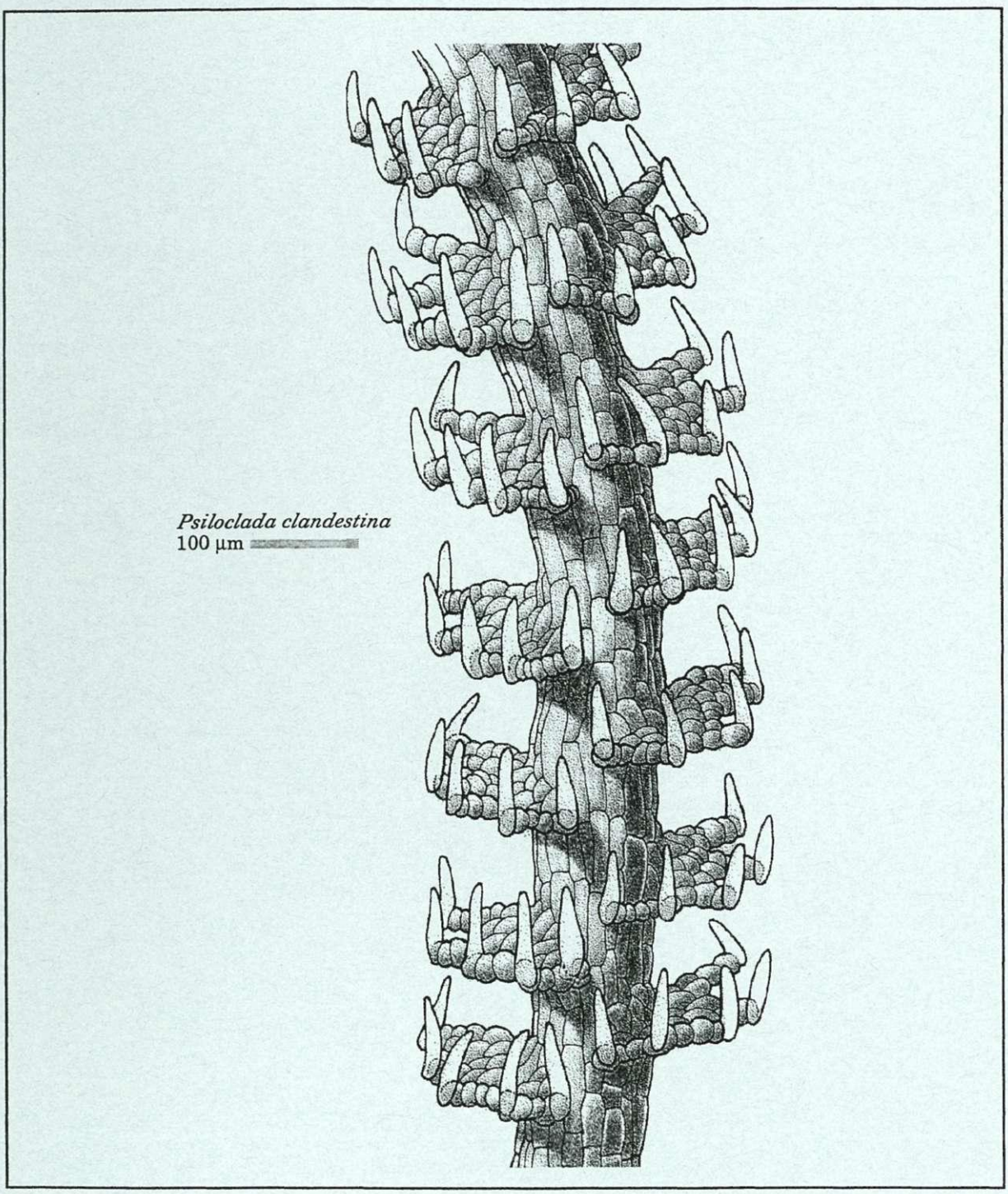
NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 63 MARCH 2001



New Zealand Botanical Society

Subscriptions

The 2000 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 June 2001 issue (Number 64) is 25 May 2001.

Please forward contributions to:

Joy Talbot
23 Salmond Street
Christchurch 8002

Contributions should be sent by e-mail to m.king@irl.cri.nz Files can be in WordPerfect (version 7 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

The liverwort *Psiloclada cladestina* is widespread in New Zealand but often overlooked because it's so small. It's leaves have been likened to human hands cupped but with the fingers spread apart. The hundreds of parallel "fingers" together form an airy cylinder around the stem that can store a prodigious volume of water.

[This is the last in the series of beautiful drawings from Bill and Nancy Malcolm's book "Mosses and other bryophytes: an illustrated glossary". Released last year this has been reviewed by John Steel in this issue (p. 22).]

NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 63 MARCH 2001

CONTENTS

New Zealand Botanical Society News

- **From the Secretary/Treasurer**

Committee election

Drs Norton Hiller and Jane Shearer, appointed as independent scrutineers by last year's committee, have reported back the result of the postal ballot for the Society's 2001 committee.

The successful candidates were Bruce Clarkson, Colin Webb and Carol West, and they are declared elected. They are joined on the committee by Joy Talbot, *Newsletter* Editor (ex officio); and, as reported in the last newsletter, Jessica Beever was returned as President and myself as Secretary/Treasurer.

Balance sheet for the financial year 1 January – 31 December 2000

INCOME	$	EXPENDITURE	$
B/fwd from 1999	3,810.12	Printing Newsletter No. 58 (1999)	1,005.75
1999 Subscriptions	477.00	Posting Newsletter No. 58 (1999)	282.80
2000 Subscriptions	4,764.00	Printing Newsletter No. 59	1217.25
2001 Subscriptions	45.00	Posting Newsletter No. 59	267.50
2002 Subscriptions	9.00	ECO Subscription	125.00
Sponsor a Student Sub Donation	323.00	Printing Newsletter No. 60	1384.88
Back Issue Sales	78.75	Printing Newsletter No. 61	1068.75
Interest Cash Drawer Saver	2.93	General Stationery	96.61
Interest Current Account	42.32	Bank Fees	2.50
TOTAL INCOME	$9,552.12	TOTAL EXPENSES	$5,451.04

Excess income over expenditure of $4,101.08 presented by current account balance of $744.40 and cash drawer saver account balance of $3,356.68 carried forward to 2001.

Note that 2000 payments for printing the December *Newsletter* 62 ($990.00) and postage and stationery for *Newsletter* 62 ($349.05) did not come to account until early January 2001. Also note that due to a change in staffing, accounts for posting and stationery of *Newsletter* 60 ($312.76) and *Newsletter* 61 ($323.51) were not received or paid for until January 2001, leaving an effective combined carry forward to 2001 of $1975.32.

Anthony Wright, Secretary, New Zealand Botanical Society 05 March 2001

Call for nominations for Allan Mere Award 2001

Nominations meeting the following conditions are invited for the award of the Allan Mere for the year 2001.

1. The Award shall be made annually to a person or persons who have made outstanding contributions to botany in New Zealand, either in a professional or amateur capacity.
2. The award shall be administered by the New Zealand Botanical Society.
3. Nominations for the Award may be made by regional Botanical Societies, or by individuals, to the Secretary of the New Zealand Botanical Society. Nominations shall close on 30th June each year. Nominations shall be signed by a nominator and seconder, and accompanied by two copies of supporting information that must not exceed one A4 page.
4. Selection of the successful nominee/nominees shall be made by the Committee of the New Zealand Botanical Society, normally within three months of the closing date for nominations.
5. If, in the opinion of the Committee, no suitable nomination is received in any particular year, the Committee may refrain from making an award.

6. The Mere shall be formally presented to the recipient on an appropriate occasion by the President of the New Zealand Botanical Society or his/her nominee, but otherwise shall remain in the custody of, and to be displayed by, the Herbarium Keeper of CHR at Landcare Research, Lincoln, together with the book recording awards.
7. The recipient shall receive an appropriately inscribed certificate.

Nominations should be forwarded to 30 June 2001 to:

Anthony Wright, Secretary, New Zealand Botanical Society, C/- Canterbury Museum, Rolleston Avenue, Christchurch 8001

■ From the Editor

This newsletter is late not because of all the late articles (and there were quite a few) but because of over-commitment in other areas of my, and my family's, life. For those who sent me articles on time - thankyou and my apologies. As I am reducing my other commitments slightly, from now on I really would like to have everything ready for the printer by the first week of the month following the deadline (it takes another week to print and mail the newsletters). Hopefully, by next newsletter I will have Email at home and the often long delay in responding to Emails, caused my husbands frequent trips away from Christchurch, will be remedied.

Joy Talbot

Regional Botanical Society News

■ Auckland Botanical Society

December workshop & potluck Dinner

The classroom at the Auckland Botanic Gardens was a suitable venue for this workshop taken by Mike Wilcox. Mike had a large number of named specimens, several microscopes available for close study, and a very useful booklet that he has written on the grasses found in the Auckland area. After the indoor session a ramble through the native section of the gardens down to an area of long grass on the bush edge allowed the participants to try out new skills of identification. The annual potluck dinner rounded off the day.

Anniversary Weekend Camp

The Poutu Peninsula on the North Head of Kaipara Harbour is an area of shifting dunes in the west, and consolidated sand towards the harbour. There are several lakes behind the dunes, and pines have been planted in large numbers to stop the drift of moving sand. The botanical interest centres around the lakes, the damp dune slacks and the occasional pockets of bush that still remain. It is also and interesting place for freshwater and shore birds. A large party of Bot Soccers camped at the Waikaretu Marae and were grateful for the assistance of the local community in transporting them overland, and even over water, to an island in the middle of the lake.

February Field Trip

Thirteen people turned out on a warm, rainy day for a trip up into the Mataitai Forest Conservation Area in the northern Hunua Ranges. The beginning of the walk led through kanuka scrub with lycopods growing beside the track. One member bent to study a stick-like growth and was surprised when a slight tug revealed a vegetable caterpillar underneath. *Hypolepis ambigua* and *H. distans* were seen , and higher up the hill was a kauri-hard beech association with large healthy specimens of beech. *Bulbophyllum pygmaeum, Drymoanthus adversus* (fruit) and a flowering spike of *Orthoceros novae-zeelandiae* were the orchids of the day.

FORTHCOMING ACTIVITES

7 March	AGM followed by a talk by Ross Beever - "Phytoplasmas, a threat to the native flora?
17 March	Bendall Bluff, Waitakere Ranges.

Maureen Young, 36 Alnwick Street, Warkworth.

■ Waikato Botanical Society

Waikato Botanical Society events in the recent past have included evening talks on New Zealand's coastal plants and the flora of Queensland and Norfolk Island, and field trips to Pureora (see account below), and most recently Kawhia to investigate the population of *Pimelea arenaria* present on the sand dunes.

The Waikato Botanical Society's 2001 AGM will be held at Landcare Research, Waikato University, Monday 19th March, 7:30pm, and will be followed by a talk from Avi Holzapfel on the fascinating *Dactylanthus taylorii*. A calendar of events for this year, with alternating monthly talks and field trips, is being finalised and will be included in the next newsletter.

Pureora Field Trip - a brief account of the hunt for *Pittosporum turneri* and *Melicytus flexuosus* at Pureora, October 14 - 15 2000.

Saturday provided us with a beautiful, sunny day for hunting down some rare plants that had previously been recorded at Pureora. *Pittosporum turneri* and *Melicytus flexuosus* are both on the list of nationally threatened and uncommon plants (de Lange et al. 1999). *Pittosporum turneri* is a small tree that is limited to the central North Island, with Pureora being the northern limit of its distribution. The juvenile leaves are small (up to approximately 20 mm long) and are commonly either toothed or lobed, while the adult leaves are larger (up to approximately 50 mm) and entire. While *Melicytus flexuosus* is in the same genus as mahoe (*Melicytus ramiflorus*), there is not much superficial resemblance between the two until you compare flowers and fruit. *M. flexuosus* (previously known as *M. angustifolius* and *Hymenanthera aungustifolia*) is a shrub or small tree with weeping, interlacing, almost leafless branches; leaves are sparse and small (up to approximately 30 mm long).

Our search for *P. turneri* was in the Carter Holt Harvey Reserve adjacent to SH30, for which a permit for entry is required. We located 8 individuals of *Pittosporum turneri* though a more extensive search would probably have revealed more individuals.

We searched for *Melicytus flexuosus* along the Kahaho stream. The prospects did not initially look promising as the area is in pine forest, but the stream terraces and banks are still in native vegetation. While travel along the stream was not easy, due to the steep banks and dense vegetation, we still located 37 individuals. Other uncommon species found were *Botrychium australe*, *Hymenophyllum atrovirens* and a large *Plagianthus regius* (ribbonwood).

Sunday provided an opportunity for Botanical Society members to do their own exploring, with a dawn visit to listen to kokako, and walks at Waipapa and Pureora mountain being favoured. All of the trip participants enjoyed the opportunity to search for, observe and learn more about two rare plants and the unusual vegetation types in which they were found.

Overnight accommodation was in the form of the very comfortable cabins at the park headquarters, courtesy of the Department of Conservation. Detailed information that was gathered about the locations of *Pittosporum turneri* and *Melicytus flexuosus* has been forwarded to them. – *L.C.*

REF: De Lange, P. J.; Heenan, P. B.; Given, D. R.; Norton, D. A.; Ogle, C. C.; Johnson, P. N.; Cameron, E. K. 1999: Threatened and uncommon plants of New Zealand. *New Zealand Journal of Botany 25*: 523-537

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

■ Nelson Botanical Society

November field trip: Serpentine Valley

About 17 intrepid botanists set off into new territory up the Serpentine Valley, a tributary of the Roding River. Beyond the first ford and alongside the Serpentine we all contributed to the species list (we had no professionals today). There were lots of ferns on one side of the road, including *Hypolepis rufobarbata, Lastreopsis velutina* and six species of *Blechnum,* and much discussion about the lancewoods on the

other side along the river. These turned out to be *Pseudopanax crassifolius* in spite of the large teeth on their leaves, which led to suggestions that they might be *P. ferox.*

We then went up, steeply in parts, on to some ultramafic country. Here we found *Pimelea suteri* in flower, a narrow-leaved, maroon-coloured *Astelia* (*A. graminea*), *Anisotome aromatica* in flower and many small clumps of *Colobanthus* "ultramafic". *Olearia serpentina, Craspedia* "Hacket" and *Carex devia* were other interesting species.

The last part of our day was down along the Serpentine River again with more *Craspedia* "Hacket" in muddy wheelruts on the roadside. A matai bearing pale gold cones was noted and several kowhai (*Sophora microphylla*). A scramble down a bank produced a 10 cm tall maire, a *Corybas* species flowering on a log, and *Carmichaelia australis*, but failed to turn up any filmy ferns. *Hebe* species seen were *H. salicifolia* and *H.stenophylla* var. *stenophylla.*

An exhaustive/ing species list was compiled, thanks to all contributors and the Editor! – *Gay Mitchell*

December field trip: Parachute Rock, St Arnaud Range
About a dozen of us left the carpark at St Arnaud on a beautiful day, determined to make it up the St Arnaud Range to Parachute Rock. We all managed to get there, with very little botanising done on the way up apart from a brief look at *Pittosporum patulum* beside the track. We had lunch on the rock and were entertained by a man who had carried his paraglider up there putting us to shame with our small daypacks. Then most of the party botanised their way to the top of the range, finding many alpines of interest nestled between clumps of snow tussock (*Chionochloa pallens*) and carpet grass (*C. australis*). These included five species of *Celmisia (C. spectabilis, C. monroi, C. incana, C. laricifolia, C. sessiliflora), Astelia petriei, Euphrasia monroi, E. zelandica, Kellaria dieffenbachii, K. laxa, K. multiflora*, *Hebe tumida, Raoulia grandiflora, Pratia macrodon* and the small *Notothlaspi.* A few of the party walked south along the ridgetop to the nearest highpoint, while a small group ventured down over scree (with *Haastia sinclairii* and *Parahebe cheesemanii*) on the other side of the ridge to a group of alpine tarns. A brief search around two of these turned up many different species including the native dandelion *Taraxacum magellanicum, Euchiton traversii,* the sundew *Drosera arcturi, Psychrophila novae-zelandiae, Ranunculus gracilipes, Celmisia gracilenta, C. alpina* and *Poa dipsacea.* This area of tarns would warrant more detailed exploration by energetic people prepared to start early in the morning (or rich enough to hire a helicopter!). Returning to the cars became a somewhat protracted process for a few of us who were not as fit as we had hoped, but it was worth it for a memorable day. – *Cathy Jones*

January field trip: Horseshoe Basin
Our unfriendly Mt Arthur jinx was with us again this trip. Fifteen members arrived at the Flora carpark to find a strong cold wind blowing, and threatening clouds building. It took no time at all to decide that venturing beyond the bushline was not on. We decided to head for Clouston's mine, (via Flora hut) hoping that the weather would clear later for us. It was to be a longish walk, so we didn't botanise till we turned off the main track just before the Gridiron shelter. From there on the well formed gently graded track through beech forest was new territory to almost everyone.

We were lucky to have Graeme and his wisdom with us. He spent time with several of our newer members pointing out the differences between some of our small leaved shrubs and was his usual informative self on many other shrubs and herbs.

Amongst other smaller plants we found three *Lagenifera* species close together - *L. strangulata, L. pumila* and *L. pinnatifida*. It was great to reacquaint ourselves with the orchid *Pterostylis irsoniana*, which some of us had met for the first time in October at Wakamarina. Other orchids spotted were *Gastrodia cunninghamii, Chiloglottis cornuta* and a *Thelymitra* allied to *T. longifolia*, which Graeme called "china blue". Its flowers were not open, and apparently are rarely so. A good fern find was *Hymenophyllum pulcherrimum*, uncommon in the area. Other ferns noted were *H. demissum, Asplenium lyallii, Blechnum montanum, Hypolepis millefolium, Lastreopsis velutina* and *Leptopteris superba.*

We continued on up the hill for a couple of hours after our lunch stop, but it was obvious that we were not going to break out of the bush for some time. The weather appeared to be closing in, so with some reluctance most of us turned back, leaving a couple to press on a bit further. It was a good walk, but we were disappointed not to have been able to explore the alpine basin. – *Jocelyn Lewis*

Anniversary Weekend Camp: Cobb Valley
Friday night saw 15 members cosily ensconced in two houses at the Cobb Dam. Unfortunately Saturday morning was not so cosy and we decided to forego our planned climb up Mt Mytton. Instead we walked in the rain up the main valley floor of the Cobb River, botanising intermittently. There was fresh snow on the mountains around us and we returned to our warm firesides around 4 pm. We had nevertheless seen some plants of interest including *Pittosporum patulum, Oreostylidium subulatum* (in fruit), *Potentilla anserinoides, Herpolirion novae-zelandiae* (in flower), *Gastrodia cunninghamii* (in flower) and the Cobb gentian with many flowers present but closed against the weather. The most striking plants were *Olearia virgata* ssp *implicita* and *Hebe* "marble" which were in full flower and looked lovely in spite of the rain.

On Sunday two people explored the chert quarry and cedar forest on Cobb Ridge while the rest of us were joined by four more members and climbed past Bushline Hut to the ridge behind Sylvester Lakes. We had a thin cloud/mist cover all day which gave good even light for photography and made climbing somewhat easier. As usual the area was full of treasures, including flowering plants of *Aciphylla polita, Gentiana bellidifolia, G.* "decumbent", *Epilobium margaretiae, Hebe hectorii* ssp. *coarctata, H. macrantha, H. masoniae, Euchiton mackayi, Euphrasia revoluta, Hierochloe recurvata, H. novae-zelandiae, Raoulia eximia,* and other interesting species such as *Dracophyllum pubescens* and *Notothlaspi* "non-australe". Graeme was a wonderful teacher once again, particularly with grasses, and found the threatened plant, *Deyeuxia lacustris* along the lakeshore.

On Monday Graeme ventured back up the valley to have another attempt on Mt Mytton while the rest of us started homeward with a stop for most of the day to walk through beech forest and then ultramafic scrub to Asbestos Cottage. In the area disturbed by the former serpentine mine there were many flowering plants of *Hebe albicans* and an attractive form of *Celmisia gracilenta* with dark, silvercoated leaves. Other ultramafic specialists such as *Carex devia, Chionochloa defracta,* and the sprawling ultramafic *Dracophyllum* were also present. Southern rata was in full flower with some stunning trees close to the track. We had lunch at the cottage which has been restored as a historic building, and then headed for home. – *Cathy Jones*

FORTHCOMING FIELD TRIPS
March 18: Teetotal - Les Moran
April 12-16: Easter Camp: Mid Awatere Valley, South Marlborough - Cathy Jones
May 20: Harwoods Covenant - Shannel Courtney

CONTACTS
President: Cathy Jones, Flat 2, 5 North Rd, Nelson. Ph 03 546 9499. Email:cjones@doc.govt.nz
Secretary-treasurer: Jocelyn Lewis, 22 Coster St, Nelson. Ph 03 547 2812. Email: tjlewis@xtra.co.nz

■ Canterbury Botanical Society

December 2000 Meeting & Field Trip: Ashworths Ponds
Trevor Patridge spoke about the dune system at Ashworths Beach, between Saltwater Creek and Amberley beach. The sand flats and interdune slacks have a good range of saltmarsh plants. The dunes are dynamic, with massive blowouts, with the flora being threatened by two & four-wheel drive activity and encroachment by pines. The area is named after James Ashworth who with his son farmed the land north of Saltwater Creek from 1859 and established a carrying business. On the field trip, passing through the stabilised dunes, we saw scattered plants of *Leptocarpus similis, Scirpus nodosus* and *Juncus maritimus*, saltmarsh species surviving in the absence of salinity. Common were *Lupinus arboreus, Coprosma acerosa,* young *Pinus radiata, Phormium tenax* and hare's-tail grass, *Lagurus ovatus.* The first large pond was surrounded by *Schoenoplectus pungens*, three-square. Crossing the toe of the foredune, we saw

much *Carex pumila* in flower and with green fruit. The dunes are dominated by marram grass, with tall *Senecio glomeratus* and *Pseudognaphalium luteoalbum*. On the extensive sand flats, *Triglochin striatum* was abundant, *with Selliera radicans, Samolus repens, Lilaeopsis* sp., *Sacrocornia quinqueflora, Cotula coronopifolia* and *Mimulus repens*. Around a second large pond grows *Schoenoplectus validus*, and *Plagianthus divaricatus*, saltmarsh ribbon wood. – *Bryony Macmillan*

Mount Cook Camp, 12-18 February

Generally good weather and magnificent scenery helped to make this a very successful camp. It will reported at greater length in the Canterbury Botanical Society Journal. Excursions were into montane, subalpine, and alpine vegetation around the Mueller Glacier and the lower Hooker Valley; Stocking Stream; Mount Sebastopol, Red Tarn and Governors Bush; a reserve near lake Pukaki and tarns at Birch Hill (the only rainy day); Blue lakes; Tasman Glacier; Tasman riverbed; Sealy Lake; Mueller hut track; Kea Point and Mueller moraines and Tasman-Hooker riverbed. A few of the botanical highlights were: *Pittosporum anomalum, Olearia moschata, Metrosideros umbellata* in full bloom but rare and inaccessible, *Myosotis macrantha, Gentiana divisa,* late-flowering *Ranunculus lyallii* and *Celmisia semicordata, Bulbinella gibbsii,* abundant *Korthalsella clavata* on a range of species, *Olearia fimbriata, Myosotis uniflora, Lobelia linnaeoides, Ranunculus sericophyllus, Celmisia hectorii* and *Hectorella caespitosa.* Outside the Mount Cook National Park were *Coprosma intertexta, Hebe cupressoides, Hypsela rivalis, Gratiola sexdentata, Elatine gratioloides, Glossostigma elatinoides, Hypericum japonicum* and *Isoetes alpinus.* – *Colin Burrows*

FORTHCOMING ACTIVITIES

April 6, Friday: Peter Bellingham, Landcare Research, will talk about natural disturbances in NZ forests.
April 7, Saturday: Quail Island. Leader, Colin Burrows.
May 11-13, Friday to Sunday: Autumn Camp, Hanmer Springs

■ Botanical Society of Otago

Reports from the Otago and Wellington Botanical Societies' Summer Field Trip.

This 10 day field trip was based at Borland Lodge, on the eastern boundary of Fiordland National Park, between Lakes Manapouri and Monowai. It ran from 29 Dec – 7 Jan, and the weather was a diverse as the botany and the botanists, ranging from skiffs of snow up on the tops of Mt Burns on the first outing to a warmly welcoming 30° C in sunny Invercargill. Reports of botanical interest follow, with more to come next newsletter.

Pukerau Red Tussock Reserve, "Burwood" Tussock Reserve and Redcliff Wetland Reserve. (29 Dec & 7 Jan)

Those who joined the convoy from and to Dunedin were treated to some interesting stops long the way. At first sight the remnant lowland plant community in Pukerau Reserve looked to be mainly red tussock (*Chionochloa rubra* ssp. *cuprea*) and wire-rush (*Empodisma minus*). Closer inspection soon had Gael and Val exclaiming over the number of different orchids in flower. Bastow's revelation that the peat was over 6.5m deep here, the deepest measured in Otago, and his question as to whether the *Sphagnum* or the *Empodisma* was the main peat-forming organism in New Zealand bogs provided something to ponder over for the rest of the trip. A highlight for me was finding several lichenised *Omphalina* in fruit. They are among the few lichens from the class Basidiomycetes, or toadstool fungi.

The second reserve was just west of Mossburn, beside the road to Te Anau. This montane hillside tussock community also contained a variety of orchids. There were many clumps of *Aciphylla glaucescens*, with their striking blue-green foliage and tall yellow flower spikes.

On the return journey we made a brief stop to look down at the Redcliff Wetland Reserve, where ponding has been re-introduced as a sanctuary for wildlife Then next stop was at Arne Cleveland's Pukerau nursery, where there were a great many native plants to admire and covet. – *Allison Knight*

Green Lake Landslide, Fiordland.
This landslide is believed to be the largest of its type on earth. Because of the lush growth of forests in Fiordland the landslide was disguised and it was not until 1976 that a geologist, Roger McPherson, recognised it as such. In 1994 it was fully documented by G. T. Hancox and N. D. Perrin.

The immense size of this 9 kilometre long landslide was appreciated by our members when viewed from a high vantage point on Mt. Burns, a part of the Hunter Mountains. The valley floor was seen to be covered in a series of rounded and pyramid shaped bush clad hills of fallen rock, between which were large boggy areas and tussock grassland. It spreads over an area of 45 square kilometres, filling the valley to a depth of 800 metres with some 27 cubic kilometres of rock debris, comprising semi-intact blocks.

The original large lake was filled and new lakes formed, the largest being Green Lake in the South. In the North is Pyramid Lake and Island Lake is in the centre of the valley. Water from the original lake flowed southwards into Lake Monowai, this exit was blocked and the flow reversed, and now the catchment flows northwards into Lake Manapouri.

This catastrophic collapse of a substantial part of a high mountain range occurred when the glaciers were retreating between 12,000 and 13,000 years ago. Geologists have found that the land broke away along a fault zone because it had been undercut by a glacier and was no longer supported by it. The final trigger was probably a large earthquake on the Alpine Fault off the coast of Fiordland.

This dramatically changed landscape is truly inspiring. And one doesn't have to climb a mountain to see it, as the 12 kilometre road from the Lodge goes right up to the Borland Saddle from whence a good view of part of the valley can be obtained. – *Audrey Eagle*

Reference
Hancox, GT , Perrin, ND. (1994) Green Lake Landslide: A very large ancient rock slide in Fiordland, New Zealand. 7th International IAEG Congress, Balkema, Rotterdam. pp 1677-89.

For more information email: g.hancox@gns.cri.nz, and for stunning aerial colour photos of the landslide see: http://www.gns.cri.nz/earthact/land_stab/green1.html

Manapouri, Hope Arm and Back Valley (1 Jan)
The organising committee had arranged a wonderful highlight for our first day of the new year - various combinations of boating across and walking beside beautiful Lake Manapouri.

We all drove to Manapouri, and from 9:00 am some went by launch to Hope Arm to walk back, others got one of several sailings of the ferry across the Waiau. Some walked in to Hope Arm and boated back; some walked the long loop: Manapouri - Back Valley - Hope Arm - Manapouri; and some did various walk-in-and-back options.The group I was with walked in to Hope Arm, taking the Lake track, not the longer Back Valley track. We enjoyed the very pleasant walking conditions alongside the river, beside the lake, and over an extensive boardwalk system. We walked through beech forest, mixed with a great variety of other vegetation.
The general appearance of the beech forest was extremely variable; sometimes the floor was thick with *Blechnum* ferns, sometimes it was a vast humpy field of mounding moss, sometimes there was a thick cover of beech saplings and sometimes the floor had a rich variety of other shrub and tree species.

The 3-wire bridge and the rotten-log-bridge were a bit of a challenge, but we reached the Hope Arm Hut in plenty of time for the boat rendezvous at 4:00 pm.

While we had been sheltered in the bush, the wind had picked up, making it impossible for the boat to land at the usual place. After much arm-waving and shouting between ship and shore, we sidled around the lake shore to a smaller, more sheltered cove, where the boat was able to pull in safely. The white-capped

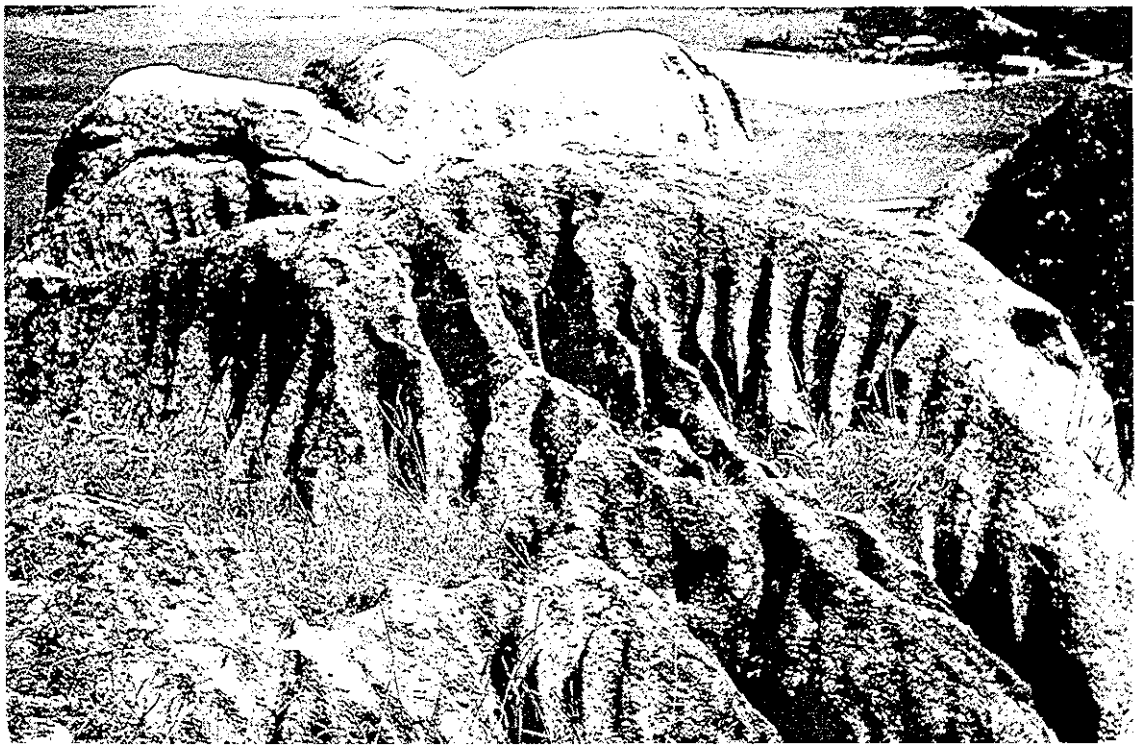
***Blechnum discolor* in beech forest.** Photo by Robyn Bridges

lake gave us a very bumpy ride back to Manapouri, between steep-sided hills dropping straight into the water, around islands splashed with red rata, and then slowly up the broad dark water of the Waiau River.

For me, the highlights of the day were more 'touristical' than botanical, but others listed these botanical highlights:
Val - Lots more orchid species than expected.
Moira - The tall *Plagianthus*, Kowhai and Kaikomako in the grove.
Ros - The large areas of 'mounding mosses' under the beech trees.
Chris H. - *Aristotelia fruticosa* (shrubby or mountain wineberry); *Melicytus flexuosus* (leafless porcupine plant) - a strange plant, with variable leaves; the variety of bush in the various understories; a 20m+ *Plagianthus regius*; 18m *Cordyline australis*; *Alepis flavida* (yellow mistletoe) in mountain beech, on the way down to the jetty.
Allison - Finding the newly re-named *Coprosma pedicillata* (=*C.* "violacea"), just as Neill Simpson predicted we should. – *Jill Goodwin*

Clifden Limestone (3 Jan)
On a lovely hot typical Southland day we botanised two limestone areas near the Clifden Historic Bridge. The day started slowly with a walk across the golf course and then the fun started. Led by a couple of intrepid pathfinders we bashed around at the base of the limestone bluff looking for a way to get up onto the top. There was a diversity of ferns at the base of the limestone scarp, mainly *Blechnum chambersii*, with maidenhair (*Adiantum cunninghamii*), hen & chicken (*Asplenium bulbiferum*) and others. The botany was interesting without being too exciting but once a short break was called near a more open seasonally wet area, species numbers and variability increased with several orchids and a small *Raukaua simplex* being noted.

The party then split with a group walking along the fenceline to get easier access up onto the top of the escarpment. This was mostly beech with an interesting understory of sedges and ferns, *Blechnum discolor* being particularly common. The descent was made outside the fenceline where the mistletoe *Tupeia antarctica* was seen on ribbonwood (*Plagianthus regius*) and *Ileostylus micranthus* on mingimingi (*Coprosma propinqua*), perhaps protected from possum depredation by the somewhat isolated nature of the trees. Of note also were a very large specimen of *Myrsine divaricata*, a specimen *Coprosma rubra* spotted just over the fence and a few *Olearia fragrantissima* plants.



Clifden Limestone. Photo by Robyn Bridges

After a leisurely lunch inertia seemed to have set in for a while but eventually a straggling procession made its way to the bush area on private land above the river. The main attraction here was the presence of both *Olearia hectori* and *O. fragrantissima*. Seeing them both together helped reinforce the difference between the two species, the zigzag branches of *O. fragrantissima* being the main determinant. *Tupeia antarctica* was seen growing on one of the *O. fragrantissima* trees. A large flowering specimen of *Aciphylla subflabellata* was also a notable find as was a plant of the rare sedge *Uncinia strictissima*. Concern was expressed about an exotic *Sedum* sp., which was noted growing on a number of limestone ledges. A specimen was taken for identification purposes.

Some of the group then made their way down to the beech forest beside the river where a number of *Gastrodia cunninghamii* plants were in full flower. These were heavily scented and the perfume permeated the air. Funnily enough some people could not detect the perfume and other comments ranged from it being delightful to rather cloying and unpleasant. Down on the river edge we were greeted with a lovely rata tree (*Metrosideros umbellata*) in full flower.

Overall another very enjoyable day of good company and good botanising. *– Pat Enright*

Eldrig Tops (4 Jan)

Fourteen renegade members forsook the flatlanders botanising option and headed for the tops around Eldrig Peak this sparkling day. The Eldrig Tops track was accessed from the pylon road after diverging from the main road in the South Branch of the Borland Burn. Leaving the vehicles at about 560 metres above sea level we began a steady ascent through a diverse shrubland; the aftermath of clearings under the pylon line. Here Gael highlighted for us the differences between two blue sun orchids, *Thelymitra pulchella* and *T. cyanea*, which are outwardly rather similar.

After critical appraisal, *Raukaua* (previously *Pseudopanax*) *edgerleyi* quickly became *R. simplex* in all its guises. Similarly, *Olearia lacunosa* transmogrified into a very faintly-toothed *Pseudopanax crassifolius* (lancewood) that at higher altitudes revealed itself to be unequivocally *P. linearis!* Learned botanisers,

beware. The leached gley soil over coarse crystalline granite rock meant that some species took on unfamiliar growth forms.

On reaching the first saddle the bush had a quasi-'gremlin forest' look, a further indication of the thin layer of peat over basement rock and a perched water table. The eight metre high canopy of *Dracophyllum longifolium*, interspersed with *Halocarpus biformis* (pink pine) and mountain beech, was pierced by emergent wannabe 'cedars'; giant *Leptospermum scoparium* (manuka) emulating round-topped kaikawaka. Throughout this zone the flowering mistletoe *Alepis flavida* was abundant on mountain beech at all storey levels.

From the forest we broke out among granite tors nestled in their gritty sandpits. Here the common 'smalls' were struggling – *Pentachondra pumila*, *Dracophyllum pronum*, *Oreobolus* sp.(alpine sedge), *Styphelia empetrifolia* et al. Views from the tors out across the saddle revealed a 3 to 4 metre canopy mosaic of open tree and shrubland dominated by pink pine and mountain beech. Of the tussocks, *Chionochloa rubra* held sway here.

The bogs in the saddle were crowded with the cushion mat, *Donatia novae-zealandiae*, the mat sedges, *Oreobolus stricta* and *O. pectinatus*, the beautiful narrow-petalled sundew, *Drosera stenopetala* and the wee pygmy pine, *Lepidothamnus laxifolius*. A streamside garden displayed bouquets of *Celmisia coriacea* and *C. petrei* nestled in a pretty setting and flanked by the red mid-ribbed *Astelia nervosa*, the robust pineapple scrub *Dracophyllum menziesii*, bright green *Hebe odora* bushes and the yellow-flowered alpine daisy *Dolichoglottis lyallii*, all underpinned by a carpet of tangle fern, *Gleichenia dicarpa*. Here and there the bog twinkled with the white flowers of *Oreostylidium subulatum*.

Beyond the tree line the curly-topped *Chionochloa teretifolia* dominated. *Caladenia lyallii,* (ahh that beautiful gland) was everywhere in flower. (Ian St George notes that New Zealand's first collection of *C. lyallii* was from Otago, by Dr David Lyall, surgeon on the *Acheron* –he must have got about – *A.K.*). Well ordered 'mini pineapple plantations' of *Celmisia lyallii* spiked the tussock land but many showed evidence of a 'harecut'!

At about 1200m the granite tors outcropped again; huge jumbled dice sculptured into fantastic shapes, many with basins of fresh water notched into their flanks. Craig Potton, eat your heart out. And now a whole new suite of plants appeared: *Geum uniflorum* with its large buttercup-like white flowers, *Ourisia sessilifolia*, sprawling *Celmisia walkeri*, brown furry edge leaved *C. traversii*, the semi-woody branched and trailing *C. ramulosa*, whipcord *Hebe hectori* and mossy cushions of *Chionohebe thomsonii* and *C. ciliata*. The surrounding granite sand desert was studded with jewels of white-flowering *Hectorella caespitosa* and contrasting red-tinted *Luzula rufa*.

***Celmisia* sp. and botanists.** Photo by Robyn Bridges

At this point some of the party headed for the grand views from the higher Eldrig Peak main ridge, while others drifted away down to the large tarn tucked under Eldrig's eastern slopes. Highlights here were *Aciphylla pinnatifida* with its bright orange bracts and yellow leaves poking out from snow groomed tussocks and seeps. Evident, too, were the succulent-like leaved *Euphrasia integrifolia*, the clumpy *Aciphylla crosby-smithii* and one stunning *A. congesta* cascading over a bank and topped with crowded flower heads. Other gems included *Gentiana montana* displaying pink-striped white petals, *Celmisia* sp flowering in profusion and *Ranunculus lyallii* popping its white flower heads out of the tussock on all sides.

Scenically and botanically the day provided a glorious eyeful for all of us. Comprehensive species lists of vascular plants were compiled by Graeme Jane and Gael Donaghy, with the able help of Southern Botanic Man Geoff Rogers. *– Les Moran*

Otatara (5 Jan)
The day, I was told, was a typical Southland day, calm and hot 26 -30° C. Our destination was Otatara, Invercargill, with three sites of Botanic interest to explore.

Bushy Point Boardwalk - Bushy Point Educational Boardwalk was a delight. Ian and Jenny Gamble have protected their forest with a QEII National Trust Covenant and have created a boardwalk through tall forest, manuka shrubland, wetland and estuary rushland. This area was previously grazed, and since this was stopped ten years ago, and eight hundred possums and 80 wild cats were eradicated, regeneration has been considerable. The boardwalk was constructed because very high tides come in to the area, occasionally almost to the home.

Forest plants seen included *Pseudopanax colensoi, P. crassifolium, Elaeocarpus hookerianus* (pokaka) *Coprosma grandifolia, C. rotundifolia, C. foetidissima, Melicytus lanceolata, Astelia fragrans, Podocarpus totara, P. hallii* and various hybrids of the two totaras, *Fuchsia excorticata, F. perscandens* and *Fuchsia* hybrids, *Aristotelia serrata, Dacrydium cupressinum* (rimu) and *Prumnopitys taxifolia* (matai). The ground cover was largely *Microsorum (=Phymatosorus)* fern species, *Astelia fragrans* and numerous seedlings of *Parsonsia capsularis*, the native jasmine.

Closer to the sea, the scrubland consisted largely of *Leptospermum scoparium* (manuka) on which was found the tiny dwarf mistletoe, *Korthalsella salicornioides*. Also present were *Coprosma propinqua* with the green mistletoe *Ileostylus micranthus*, and *Plagianthus divaricatus* (saltmarsh ribbonwood).

Towards high tide mark were grasses, the rare spiky hair-grass, *Deschampsia caespitosa*, and the introduced tall oat grass *Festuca arundinacea*, both in flower. *Leptocarpus similis*, the jointed wire rush, was very abundant. Saltmarsh herbs found included the coastal turf plants *Selliera radicans* and *Samolus repens*, as well as the native celery or shore parsley, *Apium prostratum*.

Bushy Point illustrates very well the lowland coastal zonation from forest to manuka scrub to salt marsh. A highlight was a very close encounter with a very curious fernbird.

Threatened Plant Garden – The next visit, to Brian and Chris Rance's Southland Threatened Plant Garden, was just up the road. Brian is a Botanist and Chris a horticulturalist and both have a passion for NZ flora. This garden is their 'hobby'. It was a rare privilege to see, without the effort of strenuous field work, all these rare and beautiful plants. They included *Clianthus puniceus* from East Cape, *Pittosporum dallii* from Nelson, the native brooms *Carmichaelia (=Chordospartium) stevensonii* and *C. muritai* from the top of the South Island, *Acaena rorida* from the Kaimanawa Ranges and *Hebe speciosa* from Nelson and Northland.

Special Southland plants included *Olearia hectori* and *O. fragrantissima*. Among the threatened grasses and sedges were *Deschampsia caespitosa, Carex tenuiculmis* and *Chionochloa spiralis*. Rare and threatened shrubland plants included *Pittosporum obcordatum, Melicytus flexuosus, Teucridium parvifolium* and *Helichrysum dimorphum*. Coastal plants seen were *Gunnera hamiltonii, Euphorbia glauca*

and *Lepidium oleraceum* (Cook's scurvy grass).

Other plants seen, some from offshore islands, were *Myosotis capitata, Brachyglottis stewartiae, Pratia avencinia, Aciphylla dieffenbachii* (soft, not spiky), *Geranium traversii, Muehlenbeckia euphedroides, Carmichaelia astonii, Uncinia strictissima* (very rare), *Brachyglottis compacta* and *Pimelia crosby-smithii*, with flowers smelling like honey.

Highlight was a treat of sausage rolls from Chris and scones again from Jenny Gamble, plus a handful of seeds of *Aciphylla dieffenbachii* for each of us to try and germinate.

Otatara Reserve – The third site visited was Otatara Scenic Reserve. Otatara is based on an ancient sand-dune system up to 6,000 years old. The reserve is in an urban setting, and consists of a coastal totara and totara-matai dominated forest, in the middle of which is a wet area largely made up of manuka. It is managed by the Invercargill City Council and has a good standard track. Parts of the reserve are heavily infested with weeds, notably Chilean flame creeper, blackberry and sycamore.

Plants noted were *Podocarpus totara, P. hallii* and hybrids, *Dacrydium cupressinum, Prumnopitys taxifolia, Dicksonia fibrosa, Myriophyllum triphyllum, Coprosma lucida, C. foetidissima, Pittosporum tenuifolium, Pseudopanax arboreus, Pseudopanax colensoi* and clumps of *Astelia fragrantissima*. Everyone remarked on the very large size of the leaves on all the broadleaved forest trees.

Dr Carol West, conservancy advisory scientist, Invercargill, accompanied us for the day and was a great source of information. We appreciated her being there. Quote of the day "It's hard to tell the totaras apart, but we do know that they are totary different". *– Joyce Wilson*

South Borland Burn Track (Jan 6)
The last afternoon excursion of the trip was kindly led by David Moss (Riverton, DoC), who reassured us by saying that he regularly took primary school children down these bluffs and he hadn't lost anyone yet!

At the top of the track from the Borland Saddle road we found a cluster of *Aporostylis* orchids flowering in a small, mossy hollow.

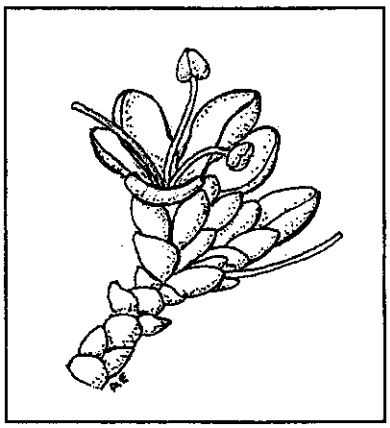
Soon we crossed the fault line from the Eldrig gneiss down into the forested limestone bluffs. This limestone is unusual as it consists of small rounded granite pebbles loosely cemented into the limestone, and is very crumbly.

Growing close to the limestone in this area of higher fertility was a stand of totara and also several southern rata (*Metrosideros umbellata*). The path descended through mossy mountain beech forest with attendant yellow-flowered mistletoe (*Alepis flavida*) then down along mossy silver beech river flats with the flowering, large-leaved red mistletoe (*Peraxilla colensoi*), high above in the 'possum cafes'. We noticed the meal remnants below on our path!

Ros did a great beetle impersonation in one of the slippery small streams we had to cross – she was rescued by Sir Tedword. Being the last day the Botanising had become a little sporadic, but lichening was avid to the last. Some of the party also noted mohua (yellow heads) calling in the tree-tops, and a unusually large number of slime-molds, both yellow and white, were noticed beside the lower track. Back at the Borland Nature Walk an arrow scratched in the ground alerted us to one last treat, the tall, sweetly scented flower of the unusual orchid, *Gastrodia*, that has no leaves or chlorophyll, but gains energy through a fungus that is parasitic on tree roots. *– Saskia Wood*

Summer Field Trip Participants:
Ted Abraham, Palmerston N. **Margaret Aitken**, Hutt Valley; **Tony Aldridge**, Christchurch; **Beth Andrews**, Eketahuna; **Sue Bennett**, Te Anau; **Barbara Bev**eridge, Wellington; **Peter Beveridge**, Wellington; **Robyn Bridges**, Dunedin; **Mary Bruce**, Dunedin; **Barbara Clark**, Porirua; **Gael Donaghy**,

Tauranga; **Audrey Eagle**, Dunedin; **Pat Enright**, Ngaio; **David Glenny**, Christchurch; **Ian Goodwin**, Wellington; **Jill Goodwin**, Wellington; **Chris Horne**, Wellington; **Ros Iles**, Wellington; **Rick Jackson**, Christchurch; **Graeme Jane**, Tauranga; **Allison Knight**, Dunedin; **John Knight**, Dunedin; **Robin Knight**, USA; **Beatrice Lee**, Southland; **Rory Logan**, Dunedin; **Alan Mark**, Manapouri; **Keith Mayhill**, Tauranga; **Pauline Mayhill**, Tauranga; **Lyne McFarlane**, Invercargill; **Julie McLintock**, Nelson; **Barbara Mitcalfe**, Wellington; **Les Moran**, Nelson; **David Moss**, Riverton; **Moira Parker**, Dunedin; **Brian Rance**, Invercargill; **Chris Rance**, Invercargill; **Mary Robertson**, Palmerston N.; **Geoff Rogers**, Dunedin; **Emil Schmieg**, Eketahuna; **Tui Slade**, Invercargill; **Rosemarie Smith**, Gore; **Val Smith**, New Plymouth; **Nola Walker**, Dunedin; **Carol West**, Invercargill; **John Whitehead**, Te Anau; **Bastow Wilson**, Dunedin; **Joyce Wilson**, Wellington; **Saskia Wood**, Wellington.



***Hebe annulata*, flower detail, approx. 4 x natural size, sketched by Audrey Eagle.** Finding this rare Hebe in flower on a high saddle in the foothills of the Takitimu Mountains was one of the highlights of this summer's Botanical Societies' field trip.
Audrey has placed the specimen she drew in the Otago Herbarium (OTA).

FORTHCOMING ACTIVITIES

21 March, Wed.7 pm: Highlights of the Summer Field Trip in Fiordland. Slides by Audrey Eagle and Rory Logan, photo displays by Robyn Bridges, Moira Parker and any one else who wishes to bring them! Supper. Zoology Annexe Seminar Room, as above.

25 March, Sun: Kelvin Lloyd will lead a full day field trip to totara-dominated forest in Awakiki Bush Scenic Reserve and to nearby Otanomomo, south of Balclutha. Meet 9am, Botany Dept car park, 464 Gt King St to car pool.

29 April Sunday afternoon: Varleys Hill, Otago Peninsula, between Hoopers and Papanui inlets. A QE II covenant belonging to John and Moira Parker. Meet 1 pm at Botany Dept car park, 464 Gt King St, to car pool, or at 1.30 pm at Hoopers Inlet Hall.

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. or see their webpage (address below).

Notes and Reports

Awards Made

- **Fellow of the Linnean Society of London**

It has just come to our notice that in May 1999, Umberto Quattrocchi, our most distant member, was elected a Fellow of the Linnean Society of London. Belated congratulations were sent by our Secretary on behalf of all members.

- **Distinguished Companion of the New Zealand Order of Merit**

Emeritus Professor Alan Mark was awarded the DCNZM in the New Years Honours list. Although "retiring" in 1998, as Professor Emeritus, after 38 years in the Botany Department, University of Otago he is active as ever both in the Botany Department and in the world at large. His research has embraced a wide variety of aspects of the ecology of southern New Zealand, with a particular interest in mountain vegetation. His book, "New Zealand Alpine Plants", written with Nancy Adams, has run to three editions over 20 years, and he is the author of well over a hundred refereed papers and scores of other reports and articles. He is perhaps best known for his research in, and championship of, snow tussock grasslands, both as entities in their own right, as areas contributing to water conservation and also as

neglected areas worthy of conservation in their own right.

Bridging the often wide gap between ecology, conservation, and other forms of land-use provided a challenge to which he vigorously and enthusiastically responded throughout his career - not only through research and debate but also through public service on bodies such as the Otago Catchment Board, the Otago Conservation Board, Chairman of the Guardians of Lakes Manapouri and Te Anau, member of the National Executive and sometime Chairman of the Royal Forest and Bird Protection Society.

Prof. Mark saw the award as a really important recognition of conservation. He was quick to acknowledge the contribution of others, as "conservation, by its nature, is a team effort". He considered the next big conservation challenge for New Zealand, and for Otago especially, was to push for the creation of a national park based on high country tussock grasslands. Central Otago high country, including the Old man Range, would be Alan's first choice.

Alan has inspired generations of students with his enthusiasm for plant ecology and conservation and continues to do so. Fittingly, Alan spent the last two days before New Year leading the first two days of the Otago and Wellington Botanical Societies' summer field trip at Borland Lodge.

[Thanks to Allison Knight and Professor Peter Bannister for assistance with this account – Ed.]

Notes

▪ Addition to Dr Lucy Cranwell Smith's bibliography in *NZ Journal of Botany 38.*

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

Dr Lucy Cranwell Smith's absence from New Zealand for most of her long career in botany will have made the compilation of a complete bibliography of her work (1) a difficult task. My Centre records include a reprint of a significant omission from the bibliography:

1953 An outline of New Zealand peat deposits, with notes on the condition of the rain-fed cushion bogs. *Seventh Pacific Science Congress 5:* 1-23.

Lucy's address is given as Cambridge, Massachusetts, before she settled with her husband Watson Smith in Tucson, Arizona. The reprint had been sent by Lucy to Dr H. H. Allan of the former DSIR's Botany Division.

Reference

Cameron, Ewen K. 2000: Obituary: Lucy May Cranwell, MA, DSc, DSc (Hon), FLS (Lond.) FRSNZ, 1907-2000. *NZ Journal of Botany 38:* 527-535.

Herbarium Report

▪ Otago Herbarium (OTA)

In the period 1st December 1999 to 30th November 2000, OTA accessioned 3012 specimens; 258 angiosperms, 14 pteridophytes, 1906 bryophytes, 36 algae, and 73 lichens. This brings the total collection size to approx. 30,000 vascular specimens and more than 20,000 nonvascular specimens. We loaned 134 specimens to other institutions, and received 691 specimens in loans. The seed collection is also being added to regularly. This is mainly a collection of seeds of native and introduced fleshy fruited species in the Dunedin area, and is proving very useful for identifying seeds from animal gut contents and faeces.

I am particularly interested in building up the weed collection in the Herbarium - we have relatively few accessions of important weed species; a good representation now can help in tracking the spread of weeds in the future.

Janice Lord, Herbarium Curator, Botany Dept., University of Otago, PO Box 56, Dunedin.

Biography/Bibliography

■ **Biographical Notes (41) : William Newsham Blair (1841–1891)**

E. J. Godley, Research Associate, Landcare Research, PO Box 69 Lincoln.

W.N. Blair, Civil Engineer and Public Servant, was born at Kilmeny on the isle of Islay, Inner Hebrides, in 1841 (probably 10 August) (1,2) and by the time of his death in his 50th year had become Engineer-in-Chief, New Zealand. His interest in timbers led to an interest in native trees and his writings helped bridge the gap between Hooker's "Handbook of the New Zealand Flora" (1867) and Kirk's "The Forest Flora of New Zealand" (1889).

Blair was educated at the Parish School, Ballygrant, and *aet* 16–17 was indentured to a surveyor and civil engineer at Oban on the Scottish west coast. Then *aet c.* 20 he joined the office of a civil engineer in Edinburgh, but lack of work led to his return to a surveying job on Islay and then to emigration. He arrived at Port Chalmers on the *Daniel Rankine* in December 1863, *aet* 22 and was at once employed on the provincial survey staff. As surveyor and road engineer Blair worked on the Dunedin, Clutha, Winton and Kingston railway lines; and in Dunedin on 22 January 1867 he married Mary Kennedy from Oban (1,2,3).

Blair is first listed as a member of the Otago Institute in 1870 (T1871). He spoke there in 1875 (13 July; 21 Sept.) and 1876 (5 Sept.; 31 Oct.) on the "Building Materials of Otago", the last dealing with Timbers (T1876, 77). These lectures, revised and extended, were published as a book in 1879 (4). In the third section of this book Blair briefly describes the distribution of forests in Otago–Southland from Martin's Bay around to Waikouaiti, and then describes the properties of the timbers of 18 native hardwoods and 13 native softwoods (10 gymnosperms, 3 beeches). He gives brief descriptions of each species and notes their distribution in the region. An important appendix lists the various names given by settlers and Maori to these trees in the far south.

In 1877 and 1879 Blair was Vice-President of the Otago Institute and President in 1878. His address as retiring President on 5 February 1879, has fortunately been published (T. 1879). He first reminds his audience that in a letter to the *Daily Times* in September, 1866 "a year before the New Zealand Institute Act was passed, and three years before the Otago branch was established" he had suggested the formation of such an association with the following objectives suitable to a new country: "The investigation of the natural resources of the country from an industrial point of view and their fitness to our everyday wants; the development of manufacturing; the encouragement of the construction of labour-saving machinery; and the consideration of engineering works generally in their application to the requirements of the country." He then argues that in the ensuing 13 years these objectives have not been attained.

> "I do not for one moment deprecate the efforts of those who devote all their energies to the investigation of purely scientific subjects; New Zealand, from its geographical position at the extreme end of the habitable globe, its peculiarities in Natural History, and its newness in almost every sense, will long remain an object of the greatest interest to scientific men. What I regret is that practical science should occupy far less of our deliberations than its theoretical *confrere*, whereas their positions should, in my opinion, be reversed. I would not, however, like to see the number of scientific men reduced. What is wanted is, that a somewhat more practical bias should be given to their studies—a great increase in the number of workers in applied science, and increased enthusiasm amongst the few that do exist. If half the energy that is sometimes displayed in considering the microscopic distinction between two species of animalcules was only applied to the investigation of our mineral resources, the result would be an incalculable benefit to the whole community."

Then, to an Institute later to be graced by John Scott Thomson, William Martin, James Murray, and David Galloway, he suggests that "instead of investigating the peculiarities of some minute lichen found only on Mount Cook or Mount Egmont, our botanists should first exhaust the study of the forest trees, their rate of growth, general habits, and facility of reproduction." But there was something to praise. "The labours of Dr Hector, Mr Kirk, Capt. Campbell Walker, and Mr Buchanan, have thrown great light on economic

botany so far as *Phormium*, timber trees and grasses are concerned, but the subject is by no means exhausted. We are still in the dark as to the habits, age, growth, habitat in relation to soil, elevation and climate, reproduction and cultivation, and numerous other particulars regarding the useful plants of the colony."

Captain Inches Campbell Walker (our first Conservator of State Forests), had visited Otago–Southland in December-January 1876–77 during his familiarisation tour to report on forests and forestry in the Colony, and had, of course, consulted Blair. With respect to the matai or "Black Pine" Walker wrote: "I am indebted to Mr W.N. Blair, of Dunedin, for having cleared up any doubts I entertained of this, by showing me the fruit of what he considered the true black pine, which is clearly *Podocarpus spicata*, the tree with the solitary fruit being the miro (*P. ferruginea*)."(5) (Presumably Thomas Kirk, who accompanied Walker for most of the tour, hadn't yet had a chance to demonstrate this point).

In 1878 Blair became Government Engineer-in-Charge of Middle (South) Island, and in 1884 was promoted to Assistant Engineer-in-chief leaving Dunedin for Wellington in May (6). In South Island he was particularly remembered for the Wingatui Viaduct near Dunedin and for the Rangitata River bridge. In central North Island he made important explorations for the Main Trunk Railway.

Soon after Blair arrived in Wellington Thomas Kirk dedicated a native beech to him at the meeting of the Wellington Philosophical Society on 1 October 1884. Blair had collected specimens near Lumsden on the Five Rivers Plain. These and their like are now considered hybrids.

In 1890 Blair was appointed Engineer-in-Chief and Under-Secretary for Public Works; but after a prolonged illness he died on 4 May 1891, at his residence "Goldesbrae" Wellington. His body was returned to Dunedin for a funeral service at the Knox Church, where he had been an office-bearer and convenor of the Building Committee; and he was buried in the Northern Cemetery (1,7).

Eponymy

1885 *Fagus blairii* "Hab. South Island. By the Little Grey River, Nelson. Head of Lake Wakatipu, Valley of the Dart, Otago: *T. Kirk*. Five Rivers Plain : *W.N. Blair*." T. Kirk *TNZI 17:* 297, t. 16.

Acknowledgements

Thanks go to the librarians, McNab Collection, Dunedin Public Library; and to Professor G.T.S. Baylis (Dunedin) for his hospitality, and Wendy Weller (Landcare Research) for her typing.

References

(1) Death of Mr W.N. Blair, *Otago Witness* 7 May, 1891; (2) T. Williams 1993: *DNZB 2:* 45; (3) G.H. Scholefield 1940: *DNZB 1:* 73–74; (4) W.N. Blair 1879: *The Building Materials of Otago and Southern New Zealand generally. Papers originally read at the Otago Institute revised and extended.* Dunedin. J. Wilkie & Co. Princes St.; (5) I.C. Walker 1877: Report of the Conservator of State Forests, with proposals for the organisation and working of the State Forest Department. *App. J. House Reps 1* (C3:22); (6) Hocken, T.M. 1898: *Contributions to the early history of New Zealand [settlement of Otago]*; (7) Deaths *Otago Witness* 14 May, 1891.

Dr Melva Philpson, a leading and versatile New Zealand botanist

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

The career of Dr Melva Noeline Philipson (née Crozier, b.1925) in science illustrates the ability of a biologist trained in botany and bacteriology to adapt to different fields of scientific research. A feature of Melva's distinguished career, like many other women scientists, was her re-entry into research after bringing up a family. In 1954 Melva married Professor W.R. Philipson (1911-1997), who was Professor of botany in the University of Canterbury (1954-76) after coming to New Zealand in 1951 from the British Museum's Department of Botany. Melva and her husband are included in a compilation of notable husband and wife researchers in science (12).

This article forms part of a larger account of notable New Zealand women in all facets of science in New

Zealand (12).

Regarding her early formative years, Melva comments (11),

"Although there were no botanists in our family, my parents came from families who were keenly interested in horticulture, as they were also. As an ardent Girl Guide I gained a Naturalist's badge, which was evidently so unusual that I remember a Commissioner came along to a meeting to present it to me. During work for the badge, I found a pink-flowered form of *Hebe lavaudiana* on an outcrop above Kaituna Valley [Canterbury]. It was identified for me by Mr L.W. McCaskill [1900-1985] who was then lecturer at Christchurch Teachers' Training College. Unfortunately, in those days no biology was taught in Secondary School, but there was a smattering of chemistry with emphasis on food science. At Secondary School I won a memorial prize for an essay on plant life in Canterbury." Obviously as a youngster, Melva already had a great interest in plants.

Melva was educated at St. Albans Primary School, Christchurch and Christchurch Girls' High School and Avonside Girls' High School, Christchurch. She graduated BSc (1948) from Canterbury University College,

"...as I was most eager to be involved in research, I worked on linen flax at Washdyke (South Canterbury), an outstation of Crop Research Division [former DSIR, LIncoln] where I had been employed during University vacations. It was here that I first met Ruth Mason [1913-1990] who was seconded to Washdyke during the war years from Botany Division." (11) It was during this time that Melva at the age of 25 published her first research papers (1,2) and she recalls they were refereed by Mr J.W.Hadfield (1887-1977), then Director of the former DSIR's Crop Research Division.

Melva next spent about 18 months with Fletcher Holdings setting up a small research laboratory at their linseed factory in Ashburton,

"...but then their policy changed, the Ashburton plant was closed and the linseed industry was concentrated at the large oil extraction factory in Dunedin."(11) Melva thus resigned and preferred to take a position in the former Department of Agriculture's Dairy Division in Wellington testing milk powder and cheese for export. She comments on this position (11),

"I enjoyed the chemical work but it was obvious that being female (unfortunately) and with only a bachelor's degree there was no hope of advancement. I therefore resigned and returned to Christchurch to study for an MSc." Melva was very interested in bacteriology though at this time microbiology was not taught at Canterbury University College and it was arranged that she should undertake a thesis under Dr I.D. Blair (1912-1989) in his Department of Microbiology at Lincoln Agricultural College (now Lincoln University), and attend seminars at Canterbury University College. Blair established the Department of Microbiology at Lincoln College in 1945, the first such Department in a New Zealand University, and the arrangement by which Canterbury University College students did masterate research under the supervision of Blair at Lincoln proved over the years a very satisfactory arrangement and produced many notable graduates in fields such as plant pathology. Melva graduated MSc (1953) with First Class Honours. Her thesis was entitled "Physiological studies on some bacteria isolated from clover roots". Part of this study on the *Rhizobium* bacterium associated with subterranean clover was published with Blair in the *Canadian Journal of Microbiology* (13). Melva remained in the Department of Microbiology until 1955 after completing her MSc and carried out research on bacteria responsible for producing brightly coloured stains in wool fleeces. She also isolated an actinomycete from fleeces which in culture was able to cause degeneration of both wool fibre and human hair (3).

The Philipson's eldest child was born in 1955,

"...and I was thoroughly immersed in family matters for the following 8 years (approx.) during which our other 3 children were born. During this time I turned my botanical interests to rock gardening. We had a fine collection of plants, many raised from seed collected in alpine regions overseas. It was at this time that my interest in the genus *Rhododendron* was kindled as I grew many of the small species in the rock garden and in addition was enthralled by the different forms contained in the garden at Ilam [Christchurch], the estate that had been purchased by the University of Canterbury from the family of the late Edgar Stead [1881-1949], an internationally known rhododendron hybridist. The fact that nobody could identify the range of species there stimulated me to become familiar with this very large genus

myself, so I made full use of overseas travel during Bill's [Professor W.R. Philipson] study leaves, spending time whenever possible in herbaria of important centres in Great Britain and USA, and also among living collections."(11) In this way Melva established a specialist interest in rhododendrons which initiated her re-entry into active participation in science as the family became less dependent.

Melva's re-entry into active science was facilitated by her appointment in 1962 as a part-time assistant to Dr Eric Godley (b.1919), then Director of the former DSIR's Botany Division at Lincoln. With the far-sighted approval of Eric, Melva began to build up a herbarium of *Rhododendron* species and the basis of this herbarium was a set of George Forrest's *Rhododendron* collections in China which Melva was able to acquire while spending several weeks in the Herbarium at the Royal Botanic Garden, Edinburgh in 1968. The genus *Rhododendron* is significant in New Zealand horticulture and the assembling of a representative collection of members of the genus would have been an important contribution to science and to horticulture, but Melva commented that the project lost favour after Eric relinquished his position as Director in 1980. However, the project was favourably viewed by Dr W. Harris (b.1940) who had been appointed Director in 1982. But by then Melva had become immersed in electron microscopy and the final setting up of the *Rhododendron* herbarium had to wait until after Melva's retirement at the end of 1990. The herbarium is a significant resource for researchers and horticulturists and will facilitate the correct identification of rhododendron plants. Melva found cotyledonary form to be of taxonomic significance (4). Research on the genus was greatly enhanced when Professor Philipson joined his wife in a study on various aspects of the genus that needed elucidation. So together the Philipson's began a period of active research, including work on the morphology, anatomy, taxonomy and the history of the classification of the genus. Their early work on embryology attracted the attention of Dr Barbara F. Palser of Rutgers University, New Jersey, USA and they embarked on joint research projects on the genus,

"...which occupied us periodically (mostly in private time) for some 20 years" (11). Their co-operative research has resulted in 3 major joint publications (18,19,20) and became the largest embryological survey of a plant genus so far achieved. Taxonomic revision work on *Rhododendron* was continued in association with the Royal Botanic Garden, Edinburgh which has been the centre for research on the genus. The revision of the Subsection *Lapponica* (17) was the first recent *Rhododendron* revision undertaken outside Edinburgh. A revision of four subgenera of the Azalea complex was also undertaken. As well as recording all this research in international botanical journals and as invited speakers at International Conferences in New York and Edinburgh, articles were published in bulletins of various Rhododendron Societies and in horticultural journals.

To improve her prospects for advancement in the former DSIR's Botany Division, Melva decided in 1974 to study for a PhD. She had been employed as a part-time temporary staff member but for some years had spent the greater part of the working week at Botany Division. She had become interested in electron microscopy and was seconded to the Electron Microscopy Unit in the University of Canterbury's Department of Botany to work under Dr B.A. Fineran. She graduated PhD from the University of Canterbury in 1977 with a thesis on embryology and ultrastructure entitled "Apomixis in *Cortaderia jubata*". The research elucidated the form of apomixis in the South American grass *Cortaderia jubata* and was published in the *NZ Journal of Botany* (6). With the completion of her Ph.D., Melva was promoted in 1977 to the full-time permanent staff of the Botany Division.

A notable finding in Melva's doctoral thesis was the recording and description of haustorial synergids (5) which are of rare occurrence in the embryo sac of flowering plants. They were later located in some other danthonioid grasses (16) and recently have proved to be an important character in the systematics of danthonioid grasses. During the course of the study, a number of interesting features were noted in the North American grass *Danthonia spicata*, and subsequently investigated. In addition to haustorial synergids, fungal hyphae, which proved to be those of a previously unknown endophyte (14) were found to be present in the embryo sac, co-existing apparently in a benign manner with the developing embryo. Yet another result of this study of *Danthonia spicata* was a clarification of its breeding system (7) which for more than 100 years had been a subject of some controversy. These findings were instrumental in directing Melva's attention to pastoral endophytes which were the major theme in her later research.

Melva established herself as the leader in electron microscopy at the former DSIR's Electron Microscopy

Unit at Lincoln. Her initial use of the electron microscope involved an ultrastructional study of nectaries and nectar production in New Zealand plants and she comments on this research project (11),

"Sadly, this [project] was not considered to be of sufficient economic importance in our changing and difficult times, so I turned to an in-depth investigation of endophytes of pasture species, with special emphasis on the symptomless endophytes of *Lolium perenne* (a major pasture grass of New Zealand and because of its endophyte associate is the cause of ryegrass staggers in grazing animals), and on *Festuca arundinacea*.

My investigation of the association of *Acremonium* and ryegrass during the annual cycle of growth and reproduction of the host was the first ultrastructural study of its kind and provided a better understanding of the plant-fungus relationship. It also proved wrong the theory that transmission of the endophyte occurred as the seed germinated, for evidence was presented that the endophytic hyphae, which lie between cells of the shoot apex during the growth phase of the grass, enter the developing ovule via the placenta when the apex becomes reproductive and invade the embryo during its early development." Two endophytes have been recorded in both *Lolium* and *Festuca* in New Zealand. Melva's research showed that the two endophytes often occurred together in the same grass and their periods of abundance in leaf sheaths varied. A significant contribution to knowledge of symptomless endophytes was the discovery of sporulation on the host plant by two of the associates (*Gliocladium* and *Phialophora*) of the *Acremonium* endophytes (8,9,10). Until this time, symptomless endophytes were not known to sporulate on the host plant. In addition, ultrastructural studies revealed previously unknown details of the endophytes.

Melva comments on her ultrastructural studies on the endophytes (11),

"It is salutary to reflect that a study of an obscure embryological feature (haustorial synergids) which might be described as pure research, was instrumental in directing the course of investigations which yielded new knowledge of practical and economic importance to agriculture."

During Melva's tenure of the position as leader of the Lincoln Electron Microscope Unit, the facilities were upgraded and the original Hitachi HU-IIB installed in the 1960's was replaced with a Zeiss 902 transmission electron microscope with electron spectroscopic imaging capabilities.

Melva has published about 47 research papers in a variety of botanical journals both in New Zealand and overseas. At the age of 30, which I use as a measure of the age at which a scientist becomes active in research, she had published two papers (1,2). Melva's publications also include general articles in the more popular journals. Melva's different eras in research are represented by her early publications in microbiology, a large body of published research on *Rhododendron*, and her later research relating to the endophytes of perennial ryegrass and fescue.

In retirement Melva and Bill built an elegant home and magnificent garden in the small southern Wairarapa town of Greytown. The garden includes a great range of species and especially rhododendrons. The garden was described with some fine illustrations in *N.Z. House and Garden* (21).

Among many overseas trips made by Melva was a botanising expedition to China in 1999 with a group from Pukeiti. They were accompanied by three Chinese botanists and explored the mountain area in North West Yunan near the Tibetan border. Melva commented,

"The alpine flora of China is out of this world" (22).

Acknowledgement

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

References

1. Crozier, Melva N. 1950: Microscopic examination of the sectioned stem of linen flax (*Linum usitatissimum*). Part 1: Microscopic analysis as a means of pre-determining yield of scutched fibre. *N.Z. Journal of Science and Technology 31A:* 17-22. **2.** ___1950: Microscopic examination of the sectioned stem of linen flax (*Linum usitatissimum*). Part 2: Examination of quality factors and their correlation with commercial grading. *N.Z. Journal of Science and Technology 31A:* 23-30. **3.** Philipson, Melva N. 1957: Actinomycete disintegration of raw wool. *Nature*

180: 1205-1206. **4.** ___ 1970: Cotyledons and the taxonomy of rhododendrons. *Notes from the Royal Botanic Garden Edinburgh 30:* 55-57. **5.**___1977: Haustorial synergids in *Cortaderia* (Gramineae). *N.Z. Journal of Botany 15:* 777-778. **6.**___1978: Apomixis in *Cortaderia jubata* (Gramineae). *N.Z. Journal of Botany 16:* 45-59. **7.** ___ 1986: A re-assessment of the form of reproduction in *Danthonia spicata* (L.) Beauv. *New Phytologist 103:* 231-243. **8.** ___ 1991: Ultrastructure of the *Glioclodium*-like endophyte of perennial ryegrass (*Lolium perenne* L.). I. Vegetative phase and leaf blade sporulation. *New Phytologist 117:* 271-280. **9.** ___ 1991: Ultrastructure of the *Glioclodium*-like endophyte of perennial ryegrass (*Lolium perenne* L.). II. Sporulation in the leaf sheath. *New Phytologist 117:* 281-288. **10.** ___ 1991: Ultrastructure of a symptomless fungal endophyte of *Festuca arundinacea. Botanical Gazette 152:* 296-303. **11.** ___1992: Biographical notes accompanying letter to A.D.Thomson, 24 June. **12.** Thomson, A.D. 2001: "New Zealand Women in Science". To be published. **13.** Blair, I.D. and Philipson, M.N. 1957: Bacteria in clover root tissue. *Canadian Journal of Microbiology 3:* 125-129. **14.** Philipson, M.N. and Christey, M.C. 1985: An epiphytic fungal associate of *Danthonia spicata* transmitted through the embryo sac. *Botanical Gazette 146:* 70-81. **15.** ___ 1986: The relationship of host and endophyte during flowering, seed formation and germination of *Lolium perenne. N.Z. Journal of Botany 24:* 125-134. **16.** Philipson, M.N. and Connor, H.E. 1984: Haustorial synergids in danthonioid grasses. *Botanical Gazette 145:* 78-82. **17.** Philipson, Melva N. and Philipson, W.R. 1975: A revision of *Rhododendron* Section *Lapponicum. Notes from the Royal Botanic Garden Edinburgh 34:* 1-71. **18.** Palser, B.F.; Philipson, W.R. and Philipson, M.N. 1971: Embryology of *Rhododendron.* Introduction and ovule, megagametophyte, and early endosperm development in *R. yunnanense. Journal of the Indian Botanical Society Golden Jubilee 50A:* 172-187. **19.** ___1989: Development of ovule, megagametophyte and early endosperm in representative species of *Rhododendron* L. (Ericaceae). *Botanical Journal of the Linnean Society 101:* 363-393. **20.** ___1991: Characteristics of ovary, ovule and mature megagametophyte in *Rhododendron* L. (Ericaceae) and their taxonomic significance. *Botanical Journal of the Linnean Society 105:* 289-390. **21.** Collier, Gordon 2000: Botanic garden. *N.Z. House and Garden July:* 106-112. **22.** Philipson, Melva N. 1999: Letter to A.D. Thomson, December.

Publications

Book Review

■ ***New Zealand Lichens*** **Bill and Nancy Malcolm. 2000. Micro-optics Press, Box 320, Nelson. ii + 134 pp. A5 format. ISBN 0-9582224-0-1. $42.50.**

In 1997 Bill Malcolm was the first author of *New Zealand Lichens*: checklist, key and glossary. This is an immensely valuable tool for those who are seriously collecting and studying lichens. Now the Malcolm's have produced a book about lichens for the all those who are curious about their environment.

This small book is an important addition to the literature about N.Z.'s natural world. It fills a niche long empty. As the book explains "home is almost anywhere" for lichens, so people see them everywhere, but few know what they are or how they live. This book will help them to see more and understand more of what they are seeing.

In clear, fun to read language we are told what a lichen is, where they live, how they reproduce, how they evolved, how they interact with and what they can tell us about the environment. We also learn the uses lichens have been put to in history. A large amount is explained about lichens specifically, but also about scientific terms, botanical nomenclature and biochemical processes. It is a rewarding read due to this varied, but relevant information, and will be a useful book for teachers of the biology sciences.

In addition to the lucid text there is an amazing array of photographs and drawings, over 300 of them, most in colour. They are of the high quality we have come to expect of the Malcolm's work. The photographs show the diversity of forms and colours lichens take, the shapes and colours of their fruiting bodies, and some of their anatomy as seen through a microscope. The drawings help us to understand all the aspects of lichen reproduction. We see that even their spores are interesting and varied. The relationships of the partners that make up a lichen, no simple matter, are also pictured. In fact, every aspect of the text is well illustrated and enriched thereby.

This book is well worth buying. If you don't already know all about lichens, your next walk around the town or tramp in the bush or along the beach will be much more rewarding having read it.

Barbara Polly, Research Associate, Te Papa, Museum of New Zealand. PO Box 467 Wellington.

Discounts from Manaaki Whenua Press – Mannaaki 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 two books 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.

Arnolds 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

DESIDERATA

- **Request for information on changes in weed abundance**

Susan Timmins and I at the Science & Research Unit, Department of Conservation are working on an investigation into the interactions between mammalian pest control and changes in weed abundance. We are collecting anecdotal and quantitative information and thought Botanical Society members could be a great source of information.

Would you be able to answer the following questions, given your observations whilst on botanical field trips?

1. Have you seen changes in the presence or abundance of weed species in relation to animal pest control work?
2. Where and what animal pest/s were controlled?
3. What weed species were more or less abundant or did not change?
4. What sort of habitat/vegetation community did any changes occur in? Please comment on general vegetation composition, e.g. if predominantly native or exotic prior to animal pest control.

Thanks for your time
Kind regards
Julie Geritzlehner
Department of Conservation
P.O. Box 357
Westport
Ph: 03 788 8016, Email: jgeritzlehner@doc.govt.nz

- **Free to a good home**

The following journals are available for free uplift in Christchurch:

Tane, Journal of the Auckland University Field Club v ols 8-34 inclusive;
Taxon, Journal of the International Association for Plant Taxonomy, vols 14(1) – 18(6), 21(1) – 33 (3) inclusive;
Regnum Vegetabile, vols 40, 41, 43, 44 47.

Anthony Wright, C/- Canterbury Museum, Rolleston Avenue, Christchurch 8001

- **Specimens for the final volume of Eagle's "Trees and Shrubs of New Zealand"**

Audrey is pleased to advise that she has completed illustrations of another 5 plants from specimens received this summer, so the following can be removed from her request list:

Pittosporum Kermadec Island form
Olearia virgata ssp. *centralis*

Rubus schmidelioides var. N. W. Nelson form
Coprosma ciliata Eastern S. I. form
Coprosma pseudocuneata S. I. Form

NOTES

Raven Press, Christchurch, New Zealand

ISSN 0112-6865