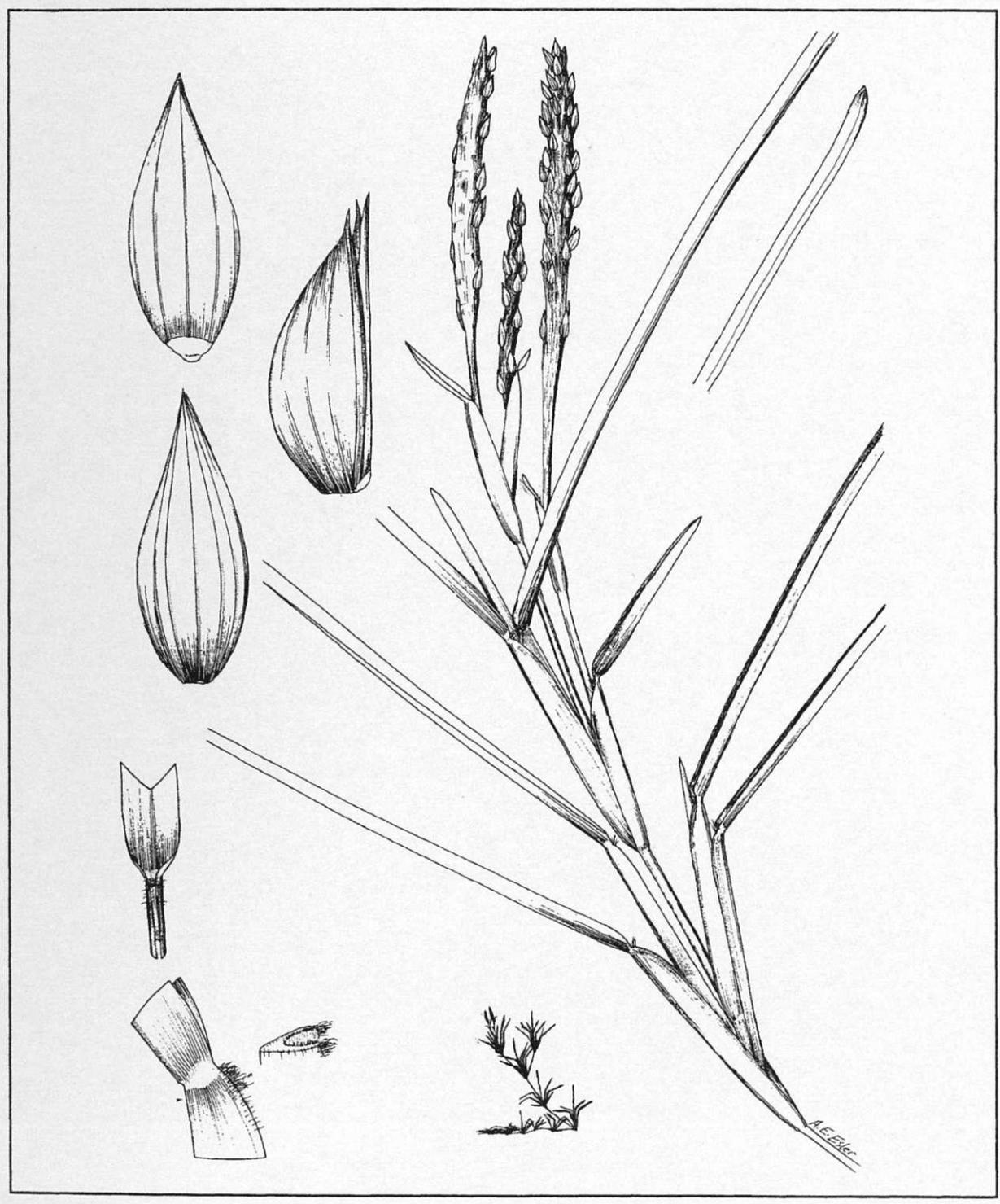


THE NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 64

JUNE 2001



New Zealand Botanical Society

President: Jessica Beever
Secretary/Treasurer: Anthony Wright
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Subscriptions

The 2001 ordinary and institutional subs are \$18 (reduced to \$15 if paid by the due date on the subscription invoice). The 2001 student sub, available to full-time students, is \$9 (reduced to \$7 if paid by the due date on the subscription invoice).

Back issues of the *Newsletter* are available at \$2.50 each from Number 1 (August 1985) to Number 46 (December 1996), \$3.00 each from Number 47 (March 1997) to Number 50 (December 1997), and \$3.75 each from Number 51 (March 1998) onwards. Since 1986 the *Newsletter* has appeared quarterly in March, June, September and December.

New Subscriptions are always welcome and these, together with back issue orders, should be sent to the Secretary/Treasurer (address above).

Subscriptions are due by 28th February each year for that calendar year. Existing subscribers are sent an invoice with the December *Newsletter* for the next year's subscription which offers a reduction if this is paid by the due date. If you are in arrears with your subscription a reminder notice comes attached to each issue of the *Newsletter*.

Deadline for next issue

The deadline for the September 2001 issue (Number 65) is 25 August 2001.

Please post contributions to: Joy Talbot
23 Salmond Street
Christchurch 8002

Send contributions by e-mail to joytalbot@free.net.co.nz. Files can be in WordPerfect (version 8 or earlier), MS Word (version 6 or earlier) or saved as RTF or ASCII. Graphics can be sent as Corel 5, TIF or BMP files. Alternatively photos or line drawings can be posted and will be returned if required. *[Drawings and photos make an article more readable so please include them if possible.]* Macintosh files cannot be accepted so text should simply be embedded in the email message.

Cover Illustration

Buffalo Grass (*Stenotaphrum secundatum*) -indigenous to tropical America and Africa, and now widely naturalised throughout the warm temperate and tropical regions of the world. In New Zealand it is usually coastal, often forming pure dense swards. It is common in the northern part of the North Island, and scattered further south to North Canterbury. Edgar and Connor (2000) report that no seed has been seen in New Zealand. Drawn by **Alan Esler**.

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NEWS

Regional Botanical Society News

■ Auckland Botanical Society

AGM & March Meeting

After a brief AGM, at which Ewen Cameron was again voted in as President, Ross Beever gave a talk on a subject which has had quite a bit of publicity lately - phytoplasmas, the cause of sudden decline disease in cabbage trees. These bacteria live in both plants and animals and are spread by insects from tree to tree. Karamu and strawberry plants are also susceptible to infection. The worry now is that phytoplasmas may be implicated in other native plants which are showing die-back.

March Field Trip

The track which leads to Bendall Bluff in the Waitakere Ranges is an informal one with which our leaders, fortunately, were very familiar. The rocky slopes bore good populations of the shiny *Asplenium lamprophyllum*. The two high points of the sandstone bluff gave clear views out over the Manukau Harbour and surrounding suburbs. Some of the special botanical features were *Sophora fulvida* (see p. 23), *Litsea calicularis*, and *Helichrysum lanceolatum*.

April Meeting

Plant ecologist Jon Sullivan, having spent the last six years doing ecological research in the tropical dry forests of Costa Rica, gave a fascinating slide presentation showing some of the flora and fauna of this fast vanishing forest type. He spoke of the country's successful efforts to conserve and restore their dry forests based around the controversial philosophy of "use it or lose it".

April Field Trip

A fine autumn day and a relatively level walk brought out a large crowd to the Otuataua Stonefields Historic Reserve, Mangere. Small patches of the original vegetation still remain, and plants of interest are maawhai (*Sicyos australis*) - not seen in Auckland since 1866 until rediscovered in 1991 - *Calystegia tuguriorum* and *Asplenium flabellifolium*. The large numbers of weed species is a worry.

May Meeting

Two Argentine botanists, Ana Maria Molina and Marcela Sanchez, who were only in New Zealand for four days, managed to fit in a talk to Auckland Bot Soc. Ana Maria spoke of some of the problems facing botanic gardens in her country, and in particular the Arturo E. Ragonese Garden in Buenos Aires, which is under her care. She also listed her aims for future management.

Marcela, with the help of maps and slides, spoke of the wide range of biogeographic areas in such a large country. Her slides illustrated the diverse flora of some of these regions, with a slight bias toward her own specialty, orchids.

May Field Trip

Despite being wet and muddy underfoot, the Waitakere track named for our late patron, Lucy Cranwell, was enjoyed for its beauty and botanical diversity. Among the scattered kauri were seen *Ixerba brexioides*, *Quintinia serrata*, *Pittosporum kirkii*, *P. ellipticum*, *Leionema nudum*, and surprisingly, *Astelia nervosa*. Nearer to Piha, an area of gumland scrub produced *Schizaea bifida*, *Genoplesium pumilum* and *Korthalsella salicornioides*. The site of an old driving dam at the top of the Kitekite Falls provided views out over the rugged volcanic terrain, and looking back from the Kitekite Track at the base of the falls, the recent autumn downpours had added enough water to make the falls a spectacular sight.

FORTHCOMING ACTIVITIES

- | | |
|----------|------------------------------------------------------------------|
| 5 June | Matt McGlone - 2001 Cockayne Memorial Lecture |
| 16 June | North Shore reserves field trip - Smiths Bush & Eskdale Reserves |
| 4 July | Tristan Armstrong - "Understanding plant Speciation" |
| 21 July | Rangitoto field trip - lower plant emphasis |
| 1 August | Avi Holzapfel - <i>Dactyloctenium aegyptium</i> ecology |

18 August Hamlins Hill & Anns Creek field trip

Maureen Young, 36 Alnwick Street, Warkworth. email: youngmaureen@xtra.co.nz

■ **Waikato Botanical Society**

March Talk

Following the Waikato Botanical Society's AGM, held on the 19th March, Avi Holzapfel presented us with a talk on a most unusual and fascinating plant, *Dactylanthus taylorii*. Avi provided some background information on this endemic species, and detailed the results of some of his research, including the process by which host tree roots are infected and the genetic distinction between populations occurring in different areas.

2001 PROGRAMME

The calendar of events for this year has been scheduled and events between now and September are listed below. All evening talks are held at Landcare Research, Gate 10 Waikato University, off Silverdale Road, Hamilton. This is also the trip departure point from Hamilton for shared transport.

- | | |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sunday 10 June | Kamai Range from top to bottom. Explore the Kaimai Summit loop track through cloud forest with a great variety of species and a protected patch of forest on farmland at the foot of the Kaimai Range. Meet Hamilton 9am or Kamai Range 10am. |
| Monday 9 July | Native vegetation in Hamilton City. Theresa Downs will present the results of a city-wide survey focussing on gully vegetation and outline the restoration project at Hammond Bush. 7:30pm. |
| Sunday 12 August | Pest-proof gully restoration. Visit a 16 ha gully site near Cambridge, surrounded by a pest-proof fence designed and tested on the property by the landowners and a team of scientists. Meet Hamilton 9:30am or at the site 10:00am. |
| Monday 10 September | Waikato wetlands. Bev Clarkson will speak about the freshwater wetlands (bogs, swamps and fens), of the Waikato, including their special features, threatened plants and history of development. 7:30pm. |

Theresa Downs email: t.downs.@waikato.ac.nz

■ **Rotorua Botanical Society**

RECENT ACTIVITIES

The Society has had several well-attended field trips in recent months. In November 2000 we visited the Ottawa Trig, inland from Te Puke, discovering a small population of *Rorippa divaricata*. This species is nationally threatened and in recent years on the mainland is known only from a small number of sites.

The field trip to Pukahunui Valley in November 2000 was well-attended and botanically very interesting, with many *Pittosporum turneri* to be seen. This is the northern limit of *Pittosporum turneri*. An interesting find was a small population of *Spiranthes novae-zelandiae*.

In March 2001 we visited the margins of Ohiwa Harbour and explored the Waiotahi Spit and Estuary. It was interesting to note that pingao is now scattered throughout the foredune vegetation along the Ohiwa Spit, whereas it was absent in 1983 when the site was visited as part of the biological survey of reserves in the West Gisborne Land District. A small population of *Austrostipa stipoides* was discovered in the Waiotahi Estuary. This is a new eastern limit for this species in the North Island.

On April Fools Day 2001 a field trip ventured to the Rock Sentinel in the Kaimai Mamaku Forest Park. A wide range of fern species were found and were the source of great interest, including three species of *Trichomanes*. The track passes a particularly large kauri, by Bay of Plenty standards, which was admired by all.

More details of these trips can be found in Newsletters Nos 35 and 36.

In January 2001, Newsletter No. 35 was published with the following articles:

Some Thoughts on the Future of the Botanical Society (W.B. Shaw)
Vegetation and Flora of Matata Scenic Reserve (S.M. Beadel)
Parimahana Scenic Reserve Field Trip (P. Cashmore and D. Gosling)
Otago Trig (R. Crabtree)

In May 2001, a bumper issue (75 pp), Newsletter No. 36 was published with the following articles:

Vascular Plants of the Lake Okataina and Waione Block Scenic Reserves (J.F.F. Hobbs)
Field trip to Te Ngae Tawa Forest Remnant and Kahikatea Stand (W.B. Shaw)
Checklist of Vascular Plants Recorded in the Kahikatea Stand at Te Ngae (S.M. Beadel and W.B. Shaw)
Mokoia Island Field Trip (P. Cashmore)
Ohiwa Harbour and Waitotahi Spit Field Trip (S.M. Beadel)
Peperomia tetraphylla (Forst. F.) Hook. & Arn. - Four Records from the Western Bay of Plenty (J.F.F. Hobbs)
Snippets from Lake Okataina Scenic Reserve (J.F.F. Hobbs)

CURRENT PROGRAMME

Wednesday 6 June 2001 - 2001 Cockayne Memorial Lecture

Title: Climate changes past and present and their effects on New Zealand's vegetation

Speaker: Dr Matt McGlone

Saturday 9 June 2001 - Waimangu Scenic Reserve

Saturday 9 June 2001 - Annual General Meeting

Guest Speaker: Dr Gordon Hosking will present an address on Indigenous Forest Health and Biosecurity Issues.

Sunday 1 July 2001 - Waipahihi Botanical Reserve/Opepe Bush near Taupo

Leader: Philip Smith - (07) 378-5450 (work), (07) 378-0571 (home); Grade: Easy

Sunday 5 August 2001 - Whirinaki Forest Park

Leader: Grey Steward - (07) 343-5899 (work), (07) 345-5337 (home); Grade: Easy

Sunday 2 September 2001 - Waipunga Valley

Leader: Paul Cashmore (07) 348-4421 (home), (07) 349-7432 (work); Grade: Medium - bring your gumboots!

Sunday 7 October 2001 - Okataina Scenic Reserve Northern Rata

Leader: Barbara Swale -(07) 362-4675; Grade: Medium

Sunday 4 November 2001 - Tihia

Leader: Chris Ecroyd - (07) 347-9067 (home), (07) 343-5609 (work); Grade: Hard

Sunday 2 December 2001 - Iwitahi Orchids

Leader: Bruce Irwin - (07) 576-2692; Grade: Easy

Sarah Beadel, c/- Wildland Consultants Ltd, P.O. Box 7137, Te Ngae, Rotorua

Email: wildland@wave.co.nz

■ Wanganui Museum Botanical Group

TRIP REPORTS

2 September 2000: Nitschke's Bush, Halcombe/Waituna West, Rangitikei District

"Nitschke's/Gorton's Bush" covers 200 ha of steep gully spur terrain within the flat terrace country by the Waituna Stream. Eight of us travelled from Wanganui and Marton and were joined at the forest by three botanists from Palmerston North. In the course of the day we explored a small fraction of the forest, because of its large area and the steep terrain of cliffs and narrow gullies. The stream beds that we'd been told were a good route through the forest had high water levels from rain the previous day, and

intermittent showers during our visit made botanical exploration difficult. However, we still saw enough to realise that this is a very significant forest area for the region, but with considerable management problems if its future is to be assured. The plant habitats ranged from very dry ridges through to dripping wet mudstone banks, and the vegetation from seral kanuka scrub and kanuka forest with totara and kowhai (*Sophora godleyi* - see article p. 23), to patches of tall tawa and even a grove of about six rimu trees. We were able to add about 30 native species to a list compiled earlier during the PNAP survey and by Manawatu botanists. Our additions included seasonal flowering orchids like *Corybas macranthus* and *C. iridescens* growing among other wet bank plants including a mountain foxglove (*Ourisia macrophylla* ssp. *robusta*), an everlasting daisy (*Anaphalioides trinervis*) and the willowherbs *Epilobium nerteroides* and *E. pedunculare*. At the dry end of the environmental gradient we found the regionally uncommon fern *Doodia australis* and another everlasting daisy (*A. subrigida*).
Colin Ogle

4 November 2000: Upper Waitotara Valley. Jim Campbell's impeccable organisation of the transport made for a thrilling and memorable trip into this quite remote valley. The upper Waitotara is rich in stories of pioneer farming. It was also one of the places where surveyor Joseph Annabell collected kokako and piopio (NZ thrush) in the period 1883-85. Our trip into the heart of this country proved to be the most popular of the year, regardless of whether we went for the history, the forest or simply a thrilling 20 minute jet boat trip through the narrow gorge of the river. Larsen's boat made 4 return trips to ferry us to the Waitotara-Omaru confluence. The first boatload was fortunate to see a blue duck on the river, but it took flight and escaped up the Omaru. Not surprisingly, nobody saw a kokako or piopio, but robins were plentiful. Some of us walked to Trains Hut and also down-river for about an hour or more to be picked up by boat at "Tunnel Culvert". Others pottered closer to the original landing point but still saw a variety of plants in forest, on track-side banks and cliffs, and along the river bed. Most of us saw flowers of mahoe, hinau and *Libertia grandiflora*. Some of us found patches of *Corybas oblongus* in full bloom and, on a steep papa face by Tunnel Culvert, hundreds of plants of a regionally uncommon fern, *Lindsaea viridis*. This cliff had the only plants we saw of karapapa (*Alseuosmia macrophylla*), no doubt eaten out elsewhere by goats. Young trunkless plants of gully tree fern (*Cyathea cunninghamii*) were everywhere, and we speculated about the identity of the tree ferns overhead. One of my pleasant memories was of the total lack of woody weeds in the area. However, Mexican daisy was abundant on dry sunny banks.
Colin Ogle

4 February 2001: Waipipi Beach, Waverley. Ten members journeyed to Waverley to meet at the house of Mr Nigel Alexander, the farmer whose property we crossed to the coast. Mr Alexander guided the party in their cars across his farm to the fence separating it from the dunes. From that point travel was by foot or 4WD, not a great distance - only 500 m or so. The day was fine but a steadily westerly wind was blowing. At the beginning of the walk many patches of *Gunnera dentata* (= *G. arenaria*) and *Selliera rotundifolia* were prominent with a few plants of *Samolus repens*. The party headed west, inland of the line of sand dunes that line the coast, and through a wetland of sedges and rushes, but at the time very little "wet". The dunes were covered with marram grass with the occasional spinifex, pingao and one or two shrubs of tauhini (*Ozothamnus* [= *Cassinia*] *leptophylla*). Further along was a kind of pan, many hectares in extent, hard underfoot, with many small higher patches which, when the area is under water, would look like little islands. Each of these was surrounded by areas of half-stars (*Selliera rotundifolia* and *S. radicans*) with *Gunnera dentata* on the rise. The display of half-star flowers was impressive and the *Gunnera* was in fruit. A dune willowherb (*Epilobium billardiereum*) was common around the many areas of rushes. A late lunch was taken at a small grassed waki at the head of which was a seepage with banks that had the ferns *Adiantum cunninghamii*, kiokio (*Blechnum novae-zelandiae*) and *Polystichum richardii*. The day was a pleasant outing, easy walking but offset a little by the rather tiring wind. Randal Springer.

PROGRAMME

Evening Meetings

1 May: Jim and Diana Howard will give an illustrated talk of wildflowers and gardens discovered during a trip to Britain in 2000.

5 June: Astrid Dijkgraaf (Conservancy Advisory Scientist, DoC Wanganui) will talk on natural areas and conservation in the Netherlands (re-programmed from last year)

3 July: Colin Ogle & Graeme La Cock will give an expanded and illustrated account of their paper on old

man's beard, *Clematis vitalba*, that was presented at a combined conference of the NZ and Australian Ecological Societies.

7 August: AGM, Members' evening.

4 September: Jocelyn & Ian Bell will give us an illustrated talk on South Australia.

Field Trips

Sunday 29 April: Higgle's Covenanted Bush, Fordell.

Sunday 2 June: Gordon's Bush.

Recently this last remnant of the podocarp swamp forest that once covered the Wanganui river flats was handed to DoC by the District Council.

Saturday 30 June: Mystery trip to Wanganui gardens.

Last winter's trip around some of Wanganui's schools was so popular that we've organised a similar one this year to see native and exotic plantings. Meet at Wanganui Collegiate School, Liverpool Street entrance at 9.30 am. Leader: Colin Ogle (347 8547).

Saturday 4 August: Massey University Gardens.

Once again Dave Bull has agreed to show us parts of the university grounds that he manages. This time we may include some of the eucalypts, including a look at the rare (in NZ) *Eucalyptus eximia*. Meet at Massey at 10 am; those leaving from Wanganui meet at Bell St police station at 8.30 am. Leader: Clive Higgle (342 7857).

Sunday 2 September: Hawken's Lagoon, Waitotara River Mouth.

Jim Campbell hopes to show us the newly discovered population of *Sebaea* (he found it just last year), as well as other rare plants of sand flats and lagoon edges. Meet at Bell St police station at 9.30 am. Leader: Jim (348 7272).

Secretary: Robyn Ogle, 22 Forres Street, Wanganui. Ph 06 347 8547

■ Wellington Botanical Society

TRIP REPORTS

Saturday 16 September 2000: Ngawihi, South Wairarapa

Bot Soccers and Department Conservation staff visited Te Kawakawa Rocks near Cape Palliser, to rediscover some of the tiny, rare, annual, native plants previously seen in the area. The 3 plants of most interest on this trip were *Isolepis basilaris*, *Myosurus minimus* ssp. *novaezealandiae* and *Myosotis pygmaea* var. *minutiflora* and *M. pygmaea* var. *pygmaea*.

All appear in early Spring, complete their life-cycle and disappear in early Summer, so timing the search was important. First, we studied photographs of 2 of the plants and looked at a potted specimen of *Isolepis basilaris* brought by Robyn Smith from Percy Reserve. We discussed them and where we might find them, then Geoff Rogers led the search. He is a DoC plant ecologist from Dunedin who had seen *M. pygmaea* var. *minutiflora* here years ago. We climbed a low beach ridge of small gravel, spread out, and began searching. Looking around this huge area of coast I had the fleeting thought that finding such tiny plants would be difficult. Geoff relocated a rock he had placed as a marker 10 years ago, but said that there were now no *M. pygmaea* there. He came back up the ridge, and pointing excitedly, called out, "Here it is!". We then crawled along the ridge and found more *M. pygmaea*, including several copper-coloured ones.

We marked each group with a peg and aluminium tag. Geoff then put a 1 m grid square over the pegs and recorded the number of plants and their position within it. We searched all the suitable habitat, then descended to the lower beach level to look for some of the other target species, but without success. We found several patches of *Leptinella pusilla* and noted that it is much less abundant here now.

Returning to near where our cars were parked we found many more *M. pygmaea*, bringing our total to about 300 plants. Geoff commented that this was a very significant find because it was one of only two in the North Island and has many more individuals than other sites he had seen. Gary Foster

Wellington Anniversary Weekend, Saturday 20 - Monday 22 January 2001: Horowhenua

Saturday: Pakipaki dune forest

Described as the only true forest remnant in the area and recognised as an area of special botanical interest, the forest is situated on a 20 m high parabolic dune between Lake Horowhenua and Waitakere pine forest. Some other dunes in the vicinity have virtually monotypic kanuka forest, but Pakipaki retains a whole suite of species representative of earlier times. (Adapted from, C.C. Ogle, C.A.S. Notes 145, 1997. DoC).

Among emergents we noted matai, rewarewa and totara, and in the lower canopy, narrow-leaved maire was a surprise among large kowhai and kaikomako. *Corokia cotoneaster*, *Coprosma rhamnoides*, and *C. crassifolia* were prominent in the understorey. The forest is recovering from browsing and trampling, thanks to the work of the trustees who have fenced it and poisoned the possums.

Saturday pm: Prouse Scenic Reserve

This impressive remnant in southern Levin is in a seriously degraded state. Wandering Willie is widespread, several other pest plant species are common, and robinia trees vie with karaka, miro, rewarewa, tawa, titoki and totara for space in the canopy. Horowhenua District Council has a huge backlog of work to do, in consultation with the Department of Conservation and Forest and Bird, to restore this gem. Its 2001—2002 Annual Plan should allocate funds to start this work. Chris Borne

Sunday: Hokio Dunes

With access approved by the Hokio Trust and by Les Jacob, we lurched over a lumpy track then walked about an hour over old dunes to arrive at an un-named lake. In the distance we saw Royal Spoonbills. Curious cattle were far too interested in us to permit botanising here but we did sight *Potentilla anserinoides* in the deeply pugged lakeside turf. A little further on we found more turf plants including *Glossostigma elatinoides*, *Ranunculus gracillipes*, *Pratia perpusilla* and *Triglochin striatum*. Later, in the dunes, occasional patches of *Spinifex sericeus* in flower and one patch of *Carex pumila* with its attractive, conical seed heads were highlights among the predominantly exotic pasture grasses and weed plants such as pampas. Julia White found the first *Coprosma acerosa*, and in a nearby blowout, Sue McIntosh spotted several *Pimelea arenaria* in flower, half buried in sand. Soon after, we found what we were hoping for - a slightly damp patch surrounded by *Apodasmia* (= *Leptocarpus*) *similis*, and nestled in it a small patch of *Mazus novaezeelandiae* in flower. We have since had confirmation of this as *M. novaezeelandiae* ssp. *impolitus*, newly distinguished from *M. novaezeelandiae* ssp. *novaezeelandiae* by having dull, (i.e. "not polished") leaves, with usually a brown marginal band. Its status is described as vulnerable, (Cameron *et al*, 1995; P.J. de Lange pers. comm.) in an article by Peter Heenan (1998) in *New Zealand Journal of Botany* 46: 407-416. Barbara Mitcalfe

Monday: Waiopahu Reserve - a time warp

Seventy-five years before the Wellington Botanical Society's and the Levin Native Flora Club's combined visit to Levin's Waiopahu Scenic Reserve, the *Horowhenua Chronicle* urged tourists to see the reserve. Close to the Tararua foothills and east of the Queen Street intersections with both SH1 and SH57, this 9 ha reserve is important as the only significant remnant of intact indigenous forest on the Horowhenua plain.

Even in the 1920's, its value was recognised. "Visitors will be well repaid in a visit to the Waiopahu Scenic Reserve which besides many other splendid specimens of our native trees, possesses what is believed to be the largest rata in the Dominion, a forest giant measuring 13 feet through," reported the *Chronicle* on 28 January 1926. Neighbour George Gimblett, who remembers the rata standing, estimated its circumference at 37 feet. The native trees, some estimated to be hundreds of years old, include tawa and pukatea, and a fallen giant pukatea near the rotting rata stump. We noted that they were unusually clear of epiphytes. The reserve is also a reference site for the giant land snail *Powelliphanta traversii*. We saw 2 empty *Powelliphanta* shells.

A wonderfully lush and hushed place to visit, with the height of the old-growth trees giving it the feeling

of a cathedral, its integrity is under threat from many quarters. It is the subject of concern and lobbying from the local branch of Forest and Bird because of the proliferation of exotic creepers and particularly sycamore seedlings on the northern boundary. In recent years, inappropriate native species, such as pohutukawa, were planted on the northern boundary, where incidentally the weeds are worst, to "beautify" the reserve.

Other threats include adjacent subdivision, dog walkers, predators, and exotic plant invaders. The Horowhenua District Council is drawing up a management plan for the reserve but as yet has no policy on lifestyle subdivisions encroaching on its southern (and likely soon) western boundaries. The boundary fences are merely post and wire farm fences.

Council staff are considering banning private gates into the reserve but do not appear to have given much thought to creating a buffer zone or to requiring developers to build strong fences to keep out stock and domestic pets. The walking of dogs is theoretically banned, but not enforced. Dogs (and human visitors) often go off the paths, endangering plants and snails. The council intends to spend about \$3000 delineating paths, installing seats and erecting signs asking people to keep to the tracks. However, staff involved in the reserve see illegal dog walking as a dog enforcement issue not a conservation issue.

No predator control is being done, and council staff say they are waiting for advice from the Department of Conservation on this. Until three years ago UCOL (formerly Manawatu Polytechnic) tutors and students trapped rodents and monitored predator populations, but no work has been done since then.

Janice Swanwick (with help from her father, Levin historian, Corrie Swanwick.)

3 February 2001: Makara Foreshore Reserve

The purpose of this visit was to resurvey our 6 vegetation transects laid out across the reserve in March 1995. They were easily relocated and we recorded species presence or soil material at 50 cm intervals along each transect. Six years ago we had been concerned about the condition of *Raoulia* in the reserve, so the condition and dimensions of each *Raoulia* encountered along the transect were also recorded.

Initial results from our survey indicate that bare ground and leaf litter have increased in 3 transects. This has coincided with a decrease in the presence of marram on the same transects (marram had been sprayed by Wellington City Council contractors). No definite trends were noticed for either *Raoulia* or *Disphyma*. However, there was a general increase in the condition of the *Raoulia* mats (as defined by the percentage of live material within the mat). No dead mats of *Raoulia* were encountered in 2001 (6 were noted in 1995). Over 75% of the mats contained more than 50% live material in 2001, whereas in 1995 only 40% of the mats were as vigorous as this.

Buck's-horn plantain was not recorded as a common species in our 2001 survey. Although its presence has become a problem in this reserve during the past 6 years, it has been most efficiently removed by Chris Horne and Barbara Mitcalfe during their many weeding efforts at the reserve. *Maggie Wassilieff*

EVENING MEETING

Monday 19 February; Speaker: Phil Garnock-Jones: Taxonomy of *Parahebe*

Parahebe is a small genus of subshrubs related to *Hebe* and *Heliohebe*. It is found in New Zealand and New Guinea (recent work shows the Australian, *P. lithophila* actually belongs in *Derwentia*). Phil's revision of *Parahebe* is one of the objectives of the *Hebe* programme based at Te Papa and is funded by the Public Good Science Fund.

Phil discussed the taxonomic problems in *Parahebe* at two levels. First he introduced us to modern ideas about classification of species into higher level taxa such as genera and families. Biologists now insist that all members of such groups must have their nearest relatives also classified in the same group. This simple requirement poses some problems for *Veronica* and *Parahebe*, because other *Hebe* and other genera have evolved within them. Possible alternative classifications were discussed, such as putting all the New Zealand *Hebe* and related genera back into *Veronica*, or enlarging *Hebe* to include all its New Zealand relatives. Phil showed that there are no unique characters that define *Parahebe* - it is made up

of the species that are left over when distinctive genera such as *Hebe*, *Chionohebe* and *Heliohebe* are recognised within the New Zealand *Hebe* complex.

Secondly, Phil stressed the importance of testing explicit hypotheses at species level. He described how the process of speciation is rarely observed, but can be inferred by seeking evidence that refutes a "hypothesis of conspecificity" which is a fancy term for a species identification. Any kind of evidence will do - morphology, genetics, or behaviour - so long as it compels us to reject the conspecificity hypothesis. This is consistent with Popper's definition of science, whereas seeking evidence to support the idea that a collection might be a new species is not. Phil discussed the 18 species he will be recognising in *Parahebe*, following these criteria. In particular, Phil proposes to divide the *Parahebe catarractae* complex as treated in Allan's Flora, into five species. To finish the talk, he showed slides of intergeneric hybrids between cushion-forming *Chionohebe* species and *Parahebe trifida*, *P. birleyi*, and a new species related to them.

2001 PROGRAMME

All meetings are held in Lecture Theatre K301 in the New Kirk Building, Kelburn Parade, Victoria University at 7.30 pm.

Sunday 10 June: Wainuiomata catchment. Guided trip into the finest remnant of podocarp/ northern rata forest in the Wellington region. Restricted to 20 people.

Monday 18 June: Evening talk on "Recent work on the evolution of the concept of scenic reserves in NZ" - Geoff Park.

Saturday 7 July: Galbraiths Gully & Holdaway Scenic Reserve, Western Hutt hills. Leader: Chris Horne 475 7025

Monday 6 July: Special General Meeting - proposed changes to Constitution followed by "Megaherbs of Campbell Island" - Vivienne Nicholls.

Saturday 28 July: Working Bee to Te Marua Bush: planting after *Tradescantia* eradication. Leaders: Sue Millar 526 7440, Glenys Sheppard 526 7450

Saturday 4 August: Maara Roa, Cannons Creek, Belmont Regional Park. Leader: Neil Bellingham 235 5501

Monday 20 August: AGM followed by "Shoreline to bushline in Chile - some comparisons with NZ" - Rodney Lewington and Darea Sherratt.

Saturday 1 and Sunday 2 September: Mana Island. Bookings Essential - max 20. Working Bee, pot-luck dinner and botanising. Leader: Vicky Froude 233 9823

Monday 17 September: Evening meeting "Botany of Banks Peninsula - a foretaste of the book" - Hugh Wilson.

Saturday 6 October: Dobsons/Tauherenikau, Tararua Range. Leader: Peter Beveridge 237 8777

Monday 15 October: Evening meeting "1. Brassicaceae; 2. Sophora" - Peter Heenan, Herbarium Curator, Landcare Research, Christchurch.

Saturday 3 November: Boom Rock - Pipinui Point. Botanise the coastline north of Makara Beach. Leader: Pat Enright 938 7537

Monday 19 November: Botanical research at Victoria University - students who have received BotSoc travel grants report on their research.

Saturday 1 and Sunday 2 December: Eastern Wairarapa

Thursday 27 December - Monday 7 January 2002: South Island

CONTACTS

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Secretary: Barbara Clark, PO Box 10-412, Wellington 6036. Ph: 04 233 8202 (h)

■ Nelson Botanical Society

February Field Trip: Moa Park, Abel Tasman National Park

About 20 members assembled at the Harwood's Hole carpark on Takaka Hill in cloudy conditions. The track commenced through *Nothofagus menziesii* - *N. fusca* forest with *Griselinia littoralis*, various

Coprosma species including *C. "tayloriae"*, *Elaeocarpus hookerianus*, *Podocarpus hallii*, *Raukaua simplex* and *Dracophyllum traversii*. At some time much of the forest has obviously been logged and most likely burnt as well. This was testified to by the lack of large and mature trees.

After about 20 minutes of relatively easy going the track suddenly became quite steep as it climbed through more open country of fern and scrub, before entering the forest again. Initially the forest was of much the same composition, but one of the most notable additions was *Cyathea colensoi* which, interestingly, was much more vigorous when growing in more open situations than in its usual forest habitat. Other ferns were *Blechnum discolor*, *B. fluviatile*, *Polystichum vestitum*, *Histiopteris incisa*, *Hypolepis millefolium* and *Hymenophyllum sanguinolentum*. The latter were quite shrivelled because of dry conditions. Soon the first specimens of *Libocedrus bidwillii* appeared. Mostly they were young or semi-mature specimens because most mature trees appeared to have died at some time in the past. At this stage the track became easier with just a few undulations and not too much climbing. The first plants of *Pittosporum divaricatum* appeared and delighted us with their most unusual aspect and almost primeval appearance. *Myrsine divaricata* also became quite a common component of the forest and added to the effect. *Raukaua simplex* was very common and bewildered members with its chameleon-like changes of form.

Soon the track dropped down to a small stream where a particularly fine specimen of *Olearia lacunosa* was observed, still with some flowers. Out of the streambed the whole aspect of the landscape changed with *Dracophyllum traversii* becoming one of the principal components of the forest along with *Myrsine divaricata* and *Pittosporum divaricatum*. Plants of the latter were considered to be of great age, so gnarled and twisted was their growth. *Metrosideros umbellata* appeared and one plant obligingly still had some flowers. Along this stretch of the track the mist descended into the forest which further heightened the Jurassic Park-like nature of the scene. Around tree bases *Libertia pulchella* was not uncommon, but the most interesting find of the day was *Hymenophyllum malingii* growing on *Libocedrus bidwillii*. Usually it was best on dead tree trunks or stumps. One or two exceptionally fine colonies were seen. It was also pleasing to note the number of young *Libocedrus* that were beginning to appear. *Lagenifera pinnatifida* was also observed.

Upon coming out of the forest we descended into Moa Park itself where a welcome lunch was had. Unfortunately time did not permit a good fossick around the open area before it was necessary to return to the carpark. Some fine specimens of *Aciphylla colensoi* grew along the streambank and in grassy areas. *Halocarpus bidwillii* abounded as did *Ozothamnus vauvilliersii* and *Olearia lacunosa* appeared to be becoming more common. *Hebe odora* was quite common with some plants still in flower. Other hebes were *H. vernicosa* and *H. hectorii* ssp. *coarctata*. Since the Society's last visit some 6-7 years ago it appears that the grassland is rapidly being colonised by shrubs. As well as adding to the atmosphere, the cloudy conditions made for more comfortable tramping.

Lawrie Metcalf

March Field Trip: Teetotal, Buller River.

Members botanised a habitat type which is uncommon in the Nelson district. The Teetotal area of Big Bush is, in part, a river terrace of the upper Buller River near St Arnaud. This stony, dry, frost flat is predominantly an open matagouri treeland interspersed with tall kanuka and shrubs. There is probably a long history of fire modification dating back to pre-European times that has resulted in the vegetation mosaic that is evident there now. The high river terraces have a sparse shorter matagouri shrubland surrounded by mostly kanuka (recent European fires) whereas the low river terrace, the focus for the day, contains a more diverse flora. Here matagouri impresses, some to 5 metres in height. Many show massive tangles of "witches brooms". Rubby banks and reefs are refuges for weeping mapou, a suite of coprosmas, mountain wineberry in its various guises and *Corokia cotoneaster*. The most interesting vine straggling through these shrubs is *Clematis quadribracteolata*. In places, porcupine shrub (*Melicytus* aff. *alpinus*) forms extensive dense low thickets over stony outcrops, surely a haven for lizards.

Small wetlands, now dry because of the northern South Island drought, turned up the find of the day, *Gratiola nana* with its tiny black-tipped leaf lobes. Despite intensive searching, only one small flowering plant was found. A rare undescribed *Hypericum*, *H. "Howard"*, was also found - one of the few times it has

been seen away from the Howard Valley where it was first recorded. Notable among the *Acaena* species was *A. juvenca*. Searches for *Coprosma obconica* located only the odd specimen near the river edge, but, on fording the very low-flowing Buller River to some tiny islands, we were gratified to see thriving *C. obconica* underpinned by their "variegated" seedlings. The luxuriance of the vegetation on these islands indicates what the adjacent riverine areas are capable of if livestock, rabbit and hare grazing were eliminated.

Only a small stretch of this river terrace was botanised, leaving plenty of scope for exploration in future years.

Les Moran

Easter Camp Report: Camden Station, Awatere Valley, South Marlborough

In spite of the dreadful weather forecast, eight of us drove through a little drizzle and met at the backpackers hostel on Camden Station on Thursday evening. Friday dawned grey but not particularly cold, and Shelley from the station kindly gave us a lift on the back of the 4WD ute partway up the Cam River. We botanised down from the ridge into the streambed, passing rock outcrops with *Pellaea calidirupium*, *Asplenium* sp. aff. *trichomanes*, *Myosotis australis* "small white", *Pachystegia insignis* and our first pink broom of the day. All of our botanising in the area turned up only one lot of seed on the pink brooms, and that appeared to be the seed of *Carmichaelia carmichaeliae* in spite of the fact that we were east of the Awatere Fault. At the river we found an amazing sight - literally hundreds of *Pseudopanax ferox* on a terrace, all sizes from young seedlings to about 10cm diameter - with a backdrop of pink broom and Marlborough daisies on the cliff behind. Unfortunately the brooms and daisies, along with many other species, including *Sophora prostrata*, were suffering severely from the drought. We worked our way downstream, through kanuka, *Carmichaelia australis*, *Hebe traversii*, *Clematis afoliata* and *C. petriei* and the species already mentioned, with several different willowherbs in the streambed, including *Epilobium nerteroides* in good numbers.

Saturday dawned fine and clear so we took the opportunity to look at the alpine on top of Black Birch. The most visually striking aspect of the area were the mats of *Celmisia* with *C. sessiliflora* very common at the top and *C. spectabilis* lower down. *Celmisia insignis*, the so-called Waihopai daisy, also occurred at the top producing attractive hybrids with *C. sessiliflora*. *Haastia pulvinaris* and *Raoulia bryoides* formed wondrous cushions, some punctuated with *Aciphylla monroi*. *Anisotome "prostrata"*, *Acaena inermis* and *Acaena saccaticupula* provided opportunity for "discussion".

Lower down *Acaena glabra* was found, beautiful golden plants of *Aciphylla aurea* in seed, *Ophioglossum coriaceum* growing in gravel and *Helichrysum parvifolium* in full flower. Lower still as we entered the subalpine zone at around 1150 metres, we found *Hoheria lyallii*, stunted mountain beech and various shrubby species.

On Sunday we walked partway up the Isis Stream through ecosystems similar to those in the Cam, finding many plants of *Carmichaelia carmichaeliae* and *Sophora prostrata*, but no *Pseudopanax ferox*. At the end of the day we explored the old hydro scheme for the station which is on the Isis between the road and the main Awatere River where the stream drops over rocks beautifully moulded by the water. Monday morning saw a few of us climb down into the Awatere and botanise the lowest stretch of the Isis from the bottom of the waterfall. Here *Coriaria arborea* and *C. sarmentosa* were side by side with their hybrids, and also *Sophora prostrata* and *S. microphylla* with their hybrids. After lunch by the Awatere with much discussion of the stones in the river bed and their olivine nodules, we drove back to Nelson, without having experienced any bad weather at all - a couple of frosts, but no rain.

Cathy Jones

April Annual General Meeting and Talk

We started the evening with an excellent potluck dinner and then held the AGM. The meeting was followed by a talk from Mike Bayley of Te Papa, talking about his research on the genus *Hebe*.

Mike gave us an overview of the genus worldwide. We learnt that *Hebe rapensis*, of French Polynesia, is the only hebe that does not occur in New Zealand, although both *H. salicifolia* and *H. elliptica* also occur in southern Chile. There are about 95 currently accepted species, which make up around 5% of New

Zealand's vascular flora. The highest biodiversity appears to be in the Nelson Lakes - Western Marlborough area, possibly because this is a mixing place for northern and southern species with Nelson-Marlborough endemics.

Mike took us through a wonderful collection of close-up and habitat slides of the nine informal groupings of *Hebe* in the Flora, mostly taken by Bill Malcolm. The groupings have been made on the basis of sinus presence and shape, leaf coloration, fleshiness and tootching, fusion of sepals, size of flowers and whether they are sessile or pedicellate, dioecy, whipcord architecture, and habitat. They provide a useful framework for identification.

Cladistic analysis of several related genera in Scrophulariaceae, undertaken by Mike, Phil Garnock-Jones and Steve Wagstaff, shows that the closest relatives of *Hebe* are *Parahebe* and *Chionohebe*, two genera also almost entirely confined to NZ. The closest relatives of these genera are a small group of Australian species in the genus *Derwentia*. The analysis has highlighted that the large and unwieldy genus *Veronica*, in which *Hebe* was previously included, is not a natural grouping and should probably be split into several genera. Neither do our *Parahebe* and *Chionohebe* genera form natural groupings, and more biosystematic work needs to be done here.

Mike speculates that the mountain-building phase of New Zealand during the mid-Tertiary (5-1.6 million years ago), provided habitat opportunities for the *Hebe* ancestor to radiate into a plethora of species. The cladistic work suggests that our alpine species are the oldest, and the lowland ones are relatively recent descendants.

Mike finished his talk with a wonderful computerised demonstration of the interactive *Hebe* key he is formulating, and how it works. He and his co-authors hope to publish the definitive illustrated monograph on *Hebe* in the near future, and the key will be supplied on a CD-ROM. Shannel Courtney

FORTHCOMING ACTIVITIES

June 17: Strides Bush, Motueka Valley - Sally Warren
June 18: Judith Petterson will talk about *Wahlenbergia*.
July 15: Pepin Island - Julie McLintock
July 16: Melanie Newfield will talk about weed surveillance
August 19: Pupū walkway - Shannel Courtney, Gaye Mitchell
August 20: Shannel Courtney- Filmy fern workshop

CONTACTS

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■ Canterbury Botanical Society

April Meeting: Peter Bellingham, a self-described "disaster ecologist", from Landcare Research, Lincoln, gave us a most interesting and entertaining talk entitled "Forests on shaky islands: how New Zealand's forest contends with disturbance". Peter gave an overview on the role of earthquakes, climate, and fire on forest dynamics and regeneration in New Zealand, illustrated with examples from his own research programme. We saw particularly graphic slides of earthquake damage in Basins Creek, Avoca River from the 1994 earthquake and learnt how individual "islands" of live trees moved downslope. Peter discussed the unpredictability of disturbances in time and space and the need for long-term research to fully understand how specific disturbances affect forest composition and biomass. The talk finished with a sobering discussion of how introduced plants, such as broom and gorse, with different life histories and plant attributes to native New Zealand plants, might change the natural regeneration trajectory of forests.

Claire Newell

April Field Trip: Otamahua/Quail Island. The 14 botanists who visited the island examined the 1982 and the 1998 to 2000 plantings, noting that some species in the older plantings (*Aristolelia serrata*,

Pittosporum eugenioides) looked drought-stressed. The present serious drought has killed some of the plants put in in 2000 (especially *A. serrata*, *Coprosma robusta*, *Griselinia littoralis*, *P. eugenioides*). However other species (especially *P. tenuifolium*, *Kunzea ericoides*, *Olearia paniculata*, *Myoporum laetum*, *Dodonaea viscosa*, *Phormium tenax*) have coped well. The 2000-planted individuals are being given water now to help them survive.

Looking ahead: a planting this year is in jeopardy unless about 5 cm of rain falls before the end of May [and it has - Ed.]. On the bright side, the 1998-99 plants are doing well in spite of the drought. Also, wherever there are bare areas under the canopies, abundant native tree and shrub seedlings are coming up. Young self-sown ngaio have grown as much as 2 m in three years.

Eight members of the group spent 2½ hours hand pulling seedlings of flowering currant in the oak wood. Many young native seedlings were evident in this area (*Coprosma* spp., *P. eugenioides*, *P. tenuifolium*, *Myrsine australis*, *Melicactus ramiflorus*, *Myoporum laetum*). Over summer 2000-01 major efforts have been made to remove all adult elderberry, hawthorn, currant, briar rose, boneseed and boxthorn and to cut off seed production. Only small areas of currant, boneseed and boxthorn remain. The main task in future will be to mop up young plants that reappear.
Colin Burrows

May Meeting: Fanie Venter from Nelson described his progress in revising the New Zealand species of *Dracophyllum*. The genus belongs to the Epacrideae, now regarded as a mainly Australian subfamily of the heath family, Ericaceae. Our two subgenera, *Dracophyllum* - represented by species such as *D. traversii*, and *Oreothamnus* - containing all our smaller leaved, shrubbier species, also occur in eastern Australia. A third subgenus is restricted to New Caledonia. Fanie began by illustrating flower and fruit characters that distinguish *Dracophyllum* from related Australian genera such as *Richea*, but also showed how much these characters vary within *Dracophyllum*, even within taxa that we have regarded as a single species.

With excellent slides showing habit and habitat, he then proceeded through all those taxa that have presented taxonomic difficulties (and most of us appreciate how pervasive these are). His revision will include a good number of new species in both subgenera, several of these being in that well-known hot-spot of biodiversity, Northwest Nelson, and several lumpings, but apparently not too many name changes, among familiar species. We keenly await his published results.
Peter Wardle

Autumn Camp: The faith of 13 members was rewarded with fine, sunny weather for the Autumn Camp which was held at Hanmer Springs over 11-13 May. The main object was to update species lists for the Forest Walk and "Arboretum" areas of the heritage forest that is currently the concern of the public campaign for conservation for public and scientific values. This 100 year old forest was originally established to trial trees mainly from Central Europe and western North America for production forestry, but has been invaded with both indigenous woody species and those of garden origin from the nearby township. Over 40 exotic and 25 indigenous woody species were noted along the Forest Walk. A single plant of *Celmisia spectabilis* drew speculation about its origin. The recent rains had brought out a range of fungi, and these were recorded. A more detailed report will appear in this year's journal of the Society.
Roger Keey

FORTHCOMING MEETING

Saturday 9 June: AGM and social gathering.

Secretary: Roger Keey, PO Box 8212, Riccarton, Christchurch. Ph: 03 364 2409
Email: wrtc@cape.canterbury.ac.nz

■ Wakatipu Botanical Group

Some botany has been managed this year although no planned trips were made. Barbara and Neill Simpson monitored known plants and searched for more of the endangered *Hebe cupressioides* in the Shotover, finding about 200 new plants, including a few seedlings. Another small population was found

by Arthur Borrell in the Poolnoon. Lyn Clendon accompanied Neill up the lake from Kingston to record the details of the *Olearia fragrantissima* growing there; they found six new seedlings. On another trip, this time into the Nevis Valley where Neill is monitoring *Myosotis glauca*, Lyn found two further populations of this tiny (mostly only 1 cm across), rare forget-me-not. This trebled the known number of plants here, which now stands at around 400 plants.

No field trips are planned for winter although there will be a work party on the Kelvin Peninsula walkway clearing and planting on Saturday 16th June from 10 am to 3 pm.

MEETING

Tuesday 12th June, 8 pm Presbyterian Hall, Frankton. Barbara and Neill will show slides and talk about the plants, scenery and people of Chile, plus a bit on Argentina.

CONTACTS

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Secretary: Lyn Clendon, Ph: 03 442 3153

■ Botanical Society of Otago

Remaining reports from the Otago and Wellington Botanical Society's Summer Field Trip

Newsletter 63 covered reports of visits to Pukerau Red Tussock Reserve, Green Lake Landslide, Hope Arm & Back Valley– Lake Manapouri, Clifden Limestone, Eldrig Tops, Otatara Reserve, Bushy Point and Threatened Plant Nursery, and South Borland Burn. The six remaining reports follow.

Mt Burns (30 Dec)

With only a light dusting of snow on the peaks on Saturday morning, but more likely within 24 hours, it was decided that the first field trip of the week would be to Mt Burns. With Prof Alan Mark as guide we drove to the Borland Saddle, then headed off up the hill to the left on foot. The track climbs for a couple of minutes through beech forest (where the lichenologists immediately peeled off from the rest of us), then opens out into tussock country.

Looking down into the Grebe Valley on our right, the rubble of the 12000 year old Green Lake Slip was quite obvious, when pointed out (geologists had missed it for years). It fills the whole Grebe Valley floor.

Mt Burns is home to a relatively rich Fiordland flora. Alan Mark told us of a PhD botany student, Lionel Solly, who came to this area to set up experiments to study the effects of deer vs takahe grazing on *Chionochloa* species. This was partly because of the easy accessibility of the site and partly because a large number of *Chionochloa* species grow on Mt Burns – species we saw included *C. crassiuscula* subsp. *torta*, *C. rigida*, *C. teretifolia*, *C. pallens*, and *C. ovata*. (One of Lionel's results was that *C. pallens* recovers much faster from takahe grazing, where the tussock tillers are pulled out from the root, than from deer grazing, where the leaves are cropped off half way down.)

As we reached the tarns, *Celmisia haastii* was pointed out as a snowbank indicator species, the yellow flowers of *Ranunculus enysii* were seen and the odd shaped flowers of *Psychrophila obtusa* (once called *Caltha*) were examined. No flowers of the latter could be found here, so it was not known if the plants were male or female.

Past the tarns, someone spotted a beautiful orange and brown coloured, shiny weta, about 50 mm long, that was trying to burrow into the tussocks. Nearby was *Celmisia holosericea*. This species rewards curious fingers with the lovely feel of its leaves – thick and firm, with silky smooth, white undersides. *Astelia linearis* is common all around these mid-level slopes but sharp eyes were needed to spot the red "jelly bean" fruits on the female plants. Further up above the lunch spot, clumps of *Aciphylla crosby-smithii* and *A. congesta* were growing, as was the shrub *Brachyglottis revolutus*. Smell the leaves of this plant next time you see it – it has a lovely strong smell, variously described by people I asked as sage, turpentine or lemon.

Reaching the ridge line where one can see east to Mt Eldrig, *Hectorella caespitosa* was pointed out. It is the only species in this genus in New Zealand and where it originated from is still debated – Prof. Mark suggests an Antarctic continent origin. *Euphrasia integrifolia* was also seen. This woody subshrub is one of only two *Euphrasia* species, out of the 27 species in New Zealand, to have entire leaves. The leaves under a hand lens look fleshy, a bit like an ice plant's leaves, someone said.

The snow from here up to the top of Mt Burns made further exploration up the ridge impractical so, after a quicker trip back down the slopes to the cars, we drove further along the Borland Road as far as the South Arm of Lake Manapouri. The highlight of the drive was undoubtedly the first spectacular view one gets over the cliff edge into the Grebe Valley from the lookout beside the road. Nearly everyone hanging over the lookout railings also spotted the peculiar rings of the reed *Eleocharis sphacelata* around the edges of the ponds on the valley floor.

Many people could have spent more time on Mt Burns, but at least we had relatively good weather for what we did see. More snow came in the night.
Beatrice Lee

Kepler and Borland Mires (31 Dec)

The botanic day started at the Manapouri airstrip where Prof Alan Mark described the structure and features of the Kepler Mire, part of the South West World heritage area. This mire is raised (6 m above surrounding area) is surrounded by a natural drainage channel (or lagg), and is gently sloping. The whole ecosystem is protected. The lagg, which has relatively fertile soils, had a cover of pasture grasses and sedges, several "hedges" of introduced broom, and a scattering of coprosmas (*C. propinqua*, *C. "tayloriae"*, *C. intertexta*). One plant of the unusual native grass, *Deschampsia caespitosa*, sparked the interest of the group.

On the mire, wire rush (*Empodisma minus*), manuka (*Leptospermum scoparium*), and *Dracophyllum oliveri* dominated. Other plants here were *Androstoma empetrifolia*, with its pretty red fruit, *Pentachondra pumila*, and two sundews, *Drosera binata* and *D. spathulata*. The common striped sun orchid, *Thelymitra cyanea* was in flower everywhere, despite the heavily overcast conditions.

On the way out a few people botanised a small manuka-covered moraine that stood above the level of the mire, and almost doubled their number of species. Of interest here were two ferns not seen before on the trip - adder's tongue (*Ophioglossum coriaceum*) and *Blechnum vulcanicum*.

After stopping off at the Mararoa control structure, where Alan Mark explained the recent history of the area in relation to the Manapouri hydro scheme, we travelled back to the Borland mire. Here Bastow Wilson explained the different structure of this mire. It had many of the same plants as the Kepler. One notable addition was the beautiful blue bladderwort, *Utricularia novae-zelandiae*.

The last area of particular interest was the edge of the mire, where bush was re-establishing among the bog pine (*Halocarpus bidwillii*). Some of the colonisers were mountain five-finger (*Pseudopanax colensoi*) lancewood (*P. crassifolius*) and elderberry (*Sambucus nigra*). On the ground there were several flowering herbs, including the little blue lily *Herpolirion novae-zelandiae*, and the white-flowered *Oreostylidium subulatum*.
Gael Donaghy

McKercher Stream (2 Jan)

After a brief introduction to the area from our guides for the day, Brian Rance and Geoff Rogers, we headed off across pasture in drizzle towards distant shrubland in the Takitimu foothills. In the first part of the sparse shrubland area stock were still grazed. It was dominated by *Coprosma propinqua* and as a result we were treated to rich turf communities containing many introduced species but also a wide selection of native herbs including *Mazus radicans* (in flower), *Nertera setulosa*, *Hydrocotyle* species and *Centella uniflora*. The denser remnants contained orchids such as *Pterostylis areolata*, still in flower, and as the rear of the grazed area was approached the first of the special plants were encountered. These included *Coprosma virescens*, *Plagianthus regius* and *Olearia fragrantissima*. Several stops were made to explain the history of the area and theories on the history of the vegetation.

At the main valley stand we were suddenly in dense shrubland dominated by *Olearia fragrantissima*, kowhai, broadleaf and *Coprosma virescens* with emergents of *Plagianthus regius*, matai and huge lemonwood (stems nearly 2 m in diameter). Near the lunch spot there was evidence of past logging of small totara. It seems that the area was once rich podocarp forest lacking in beech; this had been disturbed 150 or so years ago, giving rise to the small totara which were then logged perhaps 50-80 years ago.

From here the party began to fragment with some returning to the vehicle and the remainder climbing to about 750 m to see *Hebe annulata* in the formerly grazed shrublands. Enroute a wide variety of alpine herbs were noted, the most frequent being the strongly smelling *Gingidia decipiens* and the spiny *Aciphylla aurea*. Others of interest included *Schizaelema nitens*, the bronze *Celmisia traversii* and *Anisotome haastii*. After a break on the saddle the party split again with some returning by an easier? route and the majority climbing for a long ridge route home. New plants recorded here included *Hebe hectori*, *Kelleria dieffenbachii*, *Pimelea pseudolyallii*, *Myrsine nummularia* and hybrids of *Coriaria sarmentosa* and *C. angustissima*.
Graeme Jane

Dean Forest and Giant Totara (5 Jan)

A much smaller group visited Dean Forest/Dean Burn and Motu Bush on Jan 5th, because a brilliant blue sky that morning, something we had not seen all week, drew a break-away group up to the alpine pastures of Mt Eldrig.

Down country a bit, turning right past the limestone of Clifden towards Lake Hauroko and then right again, the rest of us found ourselves heading back towards Lake Monowai. I later learned that in earlier days this was the old coach road to Lake Monowai. Today the road ends at the giant totara reserve. Why the old coach road ceased to be is a puzzle as it appears to run roughly parallel to the present road to Lake Monowai. The expanse of Dean Bush luxuriously covers the surrounding low-lying hills. The area of interest for us was the bush margin and the wetland that lay therein.

Of the bush margin, most noticeable were several large mature specimens of weeping matipo, *Myrsine divaricata*. This for me was the plant of the week and I have not before seen such large mature trees. Interesting *Coprosmas* included *C. "tayloriae"*, *C. wallii*, *C. obconica* and some stunning *C. rubra*.

I now view these divaricating shrubs somewhat differently since I heard a visiting Botanical Society of Otago speaker expound (and demonstrate – his mimicry of a browsing moa was impressive) his theory that the divaricating habit of these species is a survival mechanism against ravaging ratites! Of the grasses, *Hierochloa redolens* was most memorable, with its sunlit golden glumes.

Of the wetlands Brian Rance kindly sent the following summary: "The *Carex* sedgeland was generally dominated by *Carex sinclairii*, with some *C. geminata*, *C. secta*, *C. maorica*, *C. tenuiculmis* (status: vulnerable), spike rush (*Eleocharis acuta*), *Coprosma* sp. aff. *intertexta* and occasional herbs including *Epilobium pallidiflorum*, *Bulbinella angustifolia*, *Potentilla anserinifolia*, *Celmisia graminifolia* and others. The grass *Deschampsia caespitosa* (status: vulnerable) has also been recorded though we didn't see it there! Other parts of the wetland were dominated by red tussock or flax."

The day ended with the giant totara trees, *Podocarpus hallii*. They were truly awesome and the largest ones I have seen. It took seven of us linking hands to surround the girth of one. There are just three (I think) left of these forests giants. How and why they were left makes for interesting speculation. The



area was boardwalked which protected the tracks. It is a pity that the giant totaras weren't so favoured.

It was sad to see where the outer layers of bark had been stripped off their lower trunks. Memorable too was the blood red trunk of a nearby Matai, *Prumnopitys taxifolia*. Audrey Eagle took a stunning slide of this, which she showed at the March BSO meeting, along with other visual treats from the summer trip.

Robyn Bridges

The giant totara encircled by 7 people. From left to right Jill Goodwin, Robyn Bridges and Tony Aldridge. Photo by John Knight.

'Pyramid' Lake (6 Jan)

While climbing Mt Burns on the first day, and again from Borland Saddle later on, we saw far below us an immense tussock basin, with tarns mirroring the steep, forested slopes above. A hairpin road led to the start of the track to Green Lake. This led through a short stretch of silver beech forest, grading at the margin into small-leaved *Coprosma* species. Here we looked out over a sea of red tussock with hebes scattered on the drier, rounded hillocks, and all around the forest frost inversion line very clearly drawn. We spread out, squelching over this unique landform, some bent to the ground botanising and some bent on botanising the biggest tarn ('Pyramid Lake') while having their first swim of the year. Ted found a *Myosotis* in the process.

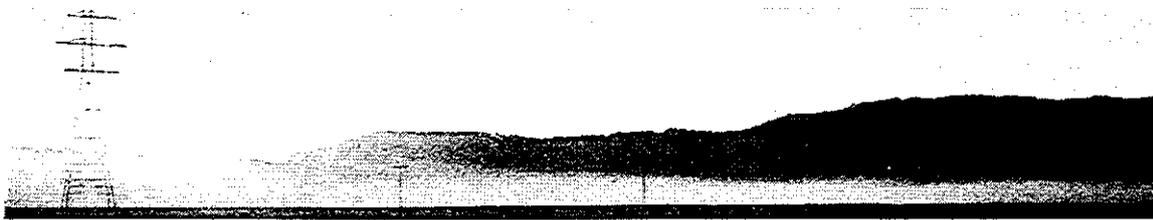
A very striking *Ranunculus* with jet black, hairy stems was in flower beneath the tussocks. I believe it to be *R. multiscapus*. Further south and on a slightly higher level were sphagnum tarns with spectacular colours, fringed by silver beech and wet-loving shrubs such as a dainty, sprawling *Dracophyllum* (prostratum?) and a pale green, tousled tussock which I believe is *Chionochoa crassiuscula* subsp. *torta*.

A population of flowering *Olearia* shrubs puzzled us then and later, when, with microscopes, we tried to identify it. Graeme was certain it was *O. bullata*, but Pat and I couldn't see why, since it didn't have bullate leaves. Afterwards we had to agree with Graeme, because it didn't key out to be anything else, and bullate leaves are not, after all, a key characteristic.

Barbara Mitcalfe



'Pyramid' Lake, at the start of the track to Green Lake, was formed by the Green Lake landslide. *Photo by Alan Mark.*



Misty farewell view from Borland Lodge on the last day. *Photo by Robyn Bridges.*

February Meeting: Divaricating plants - defence against toothless browsers?

William Bond's namesake, James, liked his martinis "shaken but not stirred". William, as guest speaker at the Botanical Society of Otago's Annual General Meeting (14 February), both shook and stirred (as well as amused and fascinated) his audience.

Divaricating shrubs are characterised by small leaves, wide branch angles, and interlacing branches that produce a cage with fewer leaves on the outside of the shrub than within. There are two main hypotheses on the evolution of divaricating plants: the first is the moa-browsing hypothesis and the second is climatic. The browsing hypothesis cites the absence of mammalian browsers and their substitution by ratite birds (moa) and the relatively high frequency of divaricate forms (from a variety of plant families) in New Zealand. It further notes that the mature foliage of trees with divaricate juvenile forms is produced above moa height.

The climatic theory explains the divaricate form as a response to a cold and windy environment, with the bush producing a favourable microclimate within the interlacing network of branches. The change to a mature form is explained as a response to the warmer air above a colder inversion layer that is 2- 3 metres deep. Avid supporters of each hypothesis tend to be resolutely unshaken but active in stirring: theories abound, but experiments are relatively few.

We were treated to some experimental findings. Divaricating shrubs were presented to mammalian (goat) and avian (emu) browsers. The examples showed us that goats eat anything and everything: divarication offered no protection at all. Not all of the proffered divaricates were resistant though, some

common ones (e.g. *Coprosma propinqua*) could be effectively browsed by emus by a stripping action. The ones that were most resistant were the wiry (fili-ramulose) divaricates with zig-zag stems - when they were grasped in the emu's beak they sprang back as soon as the hold was relaxed. This explains how some divaricate plants may have been resistant to browsing by moa, but what about the rest? Is there still hope for the climate hypothesis?

As a physiological ecologist, I am drawn to the climate hypothesis, but William Bond counts me as an ally, as he reckons that my (and my students') work has offered more support to the browsing hypothesis than that of any other proponent of the climate hypothesis. Nutrient-rich cryptic dwarf mistletoes on divaricating shrubs mimic their hosts, so they would tend to be overlooked by the moa, whereas non-cryptic mistletoes on the same shrubs are nutrient-poor and likely to be avoided. Mistletoes on trees above moa height tend to be as nutrient-rich as their hosts are. Divaricate juvenile forms of trees are not consistently more frost resistant, and tend to lose water more readily, than their mature forms.

My remaining hope for the climate theory, apart from the withdrawal of William Bond from this area of study, is that the microclimate within the shrub may enhance photosynthesis by providing a slightly warmer and more humid climate that allows stomatal opening and enhances photosynthesis. Time, and William Bond, will tell.

Peter Bannister

And a bit more

As an interesting coincidence the principal protagonist in the "Divarication Debate" - from the climate perspective - Matt McGlone, a senior Landcare scientist, was in Dunedin in May to give the Royal Society of New Zealand's Cockayne Memorial Lecture for 2001. He talked to an audience of nearly 200 on "Reconstructing the future: Past and present influences on the vegetation cover of New Zealand and future trajectories".

Before his talk I interviewed Dr McGlone to see whether, in the light of William Bond and Bill Lee's recent experiments, he thought that the presence of browsing moas had had any influence on the development of vegetation cover in New Zealand. Matt was adamant that he was not even going to mention the word 'moa' in his talk. He gave two reasons for doubting their influence. One was that the moa record went back for more than 70 million years, whereas the evolution of most of the divaricating forms appears to have only happened relatively recently, in the last 2.5 million years, a period of great climatic change. The other was that so far the 14 moa gizzards that have been examined, from the 3 largest species of moa only, have contained fragments of tough twigs, as well flax and cabbage tree leaves, all of which appear to have been cut, not tugged.

Apart from this notable omission, Dr McGlone gave a fascinating and thought-provoking address, extrapolating from his considerable body of work as a palaeo-ecologist.

Allison Knight

February Field Trip: Kennedy's Bush

Helen Clarke, QEII representative for Coastal Otago, was the leader for the day and a very small group comprising Nola, Bastow and myself, set off for Taieri Mouth.

Our first stop was Brighton, to look at a saltmarsh that is likely to be fenced from stock in the near future. Several spoonbills were present. The water level was much higher than on Helen's previous visit in November and many of the flowering *Cotula coronopifolia* and the smaller *Cotula dioica* were submerged. Another submerged plant was *Mimulus repens*. Other plants we found were the creeping herb *Lilaeopsis novae-zelandiae* with its unusual cylindrical septate leaves, *Lachnagrostis* in drier areas, *Selliera radicans*, small clumps of a salt grass, *Puccinellia* (either *P. distans* or *P. stricta*), with fine, bluegreen leaves, and *Juncus pallidus*.

The saltmarsh is only a few minutes drive from Brighton beach, but we were unsure whether or not it is tidal and there were far too many sheep droppings to want to do a taste test. So we walked to the beach to find that sand deposits had closed off the exit. It seems that periodically, when the water levels in the saltmarsh get too high, the sand bar is cleared and the salt marsh becomes tidal again.

We then drove on to Taieri Mouth and took the Waihola Road to Norman and Dorothy Kennedy's farm. As we approached the house we could see two stands of tall rimu poles across the valley. The Kennedys have a QE II covenant on 50 ha of bush situated in two steep sided gullies. The bush was fenced in 1991 and has not been grazed by farm stock since - though goats have been a problem. Norman joined us on our 3-hour walk and he was able to tell us a lot about the bush and how it is managed. We were impressed with the tracks Norman has made. The steps cut into the steeper slopes made the walking easy going, so we could concentrate on the plants.

Helen provided copies of Ralph Allen's 1985 vegetation survey of the Kennedy property, but the task of a proper update of the species list was beyond the four of us. As soon as we climbed over the stile and entered the bush the regeneration was evident - a variety of *Coprosma* species and ferns, and seedlings of marbleleaf, pokaka (only a few), clematis, mahoe, lemonwood, miro, totara and matai. There were lots of mature rimu and quite a number of tree ferns. White flowering rata vines, *Metrosideros diffusa*, were common in places, and some of the vines growing up the rimu were as thick as my wrist. While we had lunch under a giant rimu - one of thousands on the property - Helen got out her polystyrene bird squeaker. The bellbirds were quite put out by this "invader" and soon there were four or five bellbirds all calling noisily, then a tui joined in and even a tomtit came to investigate the racket.

We saw *Corybas* and patches of *Pterostylis* orchids in damp spots beside the edge of the track, and at the bottom of the gully Norman showed us what he believes are the remains of a sawmill - two notched iron wheels and a water race leading to a rectangular pit. It was fascinating to walk through one stand of rimu poles, most were about 15 -17 m high, very closely spaced and of a similar trunk diameter. Ralph Allen estimated stem densities of 1000-2500 stems/ha. Interesting to speculate on events that might have led to such a large number of rimu trees of the same age.

Goats are a bit of a problem in the bush and we saw goat droppings and browsed crown fern and mahoe. Broadleaf was being browsed by possums, and bait stations had recently been set up by Pest Services as part of the Tb control programme. I was surprised at the absence of weed species - just one small nightshade on the track and an elderberry at the creek. There was some gorse along one perimeter fence that provided low shelter and will eventually be taken over by kanuka.

Our afternoon tea stop was by a huge pokaka that had recently blown down. The cut sections of trunk made good seats. Then we climbed up the gully, over the stile, and, as I headed across the grassy paddock towards the vehicle, I turned round to see Nola and Bastow on their knees, peering into the grass. To everyone's surprise this exotic grassland supported a dense carpet of turf plants below the pasture grasses.

Moira Parker

April Field Trip: Awakiki Bush and Otanomomo

A small group of six travelled south to visit these areas, ably led by Kelvin Lloyd. At Otanomomo we were joined by Noeline and Donald MacLean who own bush on the south edge of the Awakiki Reserve and have it covenanted with Q E II National Trust.

First stop was at Otanomomo Scientific Reserve, which is easily seen and often admired from SH 92 on the way to the Catlins. I was keen to see inside this interesting looking bush. Alas, as Kelvin had warned us, it was an exercise in "spot the most invasive weed" and there were many to choose from! We were alarmed to find, in the north west corner, Chilean flame creeper (*Tropaeolum speciosum*) abundant but also holly, elderberry, *Solanum dulcamara*, *Daphne laureola*, and very dense blackberry. Below the towering matai and kahikatea in this area we found very little in the way of healthy undergrowth.

On the way to Awakiki Bush we made a quick check on another edge of Otanomomo for *Olearia hectori*, but were unable to locate any.

Awakiki Bush is reached via a farm track and just prior to entering the bush the trail passes by a derelict farmhouse and the remains of a garden. A very large ivy smothers part of the back of the house and hawthorn trees mark the garden boundaries. From the edge the bush looks degraded and scrappy but, surprisingly, inside it is significantly more intact and healthy looking than Otanomomo.

The area has been fenced for about nine years now and has a small loop track allowing easy access to a large totara. The obvious ramification of the recent fencing is an abundance of *Pittosporum eugenioides*, *Aristotelia serrata*, *Myrsine australis*, and to a lesser extent *Melicactus ramiflorus*, *Pittosporum tenuifolium*, *Cordyline australis* and *Carpodetus serratus*, all of which provide a very green effect at one to two metre height. This new understorey was really showing the effects of lack of moisture, with droopy flaccid leaves. Always towering above are large totara, miro and matai and the occasional old *Griselinia littoralis*.

Lunch stop was just inside the bush, where Moira and Allison set to try out the *Acaena* key. They discovered we were sitting on *Acaena juvenca*. The barbed fruit stuck to our clothes.

The largest *Podocarpus totara* allowed five people to "hug" it arms outstretched. The *Hoheria angustifolia* juvenile was checked out for its filiramulose habit. Mature trees of miro and matai were found for comparative identification. We observed the difference between *Neomyrtus pedunculatus* and *Lophomyrtus obcordata* and had many discussions on the small leafed shrubs. Pat Enright ventured in large circles checking out the plant list supplied by Kelvin, while Allison peered through her lens at the lichens, which included 5 different species of *Ramalina*. Kelvin showed us where Chilean flame creeper has been found.

Once the circular track was completed Kelvin led us to a drier ridge where the tall podocarps did not dominate. Here we discovered how cryptic small seedlings of *Pseudopanax ferox* are, and took, for most of us, our first look at mature plants of this species. Other treats were the tiny dwarf mistletoe, *Korthalsella lindsayi* on *Melicope simplex*, the one specimen of *Olearia fragrantissima* found in the bush and the fern *Pellaea rotundifolia* at its southern limit. On the way out Kelvin pointed out *Coprosma virescens* on the bush edge.

A great day, and thanks to Kelvin for sharing his knowledge of a very important remnant of totara-dominated forest in lowland Otago. One was left, however, pondering the threat posed by the many invasive weeds within and surrounding the bush.

Helen Clarke

May Field Trip: Witherow & Birch Islands

Recently-protected Birch Island (7 - 9 ha, depending on river flow!), in the Clutha River, downstream from Beaumont, has been the subject of much political debate. At the centre of this debate have been environmental columnist (ODT), Dave Witherow, and local ACT MP and party spokesperson for conservation/environment, Gerry Eckhoff. In a letter to the editor Gerry challenged ecologists to "visit another last remaining example just offshore from my property in the Roxburgh Gorge". He proposed the name "Witherow Island" for it. We took up Gerry's challenge. The chance to botanise an island that was previously unknown to us proved hard to resist.

Roxburgh locals transported thirteen BSO members, plus three Forest & Bird personnel from the Upper Clutha Branch, and Gerry, to the island on Saturday 19 May 2001. Witherow Island (G43 233 213) is about 500 m long and very narrow, with two much smaller islands off its northern end. The island was created when the reservoir behind the Roxburgh Dam was filled about 45 years ago. The island has been burnt within the last 25 years, to destroy *Nassella tussock*. Although no live rabbits were evident on our visit, dead remains provided abundant evidence that they have had a part in modifying the island in the recent past.

The rocky island, with steep cliffs on its eastern margin, is mostly diverse grassland with regenerating shrubland of kanuka, *Coprosma propinqua* and *Helichrysum lanceolatum*. Woody weeds such as briar, willow, broom and gorse are present, with the enclaves of native shrubland often growing amongst the many rock outcrops. Lichens abound on the island growing on rock, vegetation and the ground. Among the latter were a *Siphula coriacea* which is under threat from *Hieracium*, and an unusual, unattached *Xanthoparmelia concomitans* not before recorded in the OTA herbarium.

A total of 64 plant species were found, of which 38 are native species typical of the drylands of Central Otago. In addition 27 species of lichen were recorded. Within the mainly exotic *Rytidosperma racemosum* grassland, the dead remains of three orchid species were common. A visit to the island in early summer

would elucidate their identity, and also bring to light many herbs and grasses that by the time of our visit were undetectable.

Native tussocks of *Elymus apricus*, *Dichelachne crinita*, fescue, blue tussock and silver tussock were reasonably common together with the dryland ferns *Cheilanthes humilis* and *Pellaea calidrupium*. The exotic thyme, mouse-ear hawkweed and stonecrop were also widespread on the island. One *Nassella* tussock (*Nassella trichotoma*) was found and removed.

Speckled skink and common gecko were found inactive under rocks, together with species of darkling and carabid beetle. It was exciting to see the survival of remnants of native dryland flora and fauna, especially the grasses, lichens, small vertebrates and invertebrates on this small island. As it would be relatively easy to keep it free of mammalian browsers and predators it could become a valuable refuge.

Thank you, Gerry, for bringing it to our attention.

Later in the afternoon we drove to south of Beaumont and were transported to Birch Island, which is crowded with tall trees, appropriately enough two species of beech, black (mountain) and silver. Its understorey is dense, and rich with shrubs, seedlings, ferns, herbs, lichens and mosses. Fallen logs are everywhere, slowing the journey and providing moist habitat for the noteworthy invertebrates for which the island is famous, such as peripatus and springtails.

We traversed the island from one end to the other, noticing the abundance of broadleaf, matai, miro, totara, kahikatea and pokaka seedlings together with under-storey species *Pseudopanax anomalus*, *Corokia cotoneaster* and *Cyathodes juniperina*. The significantly higher rainfall, and the decreased browsing pressure here nurture the abundance of forest fungi, mosses, lichens and ferns. Although fallow deer can swim to Birch Island, they appear to have little impact on the island's vegetation. This makes Birch Island important as a much less disturbed forest ecosystem than the surrounding forested slopes.

Within half an hour we had traveled between two starkly contrasting ecosystems – both islands in the Clutha, but that is where the similarity ended. Brian Patrick

FUTURE MEETINGS AND FIELD TRIPS

Wednesday 27th June: 7 pm. Kelvin Lloyd talks on Fabulous Fiordland

Seminar room, Zoology Annexe, Gt King St, car park by Dental School. Side door behind the Glassblowing Unit. Supper.

Saturday 30th June: 12.30 pm. Field trip to Wairongoa Springs. Austen Banks will give us a tour of this historic holding on the Taieri Plains, once the basis of the Thomson bottled drinks empire, and now preserved under a QE II covenant. The covenant includes extensive plantings from early settlement days, including one of the largest groves of kauri in the South Island. Meet at the Botany carpark, 464 Gt King St at 12.30 pm to car pool, or at Wairongoa at 1pm.

Wednesday 25th July: 12 noon. Combined BSO/ Otago University Botany Dept seminar. Neill Simpson will talk and show slides on "Alpine and other spectacular plants from Chile and Argentina". Union St Lecture theatre, upstairs, corner of Union St. West & Gt King St. There will be an opportunity for BSO members to go out to lunch with Neill afterwards.

Saturday 21st July: 1.30 pm. Trip led by Tom Myers. Tour of the propagation area of the Botanic Garden, plus a look at the International Seed Exchange and the Garden Database. Meet at the Botanic Gardens Visitor Centre, Lovelock Ave.

Botanical Society Summer Field Trip, 27 December - 5 January: Twizel area. Keep these dates free.

In addition, every Wednesday at 12 noon Botany Dept Seminars are given by students and invited speakers. These are held upstairs in the Botany School Annex (the big red brown building), Cnr Union St West and Great King St. For details please contact the Botany Dept. Ph: 03 479 7579 or see their webpage (<http://www.botany.otago.ac.nz/bsa>)

Chairman: Bastow Wilson Email: bastow@otago.ac.nz

ANNOUNCEMENTS

■ **Moss Foray, 22 - 27 November, 2001.**

The 17th John Child Bryophyte Workshop will be held in the Wairarapa based at the Tauherenikau Race Track, near Featherston, an hour north of Wellington. For more details contact Barbara Polly, Te Papa, PO Box 467, Wellington. Email: barbarap@tepapa.govt.nz

NOTES AND REPORTS

Notes

■ **New species of kowhai named**

After Landcare /Manaaki Whenua media release, May 2001.

The recent revision by Peter Heenan (Landcare Research), Peter de Lange (Department of Conservation) and Aaron Wilton (Landcare Research) (Heenan 1998; Heenan et al 2001) recognises eight species of kowhai in New Zealand. Two are new to science, two are old names which have been reinstated, and one is a new combination.

The eight species are:

Sophora tetraptera, the large-leaved, North Island tree; ***Sophora prostrata***, the sprawling, small-leaved South Island shrub; ***Sophora longicarinata***, a shrub confined to marble and limestone areas of northern Nelson and western Marlborough; and five species in the *Sophora microphylla* complex, which previously covered everything else in between. These five species are:

- ***Sophora microphylla***, common tree, throughout the North and South Is., now regarded as distinct from the South American kowhai, and therefore endemic to New Zealand;
- ***Sophora godleyi*** n. sp., found growing on sandstone, siltstone and mudstone in areas like Rangitikei, Wanganui, Taihape and eastern Taranaki;
- ***Sophora molloyi*** n. sp., which grows on dry, exposed headlands around Cook Strait, Kapiti Island, and parts of the lower North Island. Like its namesake, Dr Brian Molloy, it is "tough as old boots and hardy in all extremes of weather";
- ***Sophora fulvida*** n. comb., which grows on basalt and other volcanic outcrops in Northland, Auckland and the Waikato, and has hairy leaves;
- ***Sophora chathamica*** reinstated name, which grows mainly in western coastal areas of the northern North Island, and also around Wellington and on the Chatham Islands. Dr Heenan speculates that this species does not occur naturally in Wellington and the Chathams, but was moved there around 300 years ago by the Waikato and Taranaki Maori, who regard it as a taonga.

Hybrids also occur.

References

- Heenan, P.B. 1998: Reinstatement of *Sophora longicarinata* (Fabaceae) from northern South Island, and typification of *S. microphylla*. *New Zealand Journal of Botany* 36: 369-379.
- Heenan, P.B.; de Lange, P.J.; Wilton, A.D. 2001: *Sophora* (Fabaceae) in New Zealand: taxonomy, distribution, and biogeography. *New Zealand Journal of Botany* 39: 17-53.

■ **Possum control in a limited forest area: in praise of an individual's contribution**

A.D.Thomson, Centre for Studies on N.Z. Science History, 5 Karitane Drive, Christchurch 8002

I have given an outline of attitudes to the possum in New Zealand by Dr Leonard Cockayne and other notables in the 1920s (3,4), and now briefly record an individual's effort at possum control in a small area of coastal broadleaf forest at Waikanae.

Mr Errol Hardy, a graduate of Lincoln Agricultural College (1949) and a retired teacher and Forest and Bird Kapiti Branch committee member, lives with his wife Wyn beside the Hemi Matenga Memorial Park

Scenic Reserve on the hills overlooking Waikanae. In 1990 Mr Hardy set out to reduce the population of rats, possums, mustelids and feral cats, especially in the area around the walking tracks on the lower slopes of the Reserve. Mr Hardy disposes of the trapped possums by burial in his garden and a post-hole digger is the implement used. His garden now has some 800 possums and several hundred other pests buried there (2).

Mr Hardy reports (2) that the first evidence of change for the good in the vegetation was shown within six months by the reduction in possum-browsing damage on mahoe leaves. After about two years recovery of the kohekohe was evident: flowers survived to produce fruit for pigeon food in winter, the outer fringe of leafless twigs were no longer evident, and scratch marks left by climbing possums were gone. Other signs of a diminishing possum population are that the only two large northern rata trees now flower heavily each year and the one remaining cluster of *Fuchsia* shrubs is thriving. Mr Hardy also comments (2), "During the nesting season we now enjoy a prolonged dawn chorus from our tui".

After three years the Hardy possum control programme was superseded by a DOC programme over the 330 ha reserve, and in 1996 1500 possums were trapped (1), though Mr Hardy "beat them to the gun" by three years, and his control work has been more intense near houses and close to the popular walking area. He reports (2) that all of the only 25 possums he trapped in 2000 were in Timm's traps located beneath the two rata trees. Traps set beneath other species have caught nothing and various bait stations are now seldom emptied. However, on 6 May 2001 Mr Hardy reports (pers.comm.) catching 5 possums recently, indicating that re-infestation is a constant threat.

This note is to recognize what can be achieved by one dedicated individual in possum control in a limited forest area.

References

1. Anonymous 1996: Possums galore. *Forest and Bird* No.279: 12. 2. Hardy, E.L. 2001: Possums and other pests. Report to A.D.Thomson, 7pp. 3. Thomson, A.D. 1993: Leonard Cockayne's view on the possum was wrong. *N.Z. Botanical Society Newsletter* No.33: 7-8. 4. ____ 2000: The possum in New Zealand as viewed by authorities in the 1920s. *N.Z. Botanical Society Newsletter* No.62: 16-18.

■ The status of Waitangi Tribunal Claim 262 "The Indigenous Flora and Fauna Claim"

The original statement of claim was received by the Tribunal on 9 October 1991. The first amended statement of claim was received in September 1997.

In the latest version it states (in clause 2.5) outcomes that are desired as a result of the claim. There are 8 parts with the most important being that:

- "Te tino rangatiratanga o te Iwi Maori incorporated and incorporates: Decision-making authority over the conservation, control of, and proprietary interests in natural resources including indigenous flora and fauna *me o ratou taonga katoa*;
- (d) The right to control and make decisions about the propagation, development, transport, study or sale of indigenous flora and fauna; "

Copies of the 1997 version can be obtained from: Waitangi Tribunal, PO Box 5022, Wellington.

Many Iwi have been presenting supporting evidence, some of it confidential, to the Tribunal. There have been meetings at Nelson, Rotorua, Tokomaru Bay, and Ruatoria as well as earlier ones in other parts of the North Island.

Once all traditional evidence has been presented by Iwi Maori then third parties (non-Maori) will be able to present evidence, but only in Auckland and Wellington. It is hoped that this will occur later in 2001.

Both Maori and Non-Maori will benefit from the developments and progress to be made from studying the indigenous flora and fauna. The requirement now is a partnership so that there will be enhanced protection and conservation of the indigenous flora and fauna.

Ronald C. Close, 38 Hinau Street, Christchurch 8001. closer@plantwise.co.nz

■ Taumarunui Ecological District Protected Natural Area Programme Survey

Sarah Beadel, J.L. Nicholls & C.J. Bibby, c/- Wildland Consultants Ltd, P.O. Box 7137, Te Ngae, Rotorua. Email: wildland@wave.co.nz

Taumarunui Ecological District spans three Department of Conservation conservancies: Wanganui, Waikato, and Tongariro/Taupo. Because little was known on the representativeness of the current protected areas network, the Wanganui Conservancy of the Department of Conservation (DOC) rated the need for a New Zealand Protected Natural Areas Programme (PNAP) survey of the Taumarunui Ecological District as "high". The survey was carried out during the winter and spring of 1999.

Taumarunui Ecological District is one of two ecological districts in the King Country Ecological Region. It comprises over 270,000 ha of hill country in the upper Whanganui River System and is situated immediately west of the volcanic ring plain. Its moderately steep to steep mudstone and sandstone hills are almost entirely in the lowland bioclimatic zone. Soils derived from a mantle of Taupo ash and riparian pumice terraces are widespread. The climate is generally temperate with mild humid summers and wet cool winters.

The PNAP report that was subsequently published (Bibby *et al.* 2000) provides a synopsis of the physical and ecological character of the Taumarunui Ecological District, an overview of the survey methods used, a summary of the remaining indigenous vegetation, and an inventory of features currently protected and areas that warrant protection (Recommended Areas for Protection; RAPs). Descriptions and site maps are provided for all RAPs.

Vegetation History

The vegetation history of the Taumarunui Ecological District has been described by Clarkson *et al.* (1986), Cooke (1981), Department of Lands and Survey (1977), Grace (1959), Kelly (1949), McKelvey (1963), Nicholls (1990, 1991), and Soar (1986).

Before humans came to New Zealand, the ecological district had been covered entirely by native forest since the end of the cold Pleistocene climate c. 15,000 years ago. Whatever local destruction was caused by the Taupo volcanic eruption, analysis of pollen in mires on the Hauhungaroa Range has shown that forest was becoming well re-established 400-500 years later. Maori had become permanent inhabitants at least as early as AD 1500, but they lived only in scattered small clearings on tillable river flats and terraces. Probably 90 percent of the forest remained intact until near the end of the 19th century. Before then, very few Europeans had entered the district, and only one is known to have become resident.

A little more than a century ago, the ecological district contained several types of unmodified forest. A very uniform association of occasional large rimu (*Dacrydium cupressinum*) and northern rata (*Metrosideros robusta*) emergent over abundant tawa (*Beilschmiedia tawa*) and frequent hinau (*Elaeocarpus dentata* (incl. *E. d.* var. *obovatus*)), rewarewa (*Knightia excelsa*) and kamahi (*Weinmannia racemosa*) grew on the hills west of Benneydale and in most of the Ohura and Retaruke catchments, and pukatea occupied gullies at lower altitudes. Kamahi was more prominent on ridge tops, with some miro (*Prumnopitys ferruginea*) and Hall's totara (*Podocarpus hallii*). Matai (*Prumnopitys taxifolia*), totara (*Podocarpus totara*), kahikatea (*Dacrycarpus dacrydioides*), and maire (*Nestegis* spp.) occurred on the very minor areas of colluvial and alluvial soils, with distinctive understoreys of houhere (lacebark; *Hoheria populnea* var. *lanceolata*), mahoe (*Meliclytus ramiflorus* subsp. *ramiflorus*), manatu (*Plagianthus regius*), and titoki (*Alectryon excelsus*). North-west and south of Matiere and about the Ohura and Retaruke river confluences with the Whanganui River, the rimu-northern rata-tawa forest type occurred in gullies, interspersed with hard beech (*Nothofagus truncata*), and locally black beech (*Nothofagus solandri* var. *solandri*), on steep, infertile ridges.

Podocarps were formerly far more common in the forest than now, reaching from more or less the line of the present main trunk railway eastward to the crest of the Hauhungaroa Range. Very dense mixtures of large and very tall rimu, miro, matai, totara, and kahikatea occurred on alluvial pumice terraces, on thickly pumice-veneered adjacent hillsides and shallow valleys, and on the lahar plain. Unless overlain by fine alluvial pumice, coarse pumice terraces are drought prone, and would have been dominated by

totara and/or kanuka. Beyond the terraces were moderately dense podocarp stands with variable abundance of northern rata, tawa, hinau, rewarewa, black maire (*Nestegis cunninghamii*), white maire (*Nestegis lanceolata*), and kamahi, and significantly fewer kahikatea. Totara and rewarewa became absent above about 650 m, the former replaced by Hall's totara. Tawa and hinau became small and rare nearing a maximum upper limit of 800 m a.s.l., whereas kamahi became more prominent. Above that altitude was submontane forest of occasional to locally frequent Hall's totara and scarcer miro over abundant short kamahi, kanuka, kotukutuku (fuchsia; *Fuchsia excorticata*), horopito (*Pseudowintera colorata*), toro (*Myrsine salicina*), and locally abundant tawheowheo (*Quintinia serrata* (incl. *Q. acutifolia* and *Q. elliptica*)).

By AD 1500 or even earlier, Maori had established a permanent presence within Taumarunui Ecological District. They occupied clearings on tillable river flats and terraces, predominantly centred on the Whanganui River, and did not penetrate far inland mainly because of the inaccessibility and ruggedness of the region. At the time of European arrival almost all of the forest cover was still intact.

The first Europeans to arrive around 140 years ago were missionaries, but it was not until the early 1880's that European settlement began and settlers cleared land for sheep and cattle farming. Construction of the North Island Main Trunk Railway reached this district from the north about 1890. The first train arrived at the then hamlet of Taumarunui in 1903 and the line reached Raurimu in 1906. From then on conversion of land from forest to pasture proceeded rapidly. However, grass establishment in the steeper country of low natural fertility was unsuccessful and without the use of artificial fertilisers, these areas soon reverted to fern and scrub. By the early 1920's, most of the present roads had been constructed and a branch railway from Okahukura had reached Tokirima. Indigenous forest in the Ohura and Retaruke catchments had been cleared to the present extent, but the heavily timbered tracts east of the main trunk railway were only marginally affected.

Some forest was simply burnt. However, sawmilling was very common and, in the earliest pioneering years, was often carried out by settlers as a step before clearing on their holdings. Between 1906 and 1910 there were 10 sawmills within 5 kilometres of Piriaka. The eastern podocarp-rich forest was logged by mainly large businesses that had the resources to build long tramways, bridge the Whanganui and Whakapapa Rivers and, finally, to log some steep and broken country in the main tributary headwaters. However, milling of native timber petered out in the 1970's, when most of the eastern hill country was being farmed.

The first use of fertilisers in the 1920's saw an intensification of farming, with revolutionary use of cobalt to combat bush sickness adding impetus to the development of farms following the Second World War. However, following changes to the economy over the past decades, farm amalgamation has seen a marked decrease in the number of holdings and a decrease in the rural population. Sheep and cattle farming remains the predominant land use of the ecological district. Exotic forestry, while still a minor land use, continues to increase, with large tracts of land having been purchased for forestry developments over recent years.

Present Vegetation

Vegetation descriptions have been compiled from Clarkson *et al.* (1986), Cooke (1981), Department of Lands and Survey (1977), Grace (1959), Kelly (1949), McKelvey (1963), Nicholls (1990, 1991), and Soar (1986).

Substantial areas of native forest remain scattered throughout the ecological district, though many have been slightly or greatly modified by logging and fire. Unaffected forest tracts are rimu-northern rata-tawa and rimu-kamahi forest on the lower and mid-slopes of Taurewa (Blue Hill), peripherally modified rimu-tawa-hard beech forest on rugged hill country north-west and south of Matiere and in the lower Retaruke Valley, and the sub-montane forest above 800 m along the Hauhungaroa Range and the spine of Taurewa. Heavily logged, originally podocarp-rich forest remains east of Taumarunui township over the headwaters of the Taringamotu, Waituhi, and Waipari rivers and streams, and between the Whangarei and Waipapa Rivers eastward of Owhango. The highest and steepest hills in the Retaruke catchment are widely covered by residual tawa-dominated stands or secondary growth forest of kamahi and some

kanuka (*Kunzea ericoides* var. *ericoides*) and rewarewa.

Dieback of Hall's totara, northern rata, and kamahi has become common during the last 40 years. Kamahi mortality has been extensive about the source of a tributary of the Retaruke River, a few kilometres west of National Park township.

Pockets of riparian and foothill matai-totara-kahikatea forest occur in the Ohura catchment, with a probably unique secondary forest of pole rimu, miro, matai, kahikatea, and tanekaha alongside a northern reach of Waikaka Stream. Tanekaha is confined to land below 300 m, occurring in only the northern-most section of this district, and mainly in hard beech stands. Totara has shown exceptional regeneration capacity in open long-established farmland, and young totara trees are especially conspicuous around Taumarunui township.

With great improvement in farmland management since World War Two, scrub and shrublands of any significant extent are very uncommon. The only major areas are the tracts of heavily logged forest in the east, where treeland is interspersed with dense associations of whauwhaupaku (fivefinger; *Pseudopanax arboreus* var. *arboreus*), kotukutuku, kohuhu (*Pittosporum tenuifolium* subsp. *tenuifolium*), rangiora (*Brachyglottis repanda* s.s.), and tree ferns. Manuka (*Leptospermum scoparium*) and horoeka (lancewood) scrub occurs on formerly burnt-over hill faces and ridges in the Benneydale area.

Exceptional occurrences of three tree species are fortuitously confined to unlogged forest: a ridge top stand of silver beech in the Taringamotu River headwaters; monoao (*Dracophyllum subulatum*) about the source of the Pungapunga; and kaikawaka (*Libocedrus bidwillii*) on a poorly drained site on the western slopes of Taurewa.

Exotic plantation forest has been established only on a small scale, most often on marginal farmland. Less productive pasture often has a scattering of totara, which regenerates despite grazing pressure. The establishment of pine plantations results in the loss of this indigenous character in farm landscapes.

A representation of the present vegetation pattern is derived from the Land Cover Database which is compiled from SPOT satellite data. It clearly illustrates the predominance of pastoral farming in the ecological district and the widespread, quite substantial, area of remnant forest, particularly in the east of the ecological district.

Flora

Approximately 390 indigenous vascular plant species have been recorded to date in the Taumarunui Ecological District. However this is not a complete list because of the rapid survey technique used and the limited time available. Further survey would undoubtedly result in additional flora being found.

Threatened species

Three threatened and two local plant species are present, or have been recorded previously in the Taumarunui Ecological District.

- (a) Pua o te reinga (*Dactylanthus taylorii*; classed as recovering - conservation dependent in de Lange *et al.* 1999) is known from several sites in the Ecological District (some protected areas and one RAP). It is a parasite most commonly found in second-growth forest and on the outer fringes of montane forest in the North Island. However, widespread clearance of forest, depletion by collectors, and inhibition of regeneration by possum and rat browsing of flowers have led to a reduction in its abundance and distribution. Pua o te reinga is known from Motutara Scenic Reserve, near Okahukura Scenic Reserve, Raurimu Spiral Scenic Reserve and RAP 11-Mount Tuhua (de Groot 1997; Whaley and Holzapfel 1996). It is also known from those parts of Pureora Conservation Park and Erua Stewardship Area that occur within the ecological district (Department of Conservation 1994; de Groot 1997).
- (b) *Pittosporum turneri* (classed as declining in de Lange *et al.* 1999) has been recorded from one site in the ecological district in the past. However, the vegetation in the area has been burnt since the

original report and *P. turneri* was not located during a search of the site during the current survey. An extensive *P. turneri* population is present in the Erua Stewardship Area immediately south of the ecological district (Ecroyd 1994).

- (c) Fuller and Edwards (1989) note that there are historical records from 1909 of *Teucrium parvifolium* (classified as declining in de Lange *et al.* 1999) on a river flat in the Ecological District (Whakapapa River at Kakahi) and that some plants may still be present. Kakahi Conservation Area and Whakapapa Island Scenic Reserve both cover river flats adjacent to the Whakapapa River immediately east of Kakahi, and it is likely that the plants recorded in 1909 were growing in what is now reserve. There are no other records of *T. parvifolium* from the ecological district. In the early 1980s *T. parvifolium* was recorded in Mapara Scenic Reserve approximately 10 km north of the Ecological District (Bayfield *et al.* 1986).
- (d) *Thismia rodwayi* (classified as naturally uncommon; sparse in de Lange *et al.* 1999) occurs in three reserves (Buckley and McLuckie 1995).
- (e) *Ileostylus micranthus* (classified as declining in de Lange *et al.* 1999) occurs at one site (an RAP) in the Ecological District.

Distribution Limits

Six species reach limits of distribution within the Taumarunui Ecological District.

- (a) *Astelia trinervia* reaches its southern distribution limit within the North Island, in Rotokahu Scenic Reserve (approx. 39° 09' S; C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999).
- (b) *Coprosma rubra* occurs at a few sites including Manunui, which is one of the most northern records of the species in the central North Island (approx. 38° 53' S; Fuller and Edwards 1989).
- (c) *Dracophyllum traversii* reaches its southern distribution limit within the North Island in Rotokahu Scenic Reserve (approx. 39° 10' S; Barkla 1992).
- (d) *Lycopodium deuterodensum* reaches its southern distribution limit within the North Island in Kauhanganaroa Scenic Reserve (approx. 39° 09' S; Fuller and Edwards 1986). It also occurs at two other locations at approximately the same latitude in the North Island (just north of Pipiriki and just inland of Waverley), and at D'Urville Island (C. Ogle, Wanganui Conservancy, Department of Conservation, pers. comm. 1999).
- (e) *Pseudopanax laetus* nears its southern distribution limit in the ecological district and is present in Erua Stewardship Area (within Taumarunui Ecological District) (approx. 39° 10' S; C. Ogle, Wanganui Conservancy, Department of Conservation, pers. comm. 1999).
- (f) *Schoenus tendo* reaches its southern distribution limit around Kaitieke (approx. 39° 05' S).

Adventive Species

Around 180 adventive vascular plant species have been recorded from the ecological district. However, these are only the prominent or common weeds generally occurring around natural areas, and the total adventive flora is likely to comprise more than twice that number. Most of the recorded species are well established and all are naturally reproducing in the ecological district. However, only a very few are species which actually or potentially threaten the conservation values of a particular area and could be classed as environmental pest plants. Adventive species are most abundant on the margins of natural areas, in canopy gaps of remnant podocarp and tawa forest that has been modified, and in small lowland wetlands. During the PNAP survey the most commonly identified environmental pest plants were willows (*Salix* sp.) in wetlands and along waterways, Japanese honeysuckle (*Lonicera japonica*) in forests and scrub, and gorse, Spanish heath (*Erica lusitanica*), buddleia (*Buddleja davidii*), cotoneaster (*Cotoneaster glaucophyllus*), pines (*Pinus* sp.) and wattles (*Acacia* sp.) on bluffs. Old man's beard (*Clematis vitalba*),

selaginella (*Selaginella kraussiana*), tree privet (*Ligustrum lucidum*) and ivy (*Hedera helix*) were present as localised infestations.

Environmental pest plants of particular concern are *Schoenoplectus californicus* and alligator weed (*Alternanthera philoxeroides*) (C. Ogle, Wanganui Conservancy, Department of Conservation, pers. comm. 1999). *S. californicus* was mistakenly thought to be *S. tabernaemontani* (a native *Schoenoplectus*) and was introduced into the Taumarunui township sewerage ponds during wetland plantings in 1997 or 1998. Alligator weed was introduced accidentally at the same time as the *S. californicus*. Total control of the alligator weed is being undertaken. Total control of *S. californicus* should be undertaken also, as elimination of both these species is a high conservation priority.

Other species of concern include climbing spindleberry (*Celastrus orbiculatus*) in Ohinetonga Scenic Reserve (currently being controlled) and in Manunui (RAP19), Chilean flame creeper (*Tropaeolum speciosum*) which has been identified recently around Raurimu and may also be present in other areas (N. Singers, Tongariro/Taupo Conservancy, Department of Conservation, pers. comm. 1999), and Japanese walnut (*Juglans ailantifolia*), which occurs locally along the Whanganui River (currently being controlled). Old man's beard (*Clematis vitalba*) is being controlled throughout the part of the ecological district in the Wanganui Conservancy. Tradescantia is known from the Te Maire part of the Whanganui National Park (N. Singers, Tongariro/Taupo Conservancy, Department of Conservation, pers. comm. 1999) and has been recorded previously in Oruru Scenic Reserve (Fuller and Edwards 1989). Darwin's barberry (*Berberis darwinii*) is present just outside the ecological district, on the eastern side of the Ongarue River near Waimiha in the north (P. Rihia, Taumarunui Field Centre, Department of Conservation pers. comm. 2000).

Threats to the natural environment

The major threats to indigenous vegetation, habitats and fauna in the Taumarunui Ecological District are:

Habitat destruction and fragmentation caused mainly by agricultural development and forestry (logging and plantation establishment).

- Grazing and browsing by exotic ungulates, particularly goats, which deplete the diversity and abundance of understorey species in forests and inhibit regeneration. Cattle cause additional damage to wetlands through trampling and pugging.
- Predation of indigenous fauna by introduced mammals.
- Invasion by environmental pest plant species that can alter the structure and/or composition of indigenous vegetation.
- Other threats include fire, water pollution and soil erosion.

Recommended Areas for Protection

The ecological district was divided into two bioclimatic zones (lowland and submontane) on the basis of altitude. It was further subdivided into five landform units, based on topography and underlying geology. These frameworks were used in combination with a set of standard PNAP criteria to select Recommended Areas for Protection:

- present versus past extent
- diversity and pattern
- naturalness
- size
- shape of area
- representativeness
- rarity and special features
- buffering and connectivity
- viability
- fragility and threat

The land cover database was used for present day vegetation cover. A map of indigenous vegetation c.1840 was also produced, for use as a comparative baseline.

The spatial information was digitised and analysed using a geographic information system to determine the extent of indigenous vegetation remaining on each landform unit within the lowland and submontane bioclimatic zones. Relatively little indigenous vegetation and habitat remains on the flatter land in the ecological district. As land becomes steeper there is typically an increase in the relative proportion of indigenous forest. Wetlands have been heavily reduced in area.

Thirty-six areas were recommended for protection, comprising c.5,600 ha or 2% of the Taumarunui Ecological District. There are numerous areas of indigenous vegetation/habitat that have not been identified as RAPs, many of which are of significant conservation value. However the emphasis in this survey was placed on selecting the best remaining examples of vegetation and habitat classes and landform units that are inadequately protected in the existing reserve network.

The highest priorities for active management relate to remaining natural areas on flatter land and wetlands. Specific management requirements will need to be assessed for each site. Fencing, retirement from grazing, and wild animal control are the highest priorities for many natural areas. These will require the development of a programme of co-operative works with landowners. There are also opportunities to restore degraded ecosystems and habitats.

Acknowledgments

This work was undertaken for the Department of Conservation (Wanganui Conservancy), who also provided approval to publish a summary of the survey. I would like to acknowledge the assistance of all people who helped with the project, including Colin Ogle, Tim Holmes, Rosemary Miller, John Spence, Peter Lock, Sue Jones, Sue Gowan, Dave Jane and Jo Priestley (Wanganui Conservancy, DOC), Avi Holzapfel, Chris Smuts-Kennedy, Dave West and Richard Cocks (Waikato Conservancy, DOC), Phil Bradfield (Maniapoto Area Office, DOC), Adrian de Groot (DOC), Cam Speedy, Sean Husheer and Hemi Kingi (Tongariro/Taupo Conservancy, DOC), Graeme Bell, Dave Stowers, Hugh (Ted) Dorian, Martin Suchma and Peter Rihia (Taumarunui Field Centre, DOC), and Dave Rothschild (Whakapapa Field Centre, DOC). Ralph Allen (Wildland Consultants Ltd) provided comments on a draft of this article.

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■ **A new site for *Pittosporum obcordatum* and other rare and threatened plants at Tawhiriwaimanuka Stream Bush, Eastern Wairarapa Ecological District.**

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Introduction.

Members of the Wellington Botanical Society and the Department of Conservation have been visiting sites in the Maungaraki Range. During October 1998 and at various times over the following two years two areas were surveyed. These sites, collectively called Tawhiriwaimanuka Stream Bush, are owned by David McLaren and are completely fenced off and legally protected as QE II Covenants.

The McLarens are proud owners of their two covenants and have created a walking track/route through the forest to allow visitor access. Initially, *Pittosporum obcordatum* and *Coprosma pedicellata* were found to be components of an unusual shrubland/forest margin association. Later visits to this and another site on the farm revealed the presence of a number of other nationally and regionally rare and threatened plant species, in particular *Mazus novaezeelandiae* ssp. *novaezeelandiae*.

Site description.

The forest is in a dry part of the Wairarapa on Ahi Paku Station, at the end of Whakarua Road, some 15 km north east of Martinborough.

The first Covenant is an area of 11.2 ha situated in a gully along Tawhiriwaimanuka Stream, running in a SE-NW direction. Here, the stream has cut down through mudstone, forming a steep gully prone to slips where the stream cuts into its sides, but also leaving a small terrace more or less intact, some 15 metres above the present streambed. On other parts of the site the streambed and its associated flood terraces are much wider.

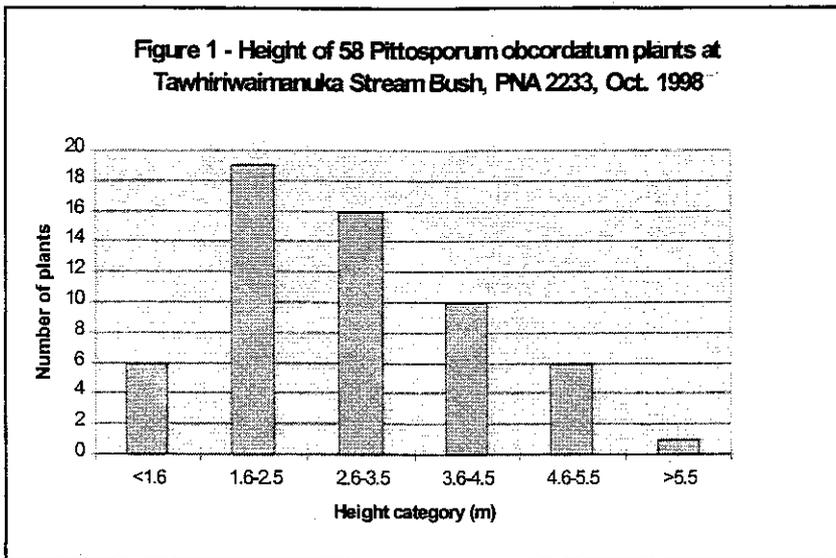
A timber mill has operated nearby, and many large trees have been removed. However, a number of large totara, matai and kahikatea remain, and regeneration of matai especially was noted.

The second covenant to the south of the first, covers an area of flat alluvium beside the stream, as well as an adjacent area of hillslope.

Vegetation

The main canopy vegetation is a combination of kanuka (*Kunzea ericoides*) and kowhai (*Sophora microphylla*), with occasional or scattered lowland ribbonwood (*Plagianthus regius*), lacebark (*Hoheria sexstylosa*) and emergent totara (*Podocarpus totara*), matai (*Prumnopitys taxifolia*) and maire (*Nestegis* spp.). The shrub community beneath is predominantly composed of *Raukaua anomalus*, various *Coprosma* species, *Myrsine divaricata* and *Lophomyrtus obcordata*.

The uncommon vegetation component with *Pittosporum obcordatum* and *Coprosma pedicellata* was in an area of approximately 200 m x 50 m, on a raised, flat, and at times wet terrace an estimated 15 m above the stream, at the southern end of the first covenant. The dead remains of tall trees emerge above this area. Dominant plant species here include *Myrsine divaricata*, *Coprosma propinqua*, *C. rigida*, *Meliclytus micranthus* and *Hoheria angustifolia*. Until this find, *Pittosporum obcordatum* was known from only two sites in the Wellington Conservancy, both in the Gladstone area near Masterton.



The population comprises at least 58 individuals, ranging in height from 1 to 6 m with an average height of 3 m. Figure 1 shows the range of heights in 1 m categories, with the 1.6 - 2.5 m category being the largest. This corresponds with an age of approximately 20 years (Clarkson and Clarkson 1994).

Mr McLaren informed us that in 1977 most large trees on this raised river terrace died, after a very wet winter. The establishment of this specialised successional shrubland followed the

collapse of the original forest, and it appears that many of the *P. obcordatum* plants currently growing at the site established after the forest cover died.

We recorded the nearest four woody species to each individual *P. obcordatum*. The results are shown in Table 1. Weeping matipo (*Myrsine divaricata*) is the most common shrub here, followed by *Coprosma propinqua*, *Hoheria angustifolia*, *Melicytus micranthus* and *Lophomyrtus obcordata*. In total 29 woody species were recorded growing nearest to *P. obcordatum*.

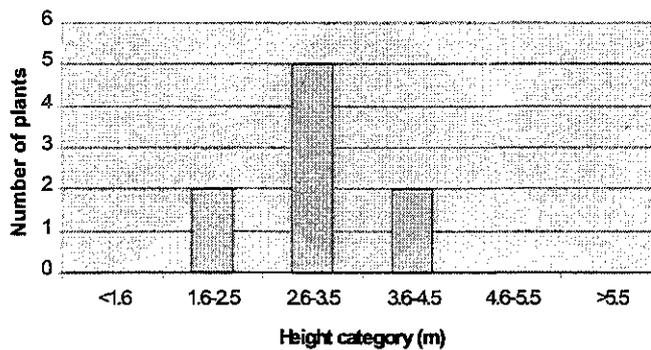
Outside the Covenant two further *P. obcordatum* trees were found, the first on a grazed river flat 1.5 km downstream and the second just outside the southern QE II Covenant on Mr McLaren's property.

Table 1 - List of 29 woody plant species that were found growing as one of four nearest neighbour trees/shrubs/climbers of 58 individual *Pittosporum obcordatum* plants.

<i>Myrsine divaricata</i>	44	<i>Coprosma pedicellata</i>	3
<i>Coprosma propinqua</i>	29	<i>Coprosma rotundifolia</i>	2
<i>Hoheria angustifolia</i>	23	<i>Alectryon excelsus</i>	2
<i>Melicytus micranthus</i>	20	<i>Parsonsia sp.</i>	2
<i>Lophomyrtus obcordata</i>	18	<i>Myrsine australis</i>	2
<i>Coprosma rigida</i>	14	<i>Dacrycarpus dacrydioides</i>	2
<i>Muehlenbeckia complexa</i>	12	<i>Coprosma rhamnoides</i>	1
<i>Melicope simplex</i>	12	<i>Coprosma crassifolia</i>	1
<i>Sophora microphylla</i>	10	<i>Plagianthus regius</i>	1
<i>Kunzea ericoides</i>	6	<i>Rubus schmidelioides</i>	1
<i>Streblus heterophyllus</i>	6	<i>Nestegis lanceolata</i>	1
<i>Coprosma areolata</i>	5	<i>Pennantia corymbosa</i>	1
<i>Elaeocarpus hookerianus</i>	4	<i>Cordyline australis</i>	1
<i>Carmichaelia australis</i>	4	<i>Passiflora tetrandra</i>	1
<i>Prumnopitys taxifolia</i>	4		

Coprosma pedicellata was initially found during tagging of *Pittosporum obcordatum* shrubs. In all, 10 individuals were found, all in the wettest parts of the area. A later visit to the second of the covenanted areas resulted in the discovery of a further 6 mature plants. *Coprosma pedicellata* is currently known from 8 sites in the Wairarapa, two of which contain over 50 individuals.

Figure 2 - Height of 9 *Coprosma pedicellata* at Tawhiriwaimanuka Stream Bush, PNA 2233 EW, Oct. 1998



The height distribution of 9 individuals is shown in Figure 2 (one individual was not measured). The average height of the 9 shrubs was 3.2 m (range 2.2 - 4.5 m). Of the 10 plants, 5 are female, 2 are male and the sex of 3 plants could not be established.

As with *P. obcordatum*, the four nearest woody plant species were recorded for each of the ten *Coprosma pedicellata* plants. The results are shown in Table 2. *Myrsine divaricata* was again the most common species, followed by *Coprosma propinqua* ssp. *propinqua*, *Hoheria angustifolia*, *Sophora microphylla*, *Meliccytus*

micranthus, *Lophomyrtus obcordata* and *Pittosporum obcordatum*.

Table 2 - List of 12 woody plant species that were found growing as one of four nearest neighbour trees/shrubs/climbers of 10 individual *Coprosma pedicellata* plants.

<i>Myrsine divaricata</i>	9	<i>Lophomyrtus obcordata</i>	3
<i>Coprosma propinqua</i>	5	<i>Coprosma rigida</i>	2
<i>Hoheria angustifolia</i>	5	<i>Melicope simplex</i>	1
<i>Sophora microphylla</i>	5	<i>Nestegis cunninghamii</i>	1
<i>Meliccytus micranthus</i>	4	<i>Muehlenbeckia complexa</i>	1
<i>Pittosporum obcordatum</i>	3	<i>Parsonsia</i> sp.	1

A healthy population of *Mazus novaezeelandiae* ssp. *novaezeelandiae* was found in the second covenant, approximately 1 km south of the main forest block, in a run-off area below a slope. It occupied a number of small channels where water from the hill was concentrated and was at its densest in the centre of these seasonally dry channels, often to the exclusion of all other plants. It occurred more sparsely toward their margins and on the drier ground beyond. The exotic sedge *Carex divulsa* is also present at this site.

A large population of *Teuclidium parvifolium* was found growing under the forest canopy 50 - 100 m. N and NE of the area where *Pittosporum obcordatum* was found. The *Teuclidium* plants were estimated to number over 100. Two smaller patches were found in forest dominated by kanuka, black maire (*Nestegis cunninghamii*) and matai. *Teuclidium* is found in approximately 15 sites in the Wairarapa.

Tupeia antarctica was believed to be extinct on the mainland of Wellington Conservancy, until a population was found in 1996 at Koromiko farm, Gladstone (host tree black maire, Sawyer et al. 1998). Since then *Tupeia* has been found at 10 more sites in the Wairarapa, some of which contain only a single plant (Sawyer and Rebergen 2001).

During the first visit we observed several apparent *Tupeia* galls in black maire. None were showing any evidence of leaves or branches. On a subsequent visit *Tupeia antarctica* was found growing on/in several branches of a large black maire. All growth was young, only a few centimetres long, indicating recent recovery from major possum browsing. This is typical of plants in the Wairarapa, most of which seem to be recovering as a result of increased control of possums. A second *Tupeia* plant was found growing 1 m above the ground in a small narrow-leaved maire (*Nestegis montana*). This plant was very small, comprising only two shoots arising directly from the trunk of the host.

Other regionally significant plant species in the covenanted areas include ass *Anemantele lessoniana*, bamboo grass (*Microlaena polynoda*), *Rumex flexuosus*, *Coprosma linariifolia* and the dwarf mistletoe

Korthalsella lindsayi (on 9 different host species, including *Pittosporum obcordatum*).

Of concern is a dense ground cover of the exotic sedge *Carex divulsa* throughout this area, its spread perhaps aided by the removal of sheep.

Tawhiriwaimanuka Stream Bush is one of the most significant forest remnants in the Wairarapa and Wellington Conservancy. This experience shows the importance of thorough botanical surveys of both protected and unprotected remnants of native vegetation by experienced botanists.

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■ *Rorippa divaricata* in the Bay of Plenty

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Rorippa divaricata (Hook. f.) Garnock-Jones and Jonsell (NZ or native cress) is a glabrous perennial dicotyledonous herb up to 1m or more tall with a long taproot. Historically, it is most common from the northern North Island (Norton and de Lange 1999), with sites previously known from Northland, Auckland, Waikato, Bay of Plenty, and Taranaki (Webb *et. al* 1988). It is reported as being present on five northern off-shore islands, but is very uncommon at all sites (Norton and de Lange 1999). In the South Island it has been reported in Marlborough (Webb *et. al* 1988), the Abel Tasman coastline and around the entrance to a cave in east Takaka (Courtney 2000).

Historically in the Bay of Plenty, this cress has been found at Te Aroha (1885) and "between Lake Rotoehu and the coast" (K. Allison 1942, CHR 36688). More recently, populations have been found around Lake Tikitapu (Blue Lake) (NZFRI 18763 1989) (Ecroyd 1991; Beadel and Pardy 1998; Cashmore 1999) and on Mokoia Island in Lake Rotorua (Beadel 1990; Beadel and Ecroyd 1990), but it has not been seen on Mokoia Island since 1990 (Cashmore 1999, Cashmore 2001). In the last few years populations have been found in the Lake Okataina Scenic Reserve (1998) and on the northern shores of Lake Rotoiti (1999). Another site was discovered on a Rotorua Botanical Society field trip to Otawa trig on 4th November 2000 (Crabtree 2001).

In addition, restoration plantings of *Rorippa divaricata* have been made on Mokoia Island (Cashmore 2001) and along the western side of Lake Tikitapu (Beadel and Pardy 1998) by DoC.

New discoveries

Along the northern shores of Lake Rotoiti three distinct populations of *Rorippa* have been found close to the shoreline. Two were quite small, but at the other, one of the authors could not see the "wood for the trees". There are good potential sites along the pumice cliff bases on both the northern and southern shores of this lake. No plants have been found on the most likely sites on the southern shores.

Large numbers of NZ cress were found by Paul Cashmore along the shoreline west of Waikereru Bay of Lake Okataina in 1998. Surveys since then have extended the range around Skull Point and southwards several hundred metres. Since the last DoC survey in June 2000, small populations were found at two sites on the western shoreline in August 2000 by John Hobbs. In late November 2000 three slip sites on the western side of the lake were investigated : 1) An un-named bay north of Shag Bay - at least 46 plants, 2) south-west corner of Kaikakahi Bay - 9 plants, and 3) between Kaikakahi Bay and Parimata Bay - 2 plants. At these slip sites all plants were in excess of 20 m above the lake and at sites 1 and 2 the slips did not reach the lake and were totally enclosed by forest. In late February 2001 two plants were found at the side of the Western Okataina Walkway in fairly deep shade in tawa/mahoe forest at an altitude of 400m. In early March 2001 another small group of plants were found at the lake edge just south of Whites Bay. Three more plants were found in early April 2001 on two slip sites in the Lake Rotongata explosion crater in the Waione Block Scenic Reserve. This reserve is surrounded by the Lake Okataina Scenic Reserve. In total nearly 200 plants are now known from the Okataina and Rotoiti areas.

The Ottawa trig track plants (5) were very young (pre-flowering), were in a small group, and, as identification was tentative, a return trip was made in mid-February to confirm the sighting. No trace was found of those cress plants, however, two more plants in flower and fruit were discovered nearby. The clearing where these plants are growing appears to have been formed as the result of dieback of a patch of mamaku (*Cyathea medullaris*), possibly the result of possum browsing (Crabtree 2001), and with a heavy infestation of various species of thistle and *Sigesbeckia orientalis* (Indian weed).

The Future for *Rorippa divaricata* in the Rotorua area

Lake Okataina Scenic Reserve now has the greatest number of known *Rorippa* plants on mainland New Zealand. We are of the opinion that as long as there is erosion on the hills on the western side of the Okataina caldera there would appear to be a reasonably healthy future for the species in the Rotorua area.

Other slip sites in the area bounded by Lakes Tarawera, Rotokakahi, Tikitapu, Rotorua, Rotoiti, Rotoehu, Rotoma and Okataina should be investigated in the future. The discovery of plants at Ottawa also raises the likelihood that other *Rorippa* populations are still present in coastal Bay of Plenty areas.

Unlike the Tikitapu population which have been found to be heavily browsed, apparently by slugs (Cashmore 1999), browsing at Okataina and Rotoiti is virtually non-existent and the populations appear to be in healthy condition. It is not known why the original plants seen on the Ottawa track disappeared.

Most plants along the shoreline of Lake Okataina are threatened by natural forces - drought and fluctuating lake levels. The lake has no surface outlet and water levels can and have fluctuated considerably over time. In 1972 it reached a recorded high of 313.5 m asl, fell to 309.0 m in 1977, dropped as low as 306.3 m in 1994 and is currently (March 2001) about 309 m and falling. Several plants towards the end of 2000 were noted to have succumbed to higher lake levels and recently (January 2001) many young plants were noted to have dried up - maybe they will shoot away in the autumn. A rise of 1 m would probably drown 75% of the eastern and all the western shoreline plants. If the lake rose to the 1972 recorded maximum of 313.4 m only the slip site plants would remain. On the positive side, if there was that much rain to raise the level of the lake so far then there would be many slip sites as potential habitat.

Questions about dispersal mechanisms

Rorippa has sticky seeds which would indicate animal dispersal - ideas suggested initially were ducks around and close to shoreline, but with the discovery of the plants on the other sites other agents such as rats, possum and possibly even wallaby must also be considered. In the past, ground birds (weka) may have been a major dispersal agent. Given the species' ability to establish on slip faces soon after their formation, there is the possibility that the species may establish a long-lived seed bank within the forest.

Acknowledgments

Lake level data supplied by Mark Stringfellow of Environment Bay of Plenty.

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Herbarium Report

■ Plant biosystematics research in New Zealand

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The New Zealand National Herbarium Network (NZNHN) decided at its last annual meeting at Rotorua, 4 November 2000, to update biannually its information on plant biosystematics research, particularly so that the "...members of the New Zealand Herbarium Network will see to the security of vouchers of unnamed taxa to ensure protection of the interests of the taxonomists who have declared that they will describe any of these taxa". (12th Annual Meeting held at Herbarium MPN, Massey University, 23 November 1994).

Previous compilations of plant biosystematics research (Breitwieser & Heenan 1997; Parsons 1999) have proved to be very useful for all herbarium curators. Herbarium curators would like to ensure that herbarium material required for studies by New Zealand scientists are not sent overseas. As agreed at the last New Zealand National Herbarium Network meeting, I will assemble the information. It will be published in the New Zealand Botanical Society Newsletter. Therefore, all researchers in New Zealand are urged to send me the following information:

- study group (genus or species),
- kind of research,
- start and completion date,
- name and address.

Please send your information to Ilse Breitwieser, Landcare Research, PO Box 69, Lincoln 8152. Fax 03-325-2418. Email: breitwieseri@landcare.cri.nz

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Biography/Bibliography

■ Mrs Audrey Eagle, leading botanical artist and conservationist

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The colour illustrations of New Zealand trees and shrubs in "Eagle's Trees and Shrubs of New Zealand in Colour" (3) and "Eagle's Trees and Shrubs of New Zealand Second Series" (6) by Mrs Audrey Lily Eagle (née Brodey, b.1925) provide the most complete record of paintings of this group of New Zealand plants. Audrey's involvement with plants extends to conservation which has been another major theme in her life's work.

Audrey was born in Timaru and her parents, originally from England, moved back to England taking their

three children with them, "From the moment of leaving New Zealand as a child, Mrs Eagle recalls, she had decided that she would return...she married in 1948 and came to New Zealand a year later" (1).

Audrey was educated at primary schools in Wellington, Dunedin, Croydon (London) and Horsham (Sussex). Her secondary education was at Horsham Girls' High School (1936-39) and the County Secondary School, Fulham (1940-42, this school was evacuated from London to Banbury during World War II), and Banbury County School (Oxfordshire, 1942-43). Her Tertiary education was at the Government Training Centre at Slough, near Windsor where she took an engineering draughting course (1944) and she then attended part-time the School of Technology, Oxford (1945-46) and the Dartford County Technical College (1947) where she gained an Ordinary National Certificate in Electrical Engineering (two credits in electrical papers and distinction in mathematics). Audrey then attended the Banbury School of Art (1948-49) before returning to New Zealand in 1949.

No doubt Audrey's aim for precision and accuracy in her illustrations of plants was helped by her early training in draughting.

Audrey's interest in nature commenced as a child and she recalls her childhood in Wroxton (Oxfordshire), "...every spare moment was spent exploring the countryside on bicycle and on foot. Hours were spent in woods, on hillsides and by streams, observing plants, birds and other details of the countryside. It was during this time that she began to paint plants, though she had been keen on drawing and painting from the age of about five" (1).

Audrey was initially employed as an engineering draughtswoman at the Baldwin Instrument Company, Dartford, Kent (1944-48). She joined the company when it was evacuated to Cumnor, Oxford during World War II and she continued working for the company when it returned to Dartford after the war. When Audrey returned to New Zealand in 1949 she was employed in the draughting office at the State Hydro-Electricity Department, Hamilton (1949-54).

A major shift in Audrey's activities occurred from 1952 when she established herself in the field of botanical illustration and writing. She recounts that while living in England her interest in plants had developed, "As the writer [Audrey] had previously spent most of the free-time in her life exploring the English countryside, and learning about the plants there, she soon set about learning the names of the New Zealand trees and shrubs in 'The Shrubbery', as Mr Caldwell's [A.C.A.Caldwell, 1898-1976] plantings were then called" (8). Audrey's mentor in relation to New Zealand plants was Athol Ceadric Albin Caldwell, an electrical engineer. In a fine tribute to Mr Caldwell, Audrey recounts their first meeting (8), "The writer and her husband Harold, first met Athol Caldwell in 1949. They had just arrived from England and Harold had been appointed to work in the Accounts Department office, and she had applied for a job in the Drawing office and later was to be interviewed by Mr Caldwell and subsequently appointed." Caldwell was District Electrical Engineer of the State Hydro-Electricity Department in Hamilton and, incidentally, was for many years involved with the conservation and maintenance of the fabric of the Cathedral Church of St. Peter in Hamilton (2). Caldwell was an enthusiastic and knowledgeable amateur botanist. He planted a large selection of native trees on unused land beside his Department's office block. This area became known as "The Shrubbery" and later the "Caldwell Native Bush" in his honour (8). Audrey accompanied Caldwell and his fellow plant enthusiast and expert on the vegetation of the Waikato region, Michael Christian Gudex (1887-1964) on many botanical expeditions. Audrey has summarized her extensive and varied expeditions with Caldwell (8), "For twenty-two years the writer [Audrey] accompanied Athol on several hundred explorations, into both gentle country and to rugged areas."

Audrey's primary contributions, like those of Nancy Adams, have been in relation to her work as a botanical artist. Her two illustrated books (3,6) have played a significant role in providing knowledge to identify plants for many without training in botanical science, as pointed out by Eric Godley (10), and they are of significance for the specialist too. The first series of "Eagle's Trees and Shrubs of New Zealand in Colour" was published in 1975 and includes 228 botanical paintings (3). The second series was published in 1982 and includes 405 botanical paintings (6). The illustrations of rare species and those of local(?) distribution in the second series make this volume of particular significance to the professional botanist as well as the amateur. This latter series is dedicated to botanist Anthony Peter Druce (1920-1999), a member of the

former DSIR's Botany Division. Tony Druce's botanical expertise helped Audrey in the taxonomic aspects of the second series and she has emphasized (9) how indispensable he was to the production of the 1982 book, "We were continually in touch by letter, or sometimes phone calls, his life-time of experience with the native plants was being 'fed' to me. He supplied me with many flowering and fruiting specimens from the native plants growing in his garden as well as searching for specimens when he was in the bush, or on the mountains. He was totally committed to making the book as perfect in its coverage and as mistake free, as I was." A notable feature of Audrey's botanical illustrations is the precision of plant details.

Audrey has also published "Eagle's 100 Trees of New Zealand" (4) and "Eagle's 100 Shrubs and Climbers of New Zealand" (5) based on her 1975 book, and "Eagle's Trees and Shrubs of New Zealand Volumes I and II" (7) which is a revised edition of the 1975 and 1982 books reprinted as a set. She is currently completing her third book of New Zealand trees and shrubs. This will include approximately 120 illustrations and descriptions and will cover varieties and forms not previously illustrated, new discoveries since 1983 and the results of recent taxonomic research.

An exhibition of about 50 of Audrey's plant paintings was held in the Waikato Museum of Art (1975) and also in Napier and in Auckland.

Audrey is an indefatigable field botanist, and her other major contribution has been in relation to conservation and its administration. She was elected a member of the National Executive of the Royal Forest and Bird Protection Society (1976-81) and a member (appointed by the Minister for the Environment) of the Nature Conservation Council (1978-89). In addition, Audrey was appointed by the Minister of Agriculture as a member of the Loder Cup Committee (1981-83) and was Chairperson of the Waikato Branch of the Royal Forest and Bird Protection Society for two years and served for some 23 years on the Waikato Branch Committee and was a foundation member of the Branch. She has also been three years on the North Taranaki and Lower Waikato Conservation Society Committee. Audrey's lifetime commitment to conservation, environmental issues and botany are reflected in her membership of the Royal Forest and Bird Protection Society, Ornithological Society of N.Z., Wellington Botanical Society, N.Z. Botanical Society, the N.Z. Native Orchid Group, and she was also a long-time member of the Auckland Botanical Society.

After residing in Ngaruawahia on a small hillock not far from the mighty Waikato River, she later moved to New Plymouth. After the death of her husband Harold, Audrey moved to Macandrew Bay, Dunedin in 1996.

Audrey's honours and awards include a Nature Conservation Council Citation (1976), Watties Book of the Year Award (third prize, 1976), Watties Book of the Year Award (second prize, 1983), Loder Cup (1985), and Distinguished Life Member, Royal Forest and Bird Protection Society (1985).

Acknowledgement

This article is part of a larger account of notable women in all branches of science in New Zealand which has been supported by the Suffrage Centennial Trust.

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Biographical Notes (42) : Richard Helms (1842 - 1914)

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Richard Helms, unsung in New Zealand, was generously remembered in Australia by Hedley (1) who recalled in 1915: "He was one of a type, now vanishing, of keen, self-taught, field naturalists. The whole range of natural science attracted him; in botany, zoology, geology, and ethnology, he was equally interested and of these his knowledge was encyclopaedic. In the field he was an expert hunter, handy with tricks and traps and having the wisdom of a savage as to where a bird would nest or a beetle burrow. Quite careless of hardships, such as cold, hunger, or fatigue, he would explore alone in the roughest country."

Hedley also notes that Helms was born at Altona [near Hamburg] Germany, on 12 December 1842, and arrived in Australia in 1858 where he assisted his cousin with a cigar business in Melbourne. He then came over to New Zealand about 1862 and spent "some time" in Dunedin before he made "another visit" to Melbourne (1). Helms's daughter (2) gives him "a few years" in Dunedin before he went back to Melbourne. Whether Helms returned to the cigar business I don't know, but he certainly came back to New Zealand. His daughter stated that "about 1869 he returned again to New Zealand and settled in Greymouth, where he married in 1878." Hedley is more interesting. "After another visit to Melbourne he commenced practice in 1876 as a dentist in Nelson, New Zealand. During the late seventies and early eighties he resided at Greymouth; in 1879 [sic] he married and engaged in business as a watch-maker." The following chronology expands and corrects some of this.

- 1865-71: Not mentioned in the five Electoral Rolls for the Grey Valley or Nelson City and Suburbs during this period.
- 1871-72: "Helms, Richard, Greymouth; Leasehold; Section No.11, Richmond Quay, Greymouth" (Electoral Roll, Grey Valley District).
- 1872-73: "Helms, Richard, Greymouth; Household; House back of Seebeck's Hotel, Mawhera Quay, Greymouth" (Electoral Roll, District of Grey Valley).
- 1873-79: Not mentioned in the six Electoral Rolls for the Grey Valley or Nelson City and Suburbs during this period. (Perhaps this was the time as dentist in Nelson mentioned by Hedley).
- 1878: Married Sarah Ann Elder, a widow, in Greymouth on 9 February. (Marriage Certificate)
- 1879-80: "Helms, Richard, Greymouth; Household; House, Chapel St. Greymouth" (Electoral Roll, Grey Valley District).
- 1880-81: "Helms, Richard, Watchmaker, Chapel St. Greymouth" (Wises NZ PO Directory).
- 1880-81: At the Melbourne International Exhibition awarded a certificate for an exhibit of dried New Zealand ferns. (3)
- 1880-82: "Helms, Richard; residential; Greymouth; Jeweller" (Electoral Roll, District of Greymouth) (also 1882-84).
- 1882: Sent collection of Westland mosses to Carl Müller.(4)
- 1882-83: On 19 October 1882 and 7 June 1883, F.W. Hutton read papers on N.Z. land shells at the Philosophical Institute of Canterbury which included 8 and 21 species from Greymouth collected by his "friend" Helms (T 1883, 1884).
- 1883: Began publishing *aet* 41 with three notes in the *N.Z. J. Science*: "A Maori rat at Greymouth"; "Habits of beetles (fam. Silphidae)"; "Remarkable Pigeons".
- 1886: Helms also collected beetles. Dr G. Kuschel has told me that "one large paper by David Sharp (1886) was based almost exclusively on Helms' collections. It dealt with over 100 species collected by Helms, 49 species from Greymouth, 39 from Picton, 16 from Bealey, 3 from Christchurch, and 2 from Kumara. Broun, Reitter, and Eppelsheim also received large amounts of material from Helms who was so successful in finding large numbers of new species because he pioneered the method of sifting forest litter. Well over a dozen species of N.Z. beetles are named after him. A good part of the Helms collection went to the Bernice P. Bishop Museum, Hawaii."
- 1884-87: "Helms, Richard; residential; Greymouth; jeweller" (Electoral Roll, District of Greymouth).
- 1888-90: To Sydney in Nov. 1880 to join the Australian Museum; particularly explored and collected in the Mt. Kosciusko region (1). His wife apparently remained in Greymouth (see below).
- 1890: In Nov. joined the NSW Dept. of Agriculture as a collector (1).
- 1891-92: Naturalist to the Elder Scientific Exploring Expedition which explored in South Australia and

- then into Western Australia from May, 1891 to June, 1892 (1).
- 1892–96: Assistant entomologist, NSW Dept. of Agriculture, Sydney (1).
- 1893: "Helms, Sarah Ann; Greymouth; housekeeper, residential" (Grey Electoral Roll).
- 1894: Henry Boswell (1837–97) of Oxford, England (5) wrote (6): "Mr Cosmo Melville has lately forwarded me a very interesting parcel for examination, being the cryptogamic portion of the rich and beautiful collection made in the neighbourhood of Nelson, Greymouth, and the Paparoa range of hills, by Mr R. Helms, sent to England in consequence of his lamented death." "The cryptogams formed but a small portion of the collection made by Mr Helms, consisting as it does of some 2,000 sheets of admirably preserved phanerogamic plants now in the possession of Mr Melville."
 Boswell's list comprises 97 mosses (including a new genus *Helmsia*) and 47 liverworts. There is also a note by T. Kirk. Both Boswell and Kirk use unpublished Müller names. Melville's collection is, no doubt, that referred to in (5) under Helms as "Herb. in Manchester Univ.; mosses at Oxford".
 Boswell also wrote: "In *Transactions of the N.Z. Institute* XXV, 1892, was published an account of another collection made by Mr. Helms in the Westland District, by Dr Carl Muller. This collection comprises about eighty species of mosses, many of which were described as new." The first sentence is rather ambiguous and the only account that I can find in Vol.25 to which Boswell could be referring is the following by T.W. Naylor Beckett, the Christchurch bryologist, who wrote (4) : "Mr T. Kirk has lately allowed me to examine an interesting collection of seventy-nine Westland mosses made by Mr. R. Helms of Greymouth in 1882. They were sent that year to Dr Karl Müller for determination, and he decided that thirty-six were new to science. These he has named but he tells me in a letter which I have recently received from him that they have not yet been described and have not been published." (This began in 1897)
 There is no correction in the *Journal of Botany* of Boswell's premature announcement of Helms' death (at least up to Boswell's own death in 1897). (7)
- 1895: Visited Greymouth "for a short time" (2).
- 1896: In March became Fruit Inspector, Western Australia (1).
- 1899: "Helms, Sarah Ann; Greymouth; housekeeper; residential." (Grey Electoral Roll).
- 1900–08: In Jan. 1900 became Experimentalist to the NSW Dept of Agriculture, Sydney. "To the Agricultural Gazette of N.S. Wales, Vols IV to XI he contributed fourteen papers dealing with apiculture, bacteriology, wheat, and manure." (1).
- 1901: On 26 Feb. Sarah Ann Helms died in Greymouth *aet* 54 and was buried in the Greymouth Cemetery. There were two daughters (Death Certificate).
- 1908–14: In his retirement in Sydney Helms worked on his natural history collections (1). In 1914 he made a 6-weeks visit to New Guinea and the Solomon Islands, from which he returned ill and died a week later on 17 July 1914 (2). He was buried in the non-sectarian section of the Gore Hill Cemetery (8).

Eponymy

As well as the many species of beetles named after Helms (both New Zealand and Australian) there are butterflies, land and marine shells and plants. The shrub *Grevillea helmsiana* was named by F. von Mueller from Elder Expedition material, as was the lichen *Endocarpon helmsianum* by J. Müller (1) and the moss *Funaria helmsii* by Brotherus (9). From New Zealand we have *Tillaea helmsii* Kirk and *Mitrasacme montana* Hook.f. var. *helmsii* Kirk, as well as the mosses *Helmsia collina* Boswell, *Macromitrium helmsii* Paris, *Hypnodendron helmsii* C. Müller, *Rhizogonium helmsii* C. Müller, *Trachyloma helmsii* C. Müller, *Eriopus helmsianus* C. Müller, and *Sphagnum helmsii* Warnstorf. Among our liverworts are *Anthoceros helmsii*, *Lejeunia helmsiana*, and *Lophocolea helmsiana* all named by Stephani.

Acknowledgements

I am indebted to the following friends for help with this note: Richie McNaughton and Helen Southen (both of Christchurch) for help with Electoral Rolls and Registrar-Generals' records; Willy Kuschei (Auckland), Colin Webb (Wellington), Bryony Macmillan, Allan Fife, Trish Faulkner, Margot Bowden (all of Landcare Research, Lincoln) for help with literature; and Wendy Weller (Landcare Research, Lincoln) for typing.

References

(1) C. Hedley 1915: *Pres. Address. J. & Proc. Roy. Soc. NSW* 49: 11–15; (2) J.H. Maiden 1921: Records of Australian botanists. *Ibid* 55: 162–163; (3) Melbourne International Exhibition, 1880–81, Official Record; (4) T.W. Naylor Beckett 1893: On some little known NZ mosses *TNZI* 25: 297; (5) J. Britten; G.S. Boulger 1931: *A Biographical Index of Deceased British and Irish Botanists*; (6) H. Boswell 1894: Some NZ mosses and hepaticae *J. Bot.* 72: 78; (7) M. Bowden *pers. comm.*; (8) A.H. Chisholm 1972: *Australian Dictionary of Biography* 4; (9) D.G. Catcheside 1980: *Mosses of South Australia*.

PUBLICATIONS

Book Reviews

■ “New Zealand Ferns and Allied Plants”. Brownsey, P.J. & Smith-Dodsworth, J.C. 2000. Revised Edition. 167 pp. H/back. David Bateman. \$89.95

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It is now just over a decade since the first edition of this book. In this time, there have been relatively few of the additions to the flora, and few of the name changes, that made the first edition so timely and urgent. Just two new native species and a handful of adventive species (15) are added. Gone are most of the unnamed species (*Nephrolepis*, and *Christella* remain), now replaced with formal names. Some of the name changes are a step back to old familiar names (*Microsorium* for *Phymatosorus* for example) but notable is the conservative approach to the lycopods, and filmy ferns, rejecting the names adopted by the Australians in their revision of the fern and fern allies flora in 1998 (Bostock & Spokes, 1998).

The first edition is notable for providing a photograph and/or a silhouette or sketch of each species. In this edition there are only two new illustrations, a silhouette for *Asplenium cimmeriorum* and a sorus for *Grammitis gunnii*, the two new native species included. Absent are photos, sketches or silhouettes for the additional adventive species. In fact the additional adventive species rate scarcely more than a few lines of text each. True, they have limited distributions, but a function of books such as this is to enable identification of these invaders and thus to record further occurrences.

The text has been thoroughly updated though few changes were actually required. Nevertheless, systematic changes have been made. Each species now has a brief distribution, summarising and supplementing the previous text, and many common and Maori names have been added. Perhaps the most welcome change is the replacement of a page on fern and botanical organisations with a page on hybridism in ferns.

A different font has been chosen for this edition and as a result the text is not as crisp as the earlier edition. The many photographs are clearer although the use of the more usual white background (rather than black) changes the apparent quality of the photographs. It is fascinating to follow how text manipulation techniques have been used to match the previous edition in size exactly, with many pages at first glance appearing identical between editions, in spite of substantial text additions. Perhaps these changes are summarised best by the cover. The dust jacket is different and the gold embossed title is missing from the hard cover. Inside the cover the fern “wallpaper” is gone and replaced by just plain green.

The book remains the most authoritative and comprehensive account of the ferns and fern allies and as such an essential reference for both amateur and professional botanists. The updating is both timely and welcome.

Reference

Bostock, P.D. & Spokes, T.M. 1998: Hymenophyllaceae. *In: Flora of Australia*. Vol. 48. Ferns, gymnosperms and allied groups. McCarthy, P.M. Ed. CSIRO, Canberra.

■ **"Field Guide to the New Zealand Orchids"** Ian St George, Bruce Irwin, Dan Hatch, Eric Scanlen, 2001 Edition. 135 pp. Paperback, The New Zealand Native Orchid Group (NZNOG), Wellington. ISBN 0-9597931-1-6. \$20 from Ian St George (see end of review)
Tricia Aspin, active member, NZ Native Orchid Group.

I had eagerly been awaiting the arrival of this new edition as my old one had disintegrated from overuse. I was not disappointed.

The book is based on the aims of, and the work undertaken by, members of the NZNOG over the last 29 years. The introduction states, "This new edition details the new names, adds to the descriptions and drawings to clarify differentiating features, and updates the distribution maps." It does this admirably. Most of the over 120 species and proposed species described are allotted a page each with an excellent drawing or drawings, a brief but comprehensive description and usually a distribution map.

This edition includes drawings of the structure of the flowers. The enthusiast eager to learn will find this most helpful. The updated notes are presented in an easy-to-follow manner and of added interest is the mention of the conservation status of each orchid. The inclusion of a glossary of the technical terms used is also appreciated. Heights are given in millimetres - I found myself converting to centimetres as used in the old edition.

The new Field Guide lists the genera, and, within each genus, the species or proposed species, alphabetically. There is no separation of the epiphytic and terrestrial orchids. I notice there is mention of eight epiphytes in the introduction, yet only one has an actual description as being an epiphyte. I assume the novice will recognise the other seven from the mention of trees, rocks, etc in the notes on habitat. A simple index may have been helpful in this regard.

A field guide is meant to be taken out into the field and worked with. It is an essential item in the back-pack on all rambles and field trips. The binding of the old edition would not allow it to lie open flat beside specimens being studied. I hope this one will. To the enthusiast and indeed all those with an interest in our native orchids, the new Field Guide with its added features must be the best value to be had for \$20 in a long while. I am definitely re-enthused. I recommend it.

Ian St George can be contacted at 22 Orchard St, Wellington; Email: istge@rnzocgp.org.nz)

Discounts from Manaaki Whenua Press – Manaaki Whenua Press offers members of Botanical Societies a generous 20% discount off all their publications except for their already bargain offer of all 5 volumes of the NZ Flora for \$100. As well as the fern book reviewed above, they have stocks of the excellent field book "Lichens of rainforest in Tasmania" price \$44.95. Do remember to mention that you are a BotSoc member when you order.

Arnold's Books, 11 New Regent St, Christchurch, are buyers and sellers of 'Antiquarian Natural History Books'. They put out a mouth-watering list of Botanical Books for sale. Check them out on <http://www.bydesign.net.nz/arnold>

Journals Received

New Zealand Native Orchid Group Journal 78 - March 2001

Edited by Ian St George [ISSN 1170-4543]

Original papers in this issue are: Bruce Irwin - More *Corybas trilobus* forms; Mark Moorhouse - Field observations on *Caladenia lyallii* in Nelson lakes district; Peter de Lange - Fire and threatened species management in a Waikato wetland; Max Gibbs - A photographic comparison between *Gastrodia* aff.

sesamoides and G. "city".

New Zealand Native Orchid Group Journal 79 - June 2001

Edited by Ian St George [ISSN 1170-4543]

Original papers in this issue are: Bruce Irwin - A small *Caladenia* from Turoa; Bruce Irwin - Making identification more difficult; Angela Abernethy - Orchid hunting in the Southern Ocean; Tricia Aspin - *Danhatchia*.

DESIDERATA

■ **The Great Drought of Summer 2000-2001.**

As inhabitants of the eastern sides of both main islands know all too well, this summer is continuing to be one of the driest on record, and one hears many stories of death and damage to plants, native and introduced, wild and cultivated. There is little doubt that the current drought is one of those extreme events, with ecological effects that are likely to persist long after the rains return. Too often, the evidence is noted but seldom put on permanent record.

I'd like to remedy this by suggesting that any observations you have made be communicated to a central repository. At least in the interim, until such a repository can be formally established, I am willing to act in this capacity. Therefore, I undertake to archive and make available any notes and observations that you wish to place on record. You could do this either by e-mail (wardlep@landcare.cri.nz) or writing to me at **Landcare Research, PO Box 69, Lincoln.**

Peter Wardle

