockland, and various subalpine and alpine communities. Earlier accounts of this area have been given by Beadel and Spring-Rice (1989), Beadel, Shaw, and Ecroyd (1989), Cunningham (1973), Druce (1968, 1988, 1989, 1990), and Elder (1941, 1950, 1956, 1959), and excellent descriptions of the walks in the area are provided by Cunningham (1993).

Balls Clearing was exceptionally impressive. It is an isolated remnant of mostly pure podocarp forest, with rimu (*Dacrydium cupressinum*) and kahikatea (*Dacrycarpus dacrydioides*) predominating, and still miraculously free of exotic weeds. An abortive search was made for *Olearia hectorii* in Hutchinson Reserve (Elder 1950; Rogers 1996). Roadside botanising near Puketitiri included using binoculars to scan flowering *Alepis flavida* on red beech *(Nothofagus fusca*), preciously guarded with metal bands against possums by the Whittle family. *Tupeia antarctica* is common in the district (including the Hartree Reserve), its main hosts being five finger (*Pseudopanax arboreus)* and putaputaweta (*Carpodetus serratus).*

At the time of our visit, many Kaweka alpine species were in flower at 1100-1700 m altitude. Those to catch the eye included *Euphrasia cuneata*, *Parahebe spathulata*, *Parahebe hookeriana* var. *olsenii, Hebe stricta* var. *lata, Hebe tetragona, Neopaxia australasica*, *Dracophyllum recurvum*, *Brachyglottis lagopus, Olearia nummularifolia*, *Ozothamnus vauvilliersii*, *Celmisia incana*, *Celmisia spectabilis*, *Raoulia albosericea*, *Raoulia grandiflora*, *Anaphalioides bellidioides*, *A. alpinum*, *Lagenifera pumila*, *Leucogenes leontopodium, Anisotome aromatica*, *Wahlenbergia pygmaea*, and *Forstera bidwillii.* On grassy roadsides, the introduced eyebright, *Euphrasia nemorosa* was abundant above 800 m, and there were magnificent groves of mountain cabbage tree (*Cordyline indivisa*), bordering the road to Makahu Saddle. Pink, white, or red-fruited *Gaultheria depressa* abounded, as did *G. colensoi*, pygmy pine (*Lepidothamnus laxifolius*), *Brachyglottis bidwillii*, and *Epacris alpina.* On track margins and other disturbed open sites there was a bewildering succession of



1. Robert White
2. Quentin Roberts
3. Catherine Beard
4. Pat Seyb
5. Quentin Blackshaw
6. Daphne Blackshaw
7. John Smith-Dodsworth
8. Sandra Jones
9. Mark Smale
10. Merilyn Merrett
11. Pat Grant
12. Tony Silbery
13. Mike Wilcox
14. Paul Cashmore
15. Pam Wilcox
16. Joan Fitzgerald
17. Alison Wesley
18. Nancy Wilcox
19. Barbara White
20. Jessica Beever
21. Pat Enright
22. Helen Cogle
23. Carol McSweeney
24. Juliet Richmond
25. Dick McMurray
26. Chris Ecroyd
27. Ross Beever

Fig. 1: Auckland Botanical Society trip, Ball's Clearing, Hawke's Bay, January 1998.

Coriaria species, ranging from the large-leaved *C. arborea*, to the fern-like *C. plumosa* and *C. pteridioides* at higher elevations. *Coriaria arborea* and *C. kingiana* were noted as dying off on roadsides, perhaps through drought.

Grasses included *Cortaderia fulvida*, *Chionochloa rubra* (lower elevations, wetter sites), *C. pallens* (alpine scrub/ grassland), *Poa colensoi*, *Hierochloe redolens*, *Poa cita*, *Poa anceps*, *Deyeuxia avenoides*, *Rytidosperma setifolia,* and *R. gracile,* with *Agrostis muscosa* recorded on the tops.

Apart from the botany, the trip was interesting geologically (a "beautiful" fault line, hotsprings, fossil beech leaves in volcanic ash beds (Cunningham 1964), greywacke screes), and some people were able to visit the fascinating Puketitiri Museum.

4. Lowland Sites

4.1 Balls Clearing Scenic Reserve (Ross Beever, Jessica Beever, Paul Cashmore, Tony Silbery)

Balls Clearing includes a magnificent, albeit tiny (36 ha), remnant of the tract of 4000-5000 ha of "heavy" podocarp forest present around Puketitiri prior to subdivision of the land in the 1870s and 1880s (Cunningham 1993, Elder 1950, Druce 1968). Local enthusiasts petitioned Parliament for its reservation with a 14 m - long petition in 1930, and it was eventually declared a reserve in 1945. We were armed with copies of Tony Druce's indigenous vascular plant list (Druce 1988), and guided by local identities Pat Grant and Quentin Roberts.

The forest is dominated by large rimu, kahikatea, and matai (*Prumnopitys taxifolia*) reaching over 35 m high, with occasional miro (*Prumnopitys ferruginea*) especially in the understorey. Near the old clearing boundary there is a stand of red beech with occasional black beech (*Nothofagus solandri* var. *solandri*), and hybrids. Matai once was more common as evidenced by the numerous old stumps and fallen trunks. Pat showed us one old stump for which he had obtained a radiocarbon date of 300 years since its death. Common understorey species included *Dicksonia fibrosa* and *D. squarrosa*, *Schefflera digitata*, *Melicytus ramiflorus, Pseudowintera colorata*, and *Fuchsia excorticata*. The ferns *Asplenium bulbiferum* and *Leptopteris hymenophylloides*, the latter with short stout trunks, were abundant ground species, proof of the ability of forest cover to retain moisture even in one of the drier parts of the country. There were also frequent patches of the herb *Hydrocotyle elongata*. We even managed two additions to the Druce list: *Carex geminata* and ongonga (*Urtica ferox)*. One more humorous sight was the large cage placed on a five finger tree, presumably to protect a now deceased specimen of the mistletoe *Tupeia antarctica*, while a few metres away a magnificent specimen was growing on an uncaged tree.

Unfortunately the botanically rich natural tussock clearing for which the reserve was named has been converted to pasture, managers of the early 1950s not appreciating the biological values of such areas and fearing it posed a fire hazard. The forest edge abutting the "clearing" was notable for the number of divaricating plants, especially *Corokia cotoneaster*, and also many fine specimens of *Pittosporum ralphii*, while the view from the track to a small shrubland held out the possibility that there might still be some surprises lurking there. However, lack of time and grazing bulls meant that this area remained unexplored.

The non-vascular plants of the reserve have been little documented, but the mosses at least were found to be luxuriant and diverse. The delicate, large umbrella moss, *Hypopterygium filiculaeforme*, was particularly notable in good moist condition on the forest floor. Another umbrella moss, *Hypnodendron comatum*, was common on rotting wood and on the ground, while the more fan-shaped species, *H. arcuatum*, was growing on the heavily shaded banks of a small stream. Here too was the delicate *Fissidens dealbatus* with *Distichophyllum pulchellum*, both characteristic mosses of moist soil. Many of the bases of the large podocarps bore a dense fur of the hairy *Echinodium hispidum*, while hanging from shrubs were the long pendant mosses *Weymouthia mollis* and species of *Papillaria*. The trunks of shrubs and trees were well clothed in mosses: *Cladomnion ericoides*, *Hypnum chrysogaster*, *Dicranoloma menziesii*, both species of *Trachyloma*, *T. planifolium* and *T. diversinerve*, growing together, *Lopidium concinnum*, *Neckera pennata* and *Camptochaete* spp. Abundant rotting wood in the forest provided a substrate for *Ptychomnion aciculare*, *Racopilum strumiferum* sensu stricto, *Wijkia extenuata*, *Rhizogonium distichum*, and here too, *Dicranoloma menziesii*. All this, in stark contrast to the parched pasture we drove through to reach the reserve, was a further reminder of the effective water retention abilities of natural forest cover.

Moss epiphytes on trees and shrubs bordering the old clearing margin, adapted to higher light conditions and more frequent desiccation than those of the forest interior, form a part of the natural forest edge flora. Here were found the pin-cushion moss *Leptostomum inclinans*, a species of *Cryphaea*, and three species of *Papillaria*, *P. flavo-limbata*, *P. leuconeura* and *P. flexicaulis*. Numerous members of the family Orthotrichaceae were present, of which three were identified with certainty: *Macrocoma tenue*, *Macromitrium ligulare*, and *Zygodon gracillimus*. This last moss is known from Java and Bolivia, with a scattering of records in Australasia. In her monograph of the genus *Zygodon* in Australasia Jette Lewinsky gives only one doubtful record in the whole of the eastern and southern North Island, a Colenso specimen from 'Hawke's Bay probably' (Lewinsky 1990).

Balls Clearing Scenic Reserve is one of the sites that Pat used to develop the controversial hypothesis (described in his book) that the major factor leading to destruction of the forests of Hawke's Bay was gales, rather than fires lit by Maori. Pat described to us in diagrammatic form with a stick on the forest floor, the formation of "pits and mounds". He interprets these surface features as indicators of fallen trees that have been windthrown while still alive and decayed *in situ*, so that soil associated with the large root plate forms a mound and the hole it came from a pit. The orientation of the pit and mound indicates the direction of the wind. These features are common throughout much of Hawke's Bay, at least in areas that have not been cultivated.

For the Balls Clearing forest Pat distinguishes two tree "cohorts": the more central comprising larger rimu and kahikatea, surrounded by younger trees of these species along with matai, miro and totara. Based on ring counts, he estimates the older trees are 500-600 years old, the younger ones 340-390 years. He surmises that the older trees established in the Waihirere period (1280-1400 A.D.) following widespread gales which had flattened the pre-existing forest, which then often burnt through fires started by natural causes. The younger trees established in the Matawhero period (1510-1620 A.D.) following another phase of high gales evidenced by the presence of pits and mounds in these stands, and the existence of old stumps such as the matai we had been shown.

The major thrust of Pat's argument is that the pits and mounds indicate that the trees were living at the time of their destruction; burnt dead trees offer less resistance to the wind and are not windthrown in the same manner. He reached this conclusion having spent much of his working life studying erosion and sedimentation especially in the eastern North Island, during which time he recognised eight major periods of erosion during the last 1800 years, each associated with major rainstorms and floods (Grant 1985). His book (Grant 1996) summarises his observations, and collates much historical information, on the forests of the Hawke's Bay region over this time period. Debate as to the relative contributions of gales and natural fire versus fire lit by Maori in destroying the Hawke's Bay forests will undoubtedly continue. We were privileged to have Pat guide us through this cherished remnant, and allow us to reflect on what has been lost.

4.2 Hutchinson Scenic Reserve (Tony Silbery, Paul Cashmore, Jessica Beever, Ross Beever)
Hutchinson Reserve, is another lowland podocarp remnant, but one which is no match for Balls Clearing. Much of the forest was destroyed by fire in 1946, and unfortunately many exotic trees have been planted. Most of the party scampered around the mown tracks of the "Western Regeneration Sector" with only a few stops. One bank provided a spleenwort feast, and provoked much discussion, with 4 species of fern (*Asplenium bulbiferum*, *A. hookerianum, A. flaccidum*, *A. flabellifolium*) and a sward beneath of the supposedly spleenwort-like moss, *Fissidens asplenioides*. The others spent most their time searching for *Olearia hectorii* among the remnant trees in a paddock beside the forest. The Druce list combines both Balls Clearing and Hutchinson Bush, possibly leading to some confusion as to the actual locality of the record for this species in Hawke's Bay. Elder's account (Elder 1950) mentions a new species of *Olearia* from Hutchinson Bush, and that seeds and cuttings were sent to Otari. Rogers (1996) notes that "the species apparently became extinct in Hawke's Bay after fire destroyed the only known population (one tree) in the 1969s (A. P. Druce pers. comm, 1963)". The paddock beside the bush certainly looked like *Olearia* habitat, based on two of the places where it grows in the Wairarapa, and one recently dead plant, probably *O. hectorii*, but just possibly *O. virgata*, which also grows there, was found. Time was against inspecting the stand of forest in the "Eastern Sector".

4.3 William Hartree Memorial Scenic Reserve (Mike Wilcox)
This small patch of bush is largely second-growth forest, and adjoins the Lodge. The main canopy is 9-12 m tall, comprising mixed hardwood trees, particularly putaputaweta, wineberry (*Aristotelia serrata*), kaikomako

(*Pennantia corymbosa*), five finger, kotukutuku (*Fuchsia excorticata*), lacebark (*Hoheria sexstylosa*), mahoe (*Melicytus ramiflorus*), lemonwood (*Pittosporum eugenioides*), kohuhu *(Pittosporum tenuifolium*), rangiora (*Brachyglottis repanda*), pate (*Schefflera digitata*), pigeonwood (*Hedycarya arborea*), broadleaf (*Griselinia littoralis),* kanuka (*Kunzea ericoides*), cabbage tree (*Cordyline australis*), kowhai (*Sophora tetraptera*), and a few small-sized podocarps, especially matai and kahikatea. There is one particularly large tree of pokaka (*Elaeocarpus hookerianus*). Smaller trees include pepperwood (*Pseudowintera colorata*), hangehange (*Geniostoma rupestre* var. *ligustrifolium*), kanono (*Coprosma grandifolia*), and saplings of the canopy species. The dominant tree fern here is *Dicksonia fibrosa*, whilst abundant ground flora are *Asplenium bulbiferum*, *Astelia fragrans*, *Blechnum fluviatile*, *B. chambersii*, *Hypolepis ambigua*, *Pneumatopteris pennigera, Phymatosorus pustulatus*, and *Pellaea rotundifolia*. Of epiphytes, vines, and parasites, *Tupeia antarctica* is frequent on five finger and putaputawera, while bush lawyer (*Rubus cissoides*) and *Parsonsia heterophylla* are the commonest climbers. *Poa anceps* is abundant on banks.

4.4 Little Bush (Mike Wilcox)

This is only a small, 12 ha, isolated forest patch, but is a "gem", in surprisingly good condition. It was visited on the last day by the "overstayers" - the Blackshaws, Whites, Wilcoxs, and Pat Seyb. The bush here has more of a lowland composition than does Balls Clearing. Canopy or emergent trees here include scattered large matai with attractively "hammered" bark, rimu, kahikatea, including a dense pole stand, and occasional totara (*Podocarpus totara*), together with tawa (*Beilschmiedia tawa*), titoki (*Alectryon excelsus*), white maire (*Nestegis lanceolata*), lemonwood, mahoe, turepo (*Streblus heterophyllus*) - including a tree 20 m tall and 50 cm in diameter, pokaka, kotukutuku, wineberry, and lacebark (*Hoheria sexstylosa*).

Common understorey shrubs were five finger, lancewood (*Pseudopanax crassifolius*), putaputaweta, pepperwood, rangiora (*Brachyglottis repanda*), *Coprosma rotundifolia*, *Melicope simplex*, *Melicytus micranthus*, toro (*Myrsine salicina*), juvenile *Hoheria sexstylosa*, juvenile *Streblus heterophyllus*, *Raukaua anomalus*, *Geniostoma rupestre* var. *ligustrifolium*, and abundant tree ferns - *Cyathea dealbata*, *Dicksonia squarrosa*, and *D. fibrosa*. Raukawa (*Raukaua edgerleyi*), *Metrosideros diffusa*, *M. colensoi*, *M. perforata*, *Rubus cissoides*, *Parsonsia capsularis*, and *P. heterophylla* were prominent perchers or lianes, and *Tupeia antarctica* was seen on five finger.

The reserve has a profuse ground cover, dominated by ferns, especially *Blechnum fluviatile*, *B. discolor*, and *Polystichum vestitum*, together with bush rice grass (*Microlaena avenacea*). Herbs included *Gastrodia cunninghamii*, and *Hydrocotyle elongata*. Care was needed to avoid contact with some vigorous patches of ongaonga.

5. Upland Sites

5.1 Lookout Point, Black Birch Range (Mike Wilcox, Jessica Beever, Chris Ecroyd, Sandra Jones)

This stopping point (1000 m) - a designated helicopter pad and water pond (for fire-fighting) - on the edge of the Black Birch Range, gives a great view across to the Kaweka Range itself and an excellent introduction to the alpine flora. Here, Ash Cunningham related the history of merino sheep grazing, burning of the tussock, and the introduction of deer (Fraser & Davidson 1990) - all important agents of forest destruction since the 1870s.

The vegetation has been modified by a history of fires, and erosion. Once through the thickets of pole mountain beech (*Nothofagus solandri* var. *cliffortioides*) (fringed in places by splendidly flowering *Hebe corriganii,* and containing much *Coprosma tenuifolia, C. foetidissima, Raukaua simplex, Griselinia littoralis,* and prolific *Rubus ? cissoides* or *R. schmidelioides*), the more open, induced shrubby vegetation is reached. It is dominated by stunted manuka (*Leptospermum scoparium*), *Dracophyllum recurvum*, *D. subulatum*, *Epacris alpina*, *Ozothamnus vauvilliersii*, *Olearia nummularifolia*, *Phyllocladus alpinus*, *Brachyglottis bidwillii*, *Griselinia littoralis*, stunted *Olearia furfuracea, Coriaria pteridioides,* and occasional *Melicytus alpinus.* The open ground plants included *Lycopodium scariosum*, *L. fastigiatum*, *Blechnum procerum*, *Gaultheria colensoi*, *Gaultheria depressa*, *Anisotome aromatica*, *Anaphalioides bellidioides*, *Celmisia incana*, *C. spectabilis*, *C. gracilenta*, *Poa colensoi*, *Rytidosperma setifolium*, *Deyeuxia avenoides*, *Trisetum antarcticum*, *Wahlenbergia pygmaea*, *Euphrasia cuneata* (and the introduced *E. nemorosa* on the grassy roadsides), *Phormium cookianum*, and *Cortaderia fulvum*.

In the open sub-alpine scrub two mosses were common. *Racomitrium lanuginosum*, the woolly *Racomitrium*, formed brittle white hummocks amongst the shrubs. Exposed on rocks were black smudges, only convincing as moss when the next morning we returned to the site after over-night rain, and found them rehydrated, much redder in colour and identifiable as the widespread alpine *Andreaea acutifolia*. Now too the *Racomitrium* was transformed, into soft greeen cushions - and photosynthesis was no doubt going at a cracking pace in these very adaptable plants.

5.2 Black Birch Range beech forests (John Smith-Dodsworth, Carol McSweeney, Mike Wilcox)
Black Birch Range lies north-south parallel to the main Kaweka Range, rising to a little over 1000 m in altitude. There is much manuka scrub, but also large areas of beech forest, both mountain beech at the higher elevations, and red beech in more sheltered situations at lower levels (Beaumont 1970, Hosking & Hutcheson 1988). In places on the range summit, mountain beech forms impenetrable pole stands - the result of dense mass regeneration following past fires (around 1850 -1860). Associated woody species are broadleaf, mountain five finger (*Pseuodopanax colensoi*), *Raukaua simplex*, *Coprosma tenuifolia*, stinkwood (*C. foetidissima)*, pepperwood, putaputaweta), mountain toatoa (*Phyllocladus alpinus*), Hall's totara (*Podocarpus hallii*), and much bush lawyer. In places, Hall's totara is rather common, both as poles and larger trees. On wetter, disturbed sites (e.g. roadsides), there are spectacular groves of mountain cabbage tree. *Astelia fragrans* is common, also.

The loop track through mountain beech forest at Littles Clearing provides a delightful walk in mature, more open conditions, with a very healthy understorey and ground cover, thanks to successful control of the populations of possum, red deer, and Sika deer. The deer exclosure installed in 1968 demonstrates the impressive recovery of the understorey, as there is now not much difference inside and outside the fence. Here, mountain beech forms an open canopy 12-15 m tall, with a light admixture of mountain toatoa, Hall's totara, and red beech on the lower slopes (in this region, red beech does not go above about 900 m, whereas mountain beech can in the south-east Kaweka Range reach to 1500 m). The shrub understorey comprises saplings of mountain beech, pokaka, with abundant pepperwood, *Coprosma* "taylorae", *C. foetidissima*, *Myrsine divaricata*, *Neomyrtus pedunculata*, and *Cyathodes fasciculata*. Prominent plants of the ground flora are mountain kiokio (*Blechnum montanum)* , *Blechnum penna-marina*, *Cyathea colensoi*, *Polystichum vestitum*, *Sticherus cunninghamii*, *Oxalis magellanica*, *Acaena* sp., *Lagenifera pumila*, *L. strangulata*, a few orchids (*Caladenia catenata*, *Gastrodia cunninghamii*), and *Uncinia uncinata.*

Mosses were abundant on the forest floor under the *Nothofagus*. Here were found *Ptychomnion aciculare*, *Atrichum androgynum* and the 12 cm tall, "tree"-like, *Dendroligotrichum dendroides*. Epiphytes seen here included *Dicranoloma menziesii*, *Cladomnion ericoides*, several species of *Macromitrium* and the pin-cushion moss, *Leptostomum inclinans*. Bare soil under an upturned tree base provided the natural equivalent of a bull-dozed roadside bank, with characteristic colonising mosses *Ditrichum difficile* and *Campylopus clavatus*. Jessica gave a brief lecture on the mating habits of mosses, showing us male and female plants and explaining how the moss capsules, seen on *Dendroligotrichum*, are sporophytes, that is spore-producing plants, equivalent to the whole of a leafy fern plant.

5.3 Makahu Saddle and Spur (Mike Wilcox, Jessica Beever)
While some explored the tops the bryologist pottered below in the cool of the beech forest. In the stream at the Ngahere Hydrological Station was found *Distichophyllum kraussei*, a new record for Hawkes Bay. This dark red aquatic moss was growing submerged on the concrete of the weir at the former DSIR hydrological station.

Ash Cunningham led the group up from the carpark at Makahu Saddle (between the Ngaruroro and Mohaka catchments), with much rewarding botanising along the way. Very common and conspicuous were pygmy pine and *Forstera bidwillii* (in full bloom), together with *Celmisia incana* and *C. spectabilis*. In all, eighteen people made it up the Makahu Spur to the Dominie Bivouac at 1500 m altitude. The vegetation here comprises a low subalpine scrub, interspersed with mid-ribbed snow tussock (*Chionochloa pallens).* Principal species of the scrub were *Brachyglottis bidwillii*, *Hebe tetragona* (= *H. subsimilis*), *Hebe stricta* var. *lata*, *Pimelea buxifolia,* and *Podocarpus nivalis*.

The ascent - very steep most of the way - gives access to the plantings and sowings of various exotic trees and shrubs dating from the work of the Forest & Range Experiment Station in the late 1960s and 70s.

5.4 Kaweka Tops (Mark Smale, Pat Enright)

A group of twelve continued along the undulating but generally upward Makahu Spur to the broad flattish top of the Kaweka Range then south to Mt Kaweka (Kaweka J), at 1724 m, its highest point. For those who had made it to the end of the spur, the extra effort of going all the way to the top was well worthwhile.

As before there was much sparsely vegetated rocky ground (fellfield, from an old English word for rock) and bare scree on the way, with swards of mid-ribbed snow tussock grassland sweeping up the very steep flanks of the spur in places and discrete patches of subalpine scrub dominated by species of *Olearia, Brachyglottis, Dracophyllum, Phyllocladus and Hebe* with some *Gaultheria* and *Pimelea buxifolia.* Differences in substrate are apparently responsible for the occurrence of one or other community, grassland on deeper soils and scrub on shallower ones. The large alpine buttercups (*Ranunculus insignis* and *R. nivicola)* that grow in grassland had finished flowering, as had the sizeable spaniard *Aciphylla colensoi.* Amongst scree plants several willowherbs were noted (why are we so reluctant in this country to use well established, unequivocal common names for genera such as *Epilobium*), including - appropriately enough - one of the typical scree willowherbs *E. pychno-stachyum.*

One very noteworthy plant was a large healthy specimen of *Epilobium crassum* with its lovely pink flowers and seed pods. It was growing on fine scree on the shoulder of a very windswept saddle at about 1650 m. This is very possibly the first North Island record for this plant (a voucher specimen is now held in WAIK). Another plant which caused some discussion (was it a *Hydrocotyle* or a *Schizeilema*) was resolved when a flower head was found thus determining *Schizeilema* 'Nth Island'. *Neopaxia australasica* (also placed in *Claytonia* and *Montia*), a small herb of fine scree with over-sized white flowers and one of the few New Zealand members of the portulaca family, also attracted interest, along with the brilliant white flowered ground-hugging *Parahebe spathulata,* better known to some of us from the scoria slopes of the central volcanoes. By contrast *P. hookeriana* var. *olsenii* inhabited more favourable sites with a more upright habit and pinkish flowers. More astute observers pointed out the scree groundsel, *Senecio glaucophyllus* var. *dischoideus.* On rocky places *Colobanthus strictus, C. acicularis* and *Leucogenes leontopodium* (edelweiss) were in flower. The varying environments on the summit gave home to differing species. The damp depressions, some with small tarns, had *Chionochloa pallens, Schoenus pauciflorus, Uncinia viridis, U. caespitosa, U. fusco-vaginata* and on the bare ground *Plantago triandra.* Elsewhere when the competition allowed, small cushions of *Agrostis muscosa* and *Luzula colensoi* grew with *Plantago novae zelandiae. Phyllachne colensoi* was noted in flower just off the harsher scree and exposed ridge top.

On the summit ridge, heavy cloud to the west obliterated magnificent views to be had on fine days of the Manson Country, the Kaimanawa Mountains, and the central volcanoes beyond, and enveloped us - briefly - in rain. There were only fleeting glimpses of the other ranges and far distant pasture in other directions. A pilgrimage to the memorial cairn to members or the Heretaunga Tramping Club who died 'Pro Patria' in the Second World War and the obligatory refreshment stop and photo opportunity at the summit, perched on the remains of the windthrown trig station, preceded a rapid descent by the same route we came up.

5.5 Littles Clearing red tussock community

Merilyn Merrett, Catherine Beard, Mark Smale, Jessica Beever)

It seemed somewhat appropriate that Hamilton people were located the task of describing this bog, although it was probably coincidental, or Mike's finely tuned sense of humour. However, on Saturday afternoon we headed for the hills, stopping at Littles Clearing and from there heading off for our first 'bog' experience. Before heading into the forest, a splash of white at the edge of the car park captured out attention, and was identified as *Olearia nummularifolia* in full flower. A short walk through beech forest brought us to a relatively small bog area, which, because of the drought, was actually very dry. This area was dominated by red tussock growing to about 1 m tall. There were occasional bog pine (*Halocarpus bidwillii*), *Ozothamnus leptophylla* (*Cassinia vauvilliersii)*, mountain toatoa, *Coprosma* "taylorae", monoao (*Dracophyllum subulatum)*, and *D. recurvum* with patches of *Empodisma minus,* tangle fern (*Gleichenia dicarpa), Carpha alpina*, and *Schoenus pauciflorus.*

The following mosses were found in this area; *Campylopus introflexus, Polytrichum commune, Dicranoloma billardieri,* and *Sphagnum cristatum,* all "good" bog mosses.

Unbelievably, the drought broke (temporarily) while we were botanising the main bog, and only a few hardy enthusiasts remained to explore, at length, the next bog stop, a little further down the road. This area was

quite extensive, at an altitude of about 1000 m a.s.l., and quite different from Waikato bogs. This clearing is evidently shrinking in area due to encroachment from the margins by manuka. Initially it appeared to be red tussock-dominated again, but further in from the road, changes in vegetation structure were apparent. The topography was undulating, and the red tussock was replaced by monoao with tangle fern forming dense hummocks. On the wetter sites, particularly shallow gullies, there is restiad mire of the peat-forming, low-growing (c. 15 cm) *Empodisma minus*, together with other monocots - *Carpha alpina*, *Schoenus pauciflorus*, *Carex echinata*, *Oreobolus pectinatus,* holy grass (*Hierochloe redolens*) - and tangle fern, together with *Celmisia spectabile* and *C. gracilenta* (the latter in flower) poking through.

Fig. 2: Red tussock (*Chionochloa rubra*), Littles Clearing, Black Birch Range. Joan Fitzgerald, Pat Seyb, Dick McMurray. Main Kaweka Range behind.

Occasional small rust-coloured pools provided a habitat for *Eleocharis acuta* with *Sphagnum cristatum* amongst *Empodisma minus* around the margins. Tall (1.6 m) flowering stems of *Aciphylla colensoi* captured our attention, with both male and female spikes seen, although they were spatially quite well separated. Other plants seen flowering were *Ozothamnus vauvilliersii*, *Euphrasia cuneata*, and *Wahlenbergia pygmaea*. Interesting, but not flowering species include *Herpolirion novae-zelandiae*, *Celmisia glandulosa, Hebe tetragona*, *Chionochloa pallens,* and *Anisotome aromatica.* On drier sites were occasional *Coprosma cheesemanii*, and *Androstoma empetrifolia and Brachyglottis lagopus* (in flower).

6. Introduced plants (Mike Wilcox)

In this account, just a few of the more conspicuous introductions need be mentioned. At Makahu Saddle and the adjoining mountain slopes, *Pinus contorta* has escaped from the research plots and operational sowings, and is regenerating freely in tussock and scrubland, up to 1700 m altitude. The Department of Conservation is faced with a big task of keeping the natural alpine vegetation free of this aggressive pine. Other planted pines such as *Pinus mugo* and *Pinus nigra* have not spread significantly.

Another genus to feature strongly in the erosion-control trials is *Salix*. One prominent species used for roadside stabilisation in the Puketitiri district is *Salix eleagnos* (syn. *S. incana*). It is recognised by the narrow, in-rolled leaves, which are white-tomentose beneath.

At the forest edge at the Balls Clearing and Hutchinson Scenic Reserves, Darwin's barberry (*Berberis darwinii*) is starting to become assertive. The forest at Balls Clearing itself is remarkably free of weeds,

about the only one of note being wall lettuce (*Mycelis muralis*), ubiquitous in native forest after the slightest disturbance.

The exotic plant attracting the most attention was *Euphrasia nemorosa*, a European eyebright. It was very common, and attractively in flower, on grassy roadsides in the Black Birch Range and at Makahu Saddle.

There are numerous woodlots of eucalypts in the Patoka and Puketitiri districts. The commonest species is *Eucalyptus delegatensis*, alpine ash. This is the species planted at "the gums" picnic site at Mangatutu Hotsprings, and in small copses up the Mohaka River. Mountain ash (*Eucalyptus regnans*) has also been much planted, especially around Rissington and Patoka, and is the species of the famous landmark trees visible from the sea.

In Little Bush and the adjoining Whittle property, giant Himalayan lily (*Cardiocrinum giganteum)* has been much planted as an ornamental, and now appears to be naturalised within Little Bush. It is a striking plant with large almost taro-like basal leaves and a tall flower head.

Tall roadside plants to attract attention were wild parsnip (*Pastinaca sativa*) and woolly mullein (*Verbascum thapsus*), and on Makahu Station, delicious ripe fruit of Japanese wineberry (*Rubus phoenicolasius*). At the parking area of the Mangatutu Hotsprings, a common introduced grass was *Elymus rectisetus*.

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