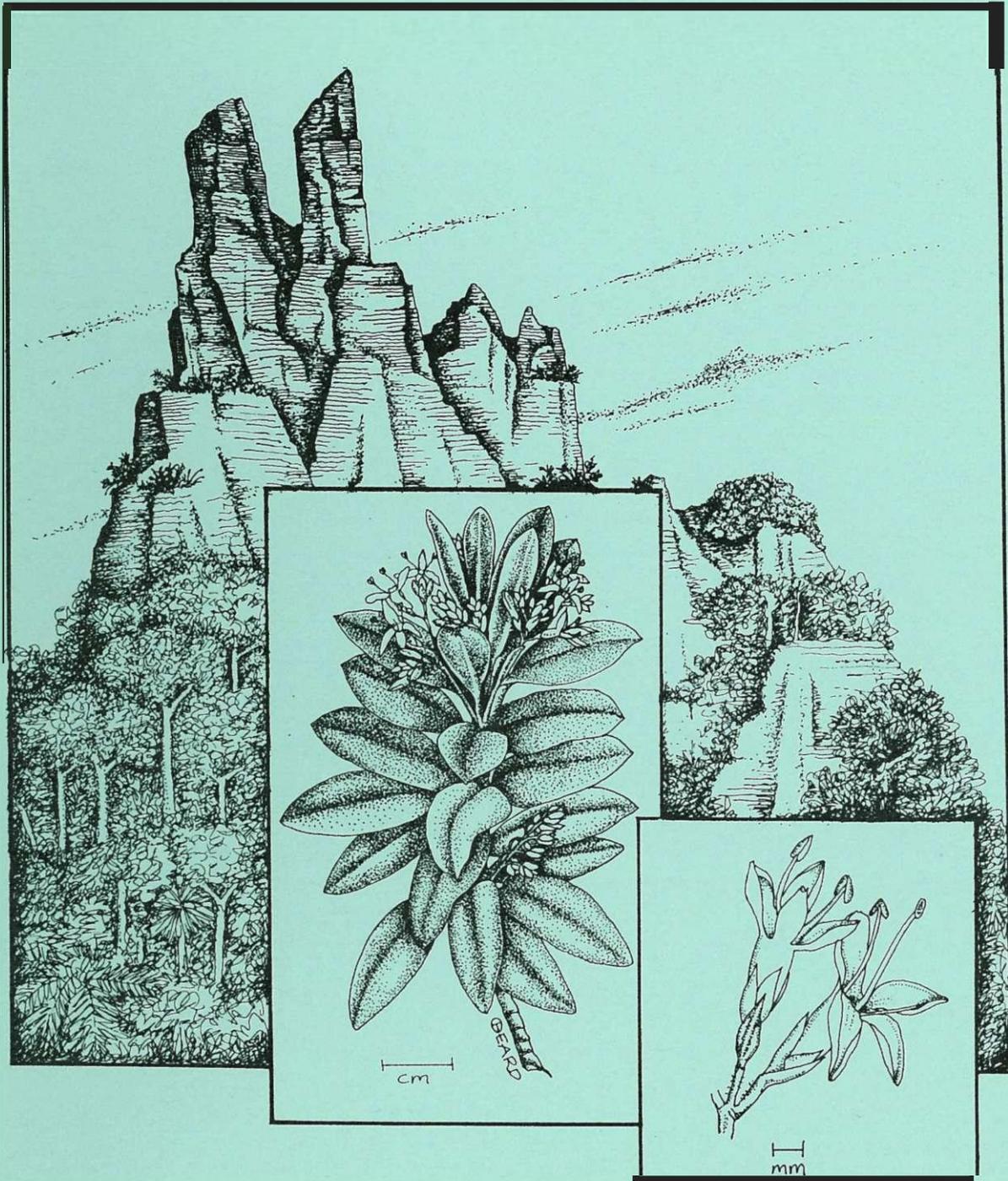


NEW ZEALAND BOTANICAL SOCIETY
NEWSLETTER

NUMBER 34

DECEMBER 1993



New Zealand Botanical Society

President: Dr Eric Godley
Secretary/Treasurer: Anthony Wright
Committee: Sara Beadel, Colin Webb, Carol West,
Beverley Clarkson, Bruce Clarkson
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Subscriptions

The 1994 ordinary and institutional subs are \$14 (reduced to \$10 if paid by the due date on the subscription invoice). The 1994 student sub, available to full-time students, is \$7 (reduced to \$5 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 34 (December 1993). 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 28 February of 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 March 1994 issue (Number 35) is 25 February 1994.

Please forward contributions to: Bruce & Beverley Clarkson, Editors
NZ Botanical Society Newsletter
7 Lynwood Place
HAMILTON

NEW ZEALAND BOTANICAL SOCIETY
N E W S L E T T E R
NUMBER 34 DECEMBER 1993

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Cover illustration

Hebe "Awaroa". Drawn by **Catherine Beard**, Herbarium Keeper at the Biological Sciences Department, University of Waikato. See article on p. 9.

NEWS

New Zealand Botanical Society News

■ From the Secretary

Nominations for 1994 Officers and Committee positions for the New Zealand Botanical Society received by the closing date of 20 November 1993 were:

President	Dr Eric Godley
Secretary/Treasurer	Anthony Wright
Committee	Sarah Beadel, Colin Webb, Carol West

As the number of nominations equalled the number of vacancies there was no need for a ballot and the above are declared elected.

Newsletter Editors for 1994

Bev and Bruce Clarkson have been re-appointed as joint Editors of the Society's *Newsletter* for 1994. Their contract address is:

Bruce and Beverley Clarkson
NZ Botanical Society Newsletter
7 Lynwood Place
HAMILTON

With this re-appointment, Bev and Bruce continue as members of the NZBS Committee ex officio. Please support them in their endeavours to maintain a newsy and informative *Newsletter*. Many thanks to them both for this year's *Newsletters*.

Subscriptions for 1994

Subscriptions for next year (if you pay promptly!) remain unchanged, as indeed they have since the inception of the Society. Ordinary subscriptions are \$14 (reducible to \$10 if paid by the due date); student subs are \$7 (reducible to \$5 if paid by the due date). An invoice for 1994 subscriptions accompanies this issue of the *Newsletter*.

Regional Botanical Society News

■ Canterbury Botanical Society

Summer Camp

Catlins area, South Otago, Monday 3 to Monday 10 January 1994. The Tautuku Outdoor Educational Centre has been booked. It is 32 km south of Owaka on S.H.92. It is set in indigenous lowland forest. There are many bush walks in the area, as well as coastal walks, plus seaweeds to explore. There will be plenty to do and see. The cost per night is likely to be \$7-00 but depends on the number attending. Full details on the camp will be sent in December to all those booking. Please book either at the November meeting and pay the \$20-00 per person deposit or by post to P O Box 8212, Christchurch, giving name, address, numbers attending, and enclosing the deposit. Please advise if you require transport, and book by 10 December.

Car pooling: will be arranged for the camps. Further information on either camp can be obtained from Ron Close 348 9231.

Advance notices

February meeting: Friday 4 February 1994, 8.00 p.m., Room A6, Arts Lecture Block, University of Canterbury. Speakers: Bot. Soc. members, on their 1993-4 activities, a "show and tell" evening. So sort out some slides, colour prints and specimens for this. One of the Committee will co-ordinate.

February field trip: Saturday 5 February & Sunday 6 1994, Cass Field Station. Travel to Cass, collect lichens and study in the laboratory there under the guidance of Howard and Elizabeth Lintott and Colin Meurk. Travel to Broken River ski area on 6th for field study of lichens in forest and alpine zone.

October meeting report

On Friday 15 October the book "Small-leaved Shrubs of New Zealand" was launched by Dr. Godley at this gathering of members and friends. A social half-hour enabled people to talk, and buy the book. The formal part was introduced by Ron Close, then Colin Webb of Manuka Press outlined their involvement in the project, and Dr. Godley, in launching the book stressed its importance for all those involved in identifying species in this group of plants. Hugh Wilson, in reply, stressed the great support that he and Tim Galloway had received throughout the duration of the project.

Hugh Wilson then gave an interesting and informative talk on small-leaved shrubs. He drew a parallel between the occurrence of webbed feet in different and unrelated bird species, and the small-leaved, divaricating form found in many unrelated plants. It was also an opportunity to outline the moa-browsing theory as a cause of divaricating shrubs, versus harsh climate as a cause.

Supper concluded the evening, and was a time for members to get their books autographed by the author.

Ron Close, Canterbury Botanical Society, P.O. Box 8212, Christchurch

■ Nelson Botanical Society

September field trip report

The September field trip from Opouri Saddle to Tennyson Inlet proved an interesting transect from an upper forest of rata (*Metrosideros umbellata*), kamahi (*Weinmannia racemosa*) and hard beech (*Nothofagus truncata*) to lowland forest containing pukatea (*Laurelia novae-zelandiae*) and nikau (*Rhopalostylis sapida*), ramarama (*Lophomyrtus bullata*) and titoki (*Alectryon excelsus*). It was an easy walk and well worth a visit in the summer when the hanging orchids, *Dendrobium cunninghamii* and *Earina mucronata* are in flower.

October field trip report

The October Field trip was a coastal walk from Split Apple Rock to Ngaio Bay. The walk down through the Split Apple subdivision provided a wide range of species planted by the developers and not usually seen in the area. The descent onto the shore passed through a substantial piece of forest which provided a wide range of ferns and orchids the most notable of which were *Hymenophyllum cupressiforme* and *Cyrtostylis reniformis*. The shore walk to Ngaio Bay revealed a great array of orchids with three species of *Pterostylis* being seen - *P. banksii* and *P. graminifolia* both being in flower and carpets of *P. alobula* rosettes.

The Labour weekend had superb weather. Base camp was two houses at Paturau which accommodated the crowd of 27. On Saturday we first visited Mangarakau Scenic Reserve where the highlights were the *Brachyglottis hectorii*, *Pittosporum cornifolium* perching in the clumps of *Collospermum hastatum* on rata (*Metrosideros robusta*) and huge pukatea (*Laurelia novae-zelandiae*), and the tiny *Hymenophyllum minimum*. For the orchid fans there were the dark tubes of the spider orchid *Corybas oblongus*. Later we wandered the southern shore of Whanganui Inlet seeing great carpets of orchids in flower - three species of *Pterostylis*, another spider orchid, (*C. rivularis*) and *Acianthus sinclairii*. Other highlights included mahoe wao (*Melicytus lanceolatus*), the scented *Alseuosmia macrophylla* in flower and the tiny *Hymenophyllum lyallii*.

Sunday was spend mostly at Lake Otuhie. The highlights were the thick-leaved *Melicytus obovatus*, an unknown *Myosotis* and an unnamed *Parahebe*, resembling *P. catarractae*, all growing on the limestone cliffs alongside lush iceplant (*Disphyma australe*) and sea primrose (*Samolus repens*). Other interesting plants included the trio of copromas (*C. areolata*, *C. tenuicaulis* and *C. rotundifolia*) which are often confused, a third spider orchid (*Corybas macranthus*) with its hidden flowers, and the jointed fern (*Arthropteris tenella*).

Later in the afternoon we went to the Anatori River and browsed bush and shore. In the forest the highlight was *Hymenophyllum rufescens*, and along the shore, the tape measure plant (*Lilaeopsis ruthiana*) and *Leptinella calcarea*, the local endemic.

On Monday we visited Knuckle Hill for superb views of Whanganui Inlet and to see the wealth of heathland plants. Here we found *Epacris alpina* in flower, *Lycopodium laterale* as an extensive ground cover and the bamboo orchid (*Dendrobium cunninghamii*) growing on the rock outcrops. In the forest silver pine (*Lagarostrobos colensoi*) drew much discussion and the scramble down the cliff revealed *Metrosideros parkinsonii*, *Archeria traversii*, *Dracophyllum townsonii*, *Astelia trinervia*, *Alseuosmia macrophylla*,

Blechnum fraseri and *Trichomanes strictum*.

Coming field trips

Dec 18-19	Billies Knob/Wangapeka
Dec 28-Jan 7	D'Urville Is
Jan 16	Ellis Basin
Jan 29 Anniversary Weekend	Murchison
Feb 20	Gordon's Knob/Ben Nevis
Mar 20	Mt Campbell
Apr 17	Croisilles

Graeme Jane, 136 Cleveland Terrace, Nelson

■ **Rotorua Botanical Society**

Programme

Friday 28 January - Monday 31 January (Anniversary Weekend) - Lake Waikaremoana

The 1994 annual expedition will be to Lake Waikaremoana and sites of interest in this special area. We will visit some places different to those visited on the annual trip in 1985. Accommodation will be either in a DoC house or at the Waikaremoana Motor Camp. Bring your own bedding and food. Please contact the trip leader, Willie Shaw (Okere Falls, R D 4, Rotorua, phone 07-362-4546) asap, if you are coming and accommodation will need to be confirmed, depending on numbers.

Sunday 20 February - Waikato River Wetlands

Visit by canoe to Rawhiti and Hardcastle's Lagoons and other riparian wetlands on the Waikato River. Launch at Fletchers Reserve south of Ohaaki Bridge, paddle downstream to pull out at Mihi Bridge. Some canoes available for those with some experience but lacking their own craft.

Leave Rotorua Civic Centre 9.00am, Mihi Bridge 9.30am, launch at Fletchers Reserve 10.00am. Contact Chris Richmond or Vicky Froude at phone (07) 347-0879 (home) or 347-9179 (work) to confirm.

19-20 March - Whale Island

An overnight trip has been arranged using the DoC huts on the island. Transport will be on a registered charter boat leaving Whakatane on Saturday morning and returning on Sunday afternoon. Due to accommodation numbers will be limited to about 14, although it may be possible for a few extra people to use tents.

Cost of the boat is expected to be a maximum of \$25-00 each. Booking and further details from the leader Derek Gosling at Whakatane (07) 307-0262 (home), (07) 308-7213 (work).

1-4 April Easter - Egmont National Park

This trip will be based at The Camphouse, North Egmont. Set amongst picturesque kamahi-Hall's totara goblin forest at 957m a.s.l., this venue allows easy access to a wide variety of vegetation types from lower montane forest to alpine herbfield. Top of our list will be visits to the floristically rich Ahukawakawa Swamp and a search for the long lost mountain lacebark (*Hoheria lyallii* var. [*H. glabrata*]). (see Clarkson, B.D. 1986: Vegetation of Egmont National Park. National Parks Scientific Series 5 for background information).

We have booked accommodation for 15 people from Thursday at \$8-00 per night each. Confirm with Bruce Clarkson (07) 855-9534, or Barry Spring-Rice (07) 362-4675.

Change of address

Please note a change of address for the Secretary: Helena Beeser, Ward Road, R.D.2, Rotorua (Phone (07) 332-2326).

Grant Milligan, 3 Munro Place, Ngongotaha

■ Wellington Botanical Society

Programme

8 December – Saturday 8 January: Field trip, Castle Hill Station

The trip will be based at Castle Hill Station (off the Arthurs Pass road, Highway 73, Map K34 065-750). We meet there in the late afternoon of Tuesday 28 December and leave on the morning of Saturday 8 January. The main party from the North Island will use the 8 am ferry on Tuesday 28th December and return on the 7.45pm ferry on Saturday 8 January. If you intend to take a vehicle book promptly. There are 15 bunks in the shearers' quarters and ample room for tents. We hope to make a wide range of day trips, with possibly an optional overnight trip. Ski roads will give us drive on access to subalpine levels.

Accommodation costs should be about \$10 per bunk and \$6 per person for tents and vehicles. The final day for deposits (\$100) to be with Margaret Aitken is 30 November.

If you propose to come, tell Margaret Aitken, 4 Godley St, Waiwhetu, Lower Hutt. Tel: Home (04) 566 2731. Work (04) 474 9499 ext 3457.

Anniversary Weekend – Friday 21–Tuesday 25 Jan 1994: Field trip, Tongariro State Forest - Erua (Maps NZMS 260 S19, T19, S20)

The earlier planned trip to Port Underwood has been cancelled because the leader was unable to make it but we hope to offer that trip in future years. Instead we will have a good look at Tongariro and Erua Forests which are interesting and varied with podocarps, hardwoods and cedar and a number of interesting and uncommon species. There are some limestone areas too, including the Okupata Caves.

It is likely that we will be based beside and have the use of a private hut in a secluded part of the forest. There is plenty of flat ground for camping around the hut. Access to most parts of the forests is by good formed roads but if anyone has a 4WD vehicle we will be able to go to some more remote places.

Travel arrangements: Assemble any time Thursday evening (20 January) at the Mangaweka camping ground by the Rangitikei River. Alternatively, you may join the group on Friday morning at Kapoors Road turn-off on SH 47 (this is the road on the left before Taurewa) at 10 a.m.

Bring bread, butter, biscuits, scroggin, fresh fruit, enough for 5 (or 4) days. The rest of the food will be ordered in bulk. Names with a deposit of \$30 for food should be with the transport organiser Margaret Aitken, 4 Godley Street, Lower Hutt, ph. (04) 566 2731, (04)474 9499 (w) by 20 December 1993. Please make sure you give a postal address and make cheques payable to Margaret Aitken, not the Botanical Society. For further information contact Margaret Aitken; leader in the field: Cathy Jones, DoC, Turangi.

Saturday 5 February, 1994: Field trip, Western Wairarapa - Corner Creek

Meet Featherston Post Office 9 a.m. Travel down western side of Lake Wairarapa looking at some botanically significant roadsides containing the mistletoe *Korthalsella salicornioides* and matagouri (*Discaria toumatou*). We will also investigate an interesting culvert with one of the two known New Zealand populations of an aquatic moss *Fissidens berteroi* and perhaps have a chance to see the lakeside flora of Lake Wairarapa. Corner Creek itself has some interesting streamside associations, along with Wairarapa endemics like the the grass *Chionochloa beddiei* and *Brachyglottis greyi* var. *greyi*, but is most notable for the North Island's southernmost population of *Pseudopanax ferox*. Time and weather permitting we might also look at the coastal associations including the sand tussock *Austrofestuca littoralis*.

Leader: Tony Silbery, ph. (04)570 6505 (w), 569 9188 (h).

Monday 21 February: Evening meeting, Botany of the Solomon Islands

David Glenny recently spent two years on VSA in the Solomon Islands working at the Herbarium in Honiara and travelling extensively throughout the country. He is currently writing a fern flora of the area. He will give an illustrated talk about the botany of the region

Speaker: David Glenny, Museum of New Zealand, Te Papa Tongarewa

Saturday 5 March: Field trip, Taita Scientific Reserve and Barton's Bush

Meet at the gates to Taita Research Centre at 9.30 a.m. If travelling by train, the 8.35 a.m. train from Wellington will get you there in time - the Research Centre is mins walk from Taita Railway Station. The morning will be spent walking through the regenerating forest, and our leader will be able to describe the changes which have taken place in the reserve over the past 30-40 years.

Leader: Ian Atkinson

After lunch we will travel to Barton's Bush to arrive there at 1 p.m. This tawa-dominated remnant beside the Hutt River is severely weed-infested, and we will assist Forest & Bird with weed eradication.

Leader: Barry Woods, Upper Hutt Branch of Forest & Bird.

Bring lunch and a drink, sunscreen, gardening gloves, secateurs, or a grubber, if you have one.

Contact for both venues: Kath Dickinson, ph. (04) 387 3405

Monday 21 March: Evening meeting, *Botrychium australe*: demography and conservation of a sparse native fern/progymnosperm that thinks it is an orchid

Dave Kelly and successive years of students from Canterbury University have been following the fate of a large population of this interesting fern in the Cass Basin, east of Arthur's Pass.

Speaker: Dave Kelly, Department of Plant and Microbial Sciences, Canterbury University

Easter: Thursday 31 March - Tuesday 5 April: Field trip, Branch Base Hut, Marlborough (Map: NZMS 260 N29)

Accommodation will be at the Branch Base Hut which we have booked from Marlborough Boys College. There are ten bunks and plenty of space outside for tents. Trips will go to the Red Hills (1 or 2 days), the Leatham Valley where limestone areas are of particular interest, and the Robert Range, near Lake Rotoiti. Travel across on the 4 p.m. ferry on Thursday and return on the 2.20 p.m. ferry on Tuesday. Please make bookings on the ferry well in advance.

Bring bread, butter, biscuits, scroggin, fresh fruit, enough for 5 days. The rest of the food will be ordered in bulk. Names with a deposit of \$30 should be with the leader Margaret Aitken, 4 Godley Street, Lower Hutt, by 4 March 1994. Please make sure you give a postal address and make cheques payable to Margaret Aitken, not the Botanical Society. For further information contact Margaret Aitken.

Leader: Margaret Aitken, ph. (04) 566 2731 (h), (04)474 9499 (w).

Monday 18 April: Evening meeting, Lowland cushionfield communities - some North Island and South Island comparisons

Mike Orchard will speak about parts of his MSc thesis topic where he compares the cushionfield communities of the dune lakes in Fitzroy Bay with similar communities in Central Otago.

Speaker: Mike Orchard, School of Biological Sciences, Victoria University of Wellington.

For Sale

T.F. Cheeseman (1914) Illustrations of the New Zealand flora. Vols I and II. Excellent condition - only slightly water damaged cover. Any offers? Contact Kath Dickinson ph. (04)387 3405 or Carol West ph. (04)387 8398.

Wellington Botanical Society Jubilee Award - 1993

The 1993 Jubilee Award of Wellington Botanical Society has not been awarded. Although several applications were received, the subcommittee felt that they were not of sufficient standard to justify granting the Award. Candidates must specifically state how the \$1000 award would assist their work.

Thanks to the subcommittee who considered the applications: Patrick Brownsey (Convenor) and Kath Dickinson.

A call for applications for the 1994 Jubilee Award will be made next year. Funds for the Jubilee Award are steadily rising but further donations are welcome.

Carol West, 9 Mamari Street, Rongotai, Wellington 3

Notes and Reports

Plant Records

■ *Carmichaelia nigrans* - living on the edge

This completely prostrate broom is a plant of stabilised riverbed silts in Westland. Coping with periodic floods, in recent decades it has also had to compete with introduced grasses and survive browsing by hares and livestock. The last formal collection was in 1967 by Peter Wardle and Ian Fryer (CHR 166996) from the Cook River flats. Seed collections by Andrew Purdie in 1978 and 1980 have resulted in one plant and one possible hybrid respectively remaining in cultivation at Lincoln.

In March 1991 Peter Wardle and I searched for this broom without success on small islands in the Fox River, below the glacier terminal. A large island immediately upstream of the S.H.6 road bridge remained

unsearched owing to regular high (icy) water flows making it inaccessible.

On a recent field trip to the Fox Glacier area Murray Dawson, David White, and I armed ourselves with a climbing rope, intending to abseil off the bridge, only to discover that the river level was low enough to walk across in gumboots. We found a plant of *C. nigrans* almost immediately, growing with *Raoulia tenuicaulis* on open silt above the normal flood zone. After careful searching we amassed a total of 25 separate plants. Herbarium and cutting material were taken from two plants (DoC permit no. 11/97), as well as seed for propagation, which has since germinated. One taller plant appeared to be a hybrid with *C. grandiflora*, which grows with *C. nigrans* and probably out-competes it on more established sites.

The flats of the Cook and Waiho Rivers, where earlier collections were made, may offer further refugia for this species. However, these flats continue to be grazed by stock, and evidence of browsing by hares suggests that the chances for survival of *C. nigrans* on the more accessible islands may be low. A closely related prostrate species, *C. prona*, from Canterbury was considered extinct, but was found cultivated in Edinburgh Royal Botanic Garden, Scotland, and was returned to New Zealand by Andrew Purdie in 1983.

Rowan Buxton, Landcare Research, P.O. Box 69, Lincoln

■ *Asplenium pauperequitum* - a new locality

Brownsey & Jackson (1984) described *Asplenium pauperequitum* as a new fern, discovered in 1982 and known only from the two main islands of the Poor Knights, north-east New Zealand. When reviewing *New Zealand ferns and allied plants* by Brownsey & Smith-Dodsworth (1989), Parris (1990) stated that the first collection of this fern on the Poor Knights was actually by Parris & Croxall in 1970. This specimen is at Kew (B.S. Parris pers. comm.).

While databasing the New Zealand ferns in the Auckland Museum herbarium, I identified a specimen from the Herbarium of T.F. Cheeseman (AK 135200) as *Asplenium pauperequitum*. The original label in Cheeseman's hand reads: *Asplenium*, Mokohinau Island, collector P.S. Sandager, undated. Instantly I was excited as it was obviously a new locality for *A. pauperequitum* and a much earlier collection than was known. The specimen consisted of a single fertile frond.

Who was the collector and when was it collected?

F.S. Sandager was the first lighthouse keeper on Burgess (Mokohinau or Pokohinu) Island, part of the Mokohinau Islands, 1883-1888 (his last entry in the Lighthouse Station Day Journal). F.S. Sandager also forwarded bird and fish specimens to Cheeseman at the Auckland Museum from Burgess Island (Sandager 1888, 1890). From his death certificate (1904) (recorded as F.A Sandagger) neither his parents, wife nor 3 children have the initials P.S. No other Sandagers are recorded in the New Zealand Deaths and Birth notices for that period.

To date one-third of the AK herbarium is databased and a search revealed only one other specimen collected by Sandager: *Lycopodium varium* from Belmont, Wellington, P.S. Sandager, undated (AK 988) which is also from the Cheeseman Herbarium.

The most plausible explanation is that Cheeseman wrote the wrong initial for Sandager (P instead of F) and that the specimen was collected by F.S. Sandager 1883-1888. This is supported by Sandager being a very unusual surname in New Zealand, F. Sandager being on the island during the right period and corresponding with Cheeseman. There is a slight possibility that P. Sandager may have been a relative of F. Sandager. Does anyone know if there was a P.S. Sandager that collected ferns late last century or early this century in New Zealand?

Discussion

Asplenium pauperequitum is listed as vulnerable in the 1993 Threatened Plant List (Cameron *et al.* 1993) and any extension to its distribution is therefore very important. The discovery of this specimen illustrates the importance of herbaria. It is interesting that Cheeseman identified it to only genus level and was not prepared to even suggest a species.

The geology of the Poor Knights and Burgess Island are rather similar. The Poor Knights are rhyolitic breccia and tuff (Hayward 1991) and Burgess Island is rhyolite lava overlain by tuff and intruded by andesite and basalt (Fleming 1950). The Mokohinau Islands are fairly close to the Poor Knights (59 km distant) and both groups together with the Three Kings Islands would have been separated from the mainland for longer than any other northern islands. Therefore the next most similar islands to the Poor Knights in terms of

their geology, history and climate are the Mokohinau Islands.

Burgess Island and most of the northern Mokohinau Islands vegetation has been highly modified (Cameron 1990). Fanal Island contains the best regenerating forest in the Mokohinau Group and therefore is the most similar to the more advanced regenerating vegetation of the Poor Knights. All the Mokohinau Islands, especially Fanal, should be searched for this distinctive but easily overlooked fern.

Acknowledgement

I thank Bruce Hayward and Juliet Herrick for helpful comments, Juliet Herrick for searching the National Archives, Mokohinau Lighthouse Station Visitors Book and Day Journal and also the Births, Deaths & Marriages Records, and the Lottery Grants Board towards assisting in the databasing of the herbarium.

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E.K. Cameron, Auckland Institute & Museum, Private Bag 92018, Auckland

■ Bryophytes and lichens of Te Kopia Scenic Reserve geothermal vegetation

The Te Kopia Scenic Reserve is a 1408 ha protected natural area on the Paeroa Range south of Rotorua and within the Atiamuri Ecological District (Wassilieff & Timmins 1984). Geothermal features and vegetation occur over 95 ha of this reserve and are located on the scarp and at the base of the Paeroa Fault. The reserve contains large colonies of the rare fern *Dicranopteris linearis*, and the rare orchids *Calochilus paludosus* and *C. robertsonii* are well-represented. In March 1993, I spent several days collecting data on plant distributions within the geothermal vegetation. Although I did not add to the vascular plant species list compiled originally by Bruce Clarkson (Clarkson 1984) and added to by Humphries and Ecroyd (1990), I collected a large number of bryophytes and lichens from the area, a few of which were lodged in CHR. All collected are listed below, each graded as to whether they were found on hot (H, ground surface 30°C), warm (W, ground surface between 20°C and 30°C) or cool (C, ground surface 20°C) sites or as an epiphyte (E). Also, the list includes a record of *Isopterygium albescens* collected by Bryony Macmillan in August 1993, described as "abundant locally on hot ground/manuka". This was also lodged in CHR.

The cryptogamic flora of the Te Kopia geothermal field contains many of the species reported at Karapiti in the Wairakei geothermal field (Given 1980). *Cladina mitis*, recorded here, is not recorded from the North Island by Galloway (1985) but has been found in geothermal systems in Japan (Fahselt 1992).

Nomenclature follows Allison and Child (1975), Beever, Allison and Child (1992) and Galloway (1985) except where indicated.

Species Temperature tolerance

Musci

<i>Campylopus clavatus</i>	C
<i>C. holomitrium</i>	W, H
<i>C. introflexus</i>	C, W, H
<i>Catagonium nitens</i>	C
<i>Dicnemon calycinum</i>	C
<i>Dicranoloma plurisetum</i>	C
<i>D. robustum</i>	C, W, H
<i>Ditrichum difficile</i>	C
<i>Eurhynchium</i> cf. <i>novae-zealandiae</i> (<i>Rhynchostegiella</i> cf. <i>novae-zealandiae</i>)	C
<i>Hampeella</i> sp.	C
<i>Hypnum chrysogaster</i>	C
<i>Isopterygiopsis pulchella</i>	H
<i>Isopterygium albescens</i>	W, H
<i>Leucobryum candidum</i>	C, W
<i>Macromitrium</i> cf. <i>microstomum</i>	E
<i>Polytrichum juniperinum</i>	C
<i>Ptychomnion aciculare</i>	C
<i>Pyrrhobryum bifarium</i>	C
<i>Racomitrium pruinatum</i>	H
<i>Rhizogonium novae-hollandiae</i>	C
<i>Sematophyllum contiguum</i>	C, W
<i>Sphagnum cristatum</i>	H
<i>Thuidium furfurosum</i>	C

Hepaticae

<i>Bazzania adnexa</i>	W, H
<i>Chandonanthus squarrosus</i>	W
<i>Chiloscyphus compactus</i>	C, W
<i>C. normalis</i>	C, W, H
<i>Kurzia</i> cf. <i>compacta</i>	C
<i>Lejeunea flava</i>	C
<i>Lepidozia laevifolia</i>	C, W, H
<i>Lophocolea bidentata</i>	C
<i>L. semiteres</i>	C, W, H
<i>Porella elegantula</i>	C
<i>Radula</i> sp.	C, W
<i>Telaranea praenitens</i>	C, W, H

Lichens

<i>Cladia aggregata</i>	C
<i>Cladia retipora</i>	H
<i>Cladonia capitellata</i>	H
<i>Cladina mitis</i>	H
<i>Hypogymnia</i> cf. <i>lugubris</i>	W, H
<i>Usnea</i> sp.	E

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■ *Hebe* "Awaroa"

The limestone outcrop *Hebe* endemic to the western Waikato has been variously referred to as *Hebe rigidula* form 1 (Eagle 1982), *Hebe* "Lady" (Druce 1989) and *Hebe* "Awaroa" (Given 1990). It was first discovered one weekend in March 1963 by John L. Kendrick (ex NZ Wildlife Service) who, along with three members of the Hamilton Junior Naturalists Club, explored Otuatakahi (Knob Head), one of the many limestone outcrops in the area (J.L. Kendrick pers. comm. 1989). The plant illustrated (see cover of this issue) was propagated from a cutting collected from Hauturukanekeneke (The Dome). Flowering in cultivation usually begins in the first week of October and may persist until the end of November. The corolla is pale mauve at anthesis and becomes white after pollination. The background illustration shows one of the plant's stronghold habitats - Ngawhakatarā (The Lady) - several of which have been

recommended for protection (Clarkson 1982). The plant is listed as 'vulnerable' (taxonomically indeterminate) in our societies' Threatened and Local Plant Lists (Cameron *et al.* 1993).

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Field Report

■ Report on the 9th John Child Bryophyte Workshop - Kaikoura 28 October - 2 November, 1993

A university marine station may seem an unlikely venue for a bryophyte workshop, but this is the second time a John Child Workshop has been held at such a site, the 1986 workshop having been held at Leigh. As on the previous occasion it proved an excellent venue. The Edward Percival Field Station of Canterbury University, at Kaikoura, was gathering point for 27 Bryologists. Our only overseas participant was Marie Hicks, whom we welcomed back again from Tennessee, USA. Disappointingly, we were without any Australians this year.

Kaikoura provided perhaps the greatest range of habitats we have ever had access to on a bryophyte workshop, from pockets of snow in the subalpine/alpine near the summit of Mt Fyffe (1601 m), lowland podcarp forest on the mountain's flanks, right down to exposed limestone on the sea coast. The apparent barrenness of this last habitat led initially to jocular requests for a refund, but as we proceeded around the Kaikoura Peninsula the pace soon slowed to a more normal bryologists' crawl as we came upon grassy flats rich in mosses, and damp gullies. Pottiaceae were particularly well represented here, as at several of the other sites, with some 7 species of *Tortula* being found during the workshop (this exceeded even *Fissidens*, with only 5 species!). *Totula abruptinervis*, with its distinctive paddle-shaped brood bodies in place of leaf hair-points, was a source of particular interest, never having been seen in the field by most of us. Other well-represented families were the Brachytheciaceae, including *Rhynchostegium laxatum* and *Eurhynchium novae-zealandiae*, and the Lembophyllaceae, including two forms of *Lembophyllum*. For me the most unexpected find of the workshop was *Fissidens hyophilus*, growing on tree trunks and rock, with abundant capsules, in Hinau Walk, a forest remnant at the base of Mt Fyffe. This moss was recently found near Wellington, but until then was considered to be tropical and sub-tropical, with the few New Zealand records coming from lowland sites on the North Auckland Peninsula, and its offshore islands. The Kaikoura finding is thus the southern-most known. Another exciting find was *Petalophyllum preissii*, the plant on the front of George Scott's book of Southern Australian Liverworts, for which there are few New Zealand records. The plants, some bearing fruit, were growing on a moist grassy bank in Blue Duck Reserve.

A record number of talks were offered in the evenings, and these demonstrated that, in spite of current problems in biosystematics research in New Zealand (as elsewhere), good bryology continues to flourish. Ella Campbell of Massey University gave us an authoritative summary of New Zealand hornworts, bringing us up to date with name changes in that group. Shawn Walsh of Waikato University told us of his M.Sc. work on isozyme studies of Antarctic mosses, and with his slides showed us something of the beauty of his field sites. Raoul Island in the Kermadecs bears a contrasting vegetation, described to us by Carol West of the Department of Conservation, who earlier this year spent 10 weeks there. Carol collected several bryophytes new to the Kermadecs, and a species of *Cyclodictyon* (Hookeriaceae), a genus not previously recorded in New Zealand. Alastair Suren of NIWA described his research on bryophyte distribution patterns in South Island streams. His concurrent analysis of environmental factors such as substrate nature and flow disturbance regime will make this a definitive contribution to bryophyte ecology. Sister Marie Wright's infectious enthusiasm for mosses cheered us all, as she told of the expeditions she undertakes with secondary school girls in the Wellington area. I gave an account of some of the

nomenclatural detective-work I have been doing in *Fissidens*, and my ventures into ethnobotany - identifying mosses used as decorative material on historic Maori cloaks. Otago University was well represented at this workshop. Bastow Wilson gave us a lucid account of research undertaken there, comparing between-species competition in bryophyte-dominated vegetation with that occurring in vascular plant communities. This was a team effort, John Steel and Jamie Newman doing the field work, Ray Tangney taking charge of the taxonomy and nomenclature, and Bastow "sitting in his room thinking grand thoughts". A very productive pooling of skills! Ray, having shown us the distinctive features of several *Camptochaete* species in the field, was able to give us a more detailed account of his taxonomic work in this genus, part of his PhD research. Ray concludes that the New Zealand taxa are very variable in morphology, and intends to make only a few taxonomic changes from the treatment of Sainsbury. As with me in my *Fissidens* studies, he says he can identify with Peter Wardle's jesting comments made at the 1993 SYSTANZ conference (with respect to Peter's taxonomic work on the whipcord hebes) - at first every specimen looked the same, in the next stage every specimen looked distinctive, and in the third stage he discovered he'd been measuring the wrong characters anyway!

A particularly striking feature of this year's workshop was the presence of numerous very keen first-time participants, which bodes well for the future of bryology in New Zealand. The spacious laboratory, and separate, dining/relaxing/lecture room at the Marine Station gave us room to spread out - and from both of these a superb view of the sea pounding on the coastal rocks, with snow flecked Seaward Kalkoura Range as a back-drop (plus the occasional cold beer) helped us to relax.

Allan Fife and Bryony Macmillan of Landcare Research were the organisers, providing such diverse skills as bryological nomenclature and rally driving. They are to be congratulated on a very well-run and most enjoyable workshop.

Plans are for the 10th John Child Workshop to be held 24-29 November, 1994, in the Waipoua Forest, North Auckland. To be placed on the mailing list for the first circular contact Lisa Forester, Department of Conservation, P O Box 842, Whangarei.

Reference

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Footnote: Of moths and moss

During the 8th John Child Workshop on Mt Ruapehu, a collection was made of severely insect-damaged plants of the giant moss *Dawsonia superba*. These were growing in a colony close to the Ranger Station, at the foot of Ohakune Mountain Road, in podocarp forest. Leaves were chewed and shoots encrusted in a mass of silk, leaf fragments and frass. With further collections being made by DoC Officers Cathy Jones and John Luff, the insect involved has now been reared through to the adult stage by Landcare Research entomologist John Dugdale at Mt Albert, and identified as the endemic moth, *Glaucobaris epiphaea*. This species is known to be an inhabitant of wet montane forests, and is no doubt a natural herbivore of *Dawsonia*. Interestingly, the taxonomically related but ecologically quite distinct moss, *Polytrichadelphus magellanicus* proved an acceptable food source and pupating site for the larvae when conservation ethics lead us to try alternatives to *Dawsonia*.

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Research

■ Progress toward a revision of New Zealand harebells (*Wahlenbergia*)

The harebells of New Zealand rejoice in the name *Wahlenbergia*, named after a Swedish professor of botany in the 1800s. Before 1830 they were included in the genus *Campanula* which differs in the way the capsule sheds its seed.

There are about 26 species in Australia, over 100 in Africa, several species in China, Japan, Taiwan, Malaysia, New Guinea and the volcanic islands of the Pacific, most of which are included under the name *W. marginata* Thunberg. There are also unknown numbers of species in India and South America. New Caledonia has one species, and New Zealand has about 11, some of which are still uncertain and need further investigation. In the following account, species I recognise and intend to formally name are

italicised and in quotation marks. Those taxa still under investigation have tag-names in quotation marks, not italicised.

Many years have passed since I started this study in 1949, and Allan's Flora of New Zealand Vol. 1 indicates the species as we understood them in about 1953. We were uncertain of the status of several taxa then, mainly because some species tend to look alike as dried specimens, and all vary greatly in habit and foliage according to habitat conditions. Growing the various suspected species side by side, and having their chromosomes counted, has been helpful in sorting them out, as this cannot be done with a study of dried or field specimens alone. Now, 40 years later, this is how I interpret the variation in *Wahlenbergia*. Comments or specimens which will assist in finalising this revision for formal publication will be gratefully received.

Group 1 taprooted species 2n = 72:

Tap-rooted, long-stemmed short-lived perennials, with branching slender aerial stems, each branch tipped with a flower. The age of the specimen can be judged by the thickness of the taproot and the number of stems e.g. a single-stemmed plant with root 1 - 2 mm diameter is less than one year old, one with root 3 - 4 mm diameter and several stems is 2 - 3 years old, and one with taproot 5 - 10 mm diameter and multiple stems is 4 years old and near the end of its life. Propagation is by seed in nature, but plants can be transplanted successfully by taking 3 - 5 cm of root-stock, clipping the stems short, and setting the plant in a sandy soil mix, keeping it in moist shade until new growth starts.

All species are normally self-pollinated and self fertile, and do not require pollinating insects to set viable seed. However, artificial pollination resulted in viable seed (Petterson, J. 1953: The genus *Wahlenbergia* in New Zealand. Unpublished M.Sc. thesis, Victoria University of Wellington.)

To this group belong the following species, distinguished most easily by flower colour and size (see Fig. 1):

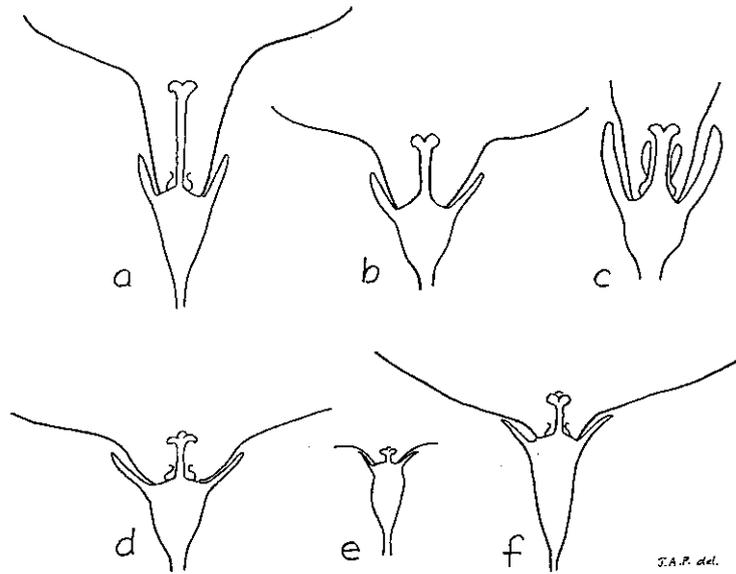
1. pale-lilac *W. gracilis* s.s. (Forster f.) A. DC. (= *W. ramosa* Simpson). Flowers 10 - 18 mm diameter, rotate or shortly campanulate. Always coastal, but may be restricted to Wellington-Marlborough Sounds. Flowers "compact", the petals touch or overlap at the sides, broadly ovate.
2. light-blue to bright-blue *W. "australis"* (= *W. marginata* var. *australis* Hatch). Flowers 10 - 20 mm diameter, shortly campanulate-rotate, "compact", lobes broadly ovate. Pure populations occur on Tararua foothills, e.g. at Otaki Forks, and Mangaone.
3. large-white *W. rupestris* Simpson. flowers 15 - 30 mm diameter, rotate. Usually inland, Rangitikei R., Manawatu Gorge and Pahaoa Gorge in North Island, Central Otago in South Island. Flowers "starry", petals separate to base, lanceolate. Pure populations occur in Manawatu Gorge and Central Otago.
4. small-white *W. colensoi* N.E. Brown. Flowers 5 - 9 mm diameter, rotate. Inland, grows under scrub and light forest. Flowers very small, usually with rounded petals. Capsules elliptic. Both islands.

These four are well-established and understood now, both by Tony Druce and by me. We have both grown them for many years in home gardens and glasshouses. Two new radicate species have been recently brought to my notice by Tony Druce who has been cultivating them:

5. large pale blue to white *W. "Akaroa"* (Fig. 2). This is a robust coastal taxon, with large rotate flowers, very beautiful. It is found on the eastern rim of Banks Peninsula on cliffs overlooking the sea. More information is needed on this species. Is it confined to Banks Peninsula? Is it confined to cliffs? What is the substrate? What other species are found in the area? Conservation status?

Hugh Wilson (N.Z.B.S. *Newsletter* June 1987) recognised the taxon as distinctive. The specimens I now have come from Tony and Helen Druce's garden in Pinehaven, seedlings from a plant collected by Hugh Wilson near Akaroa Head. Hugh also records finding the species at the following sites: Hickory Bay, North Head, South Head, Dyke Head (H.D. Wilson pers. comm.). Collectors are requested to note flower colour, measure flower diameter (fully open), note substrate, height above sea-level, number of plants seen in each site, and proximity of other *Wahlenbergia* species.

Fig. 1 Corolla and calyx shapes in New Zealand *Wahlenbergia*.



- a. Deeply campanulate - Tube longer than wide: *W. albomarginata*, *W. matthewsii*.
- b. Deeply and broadly campanulate - Tube as wide as long, tube about = corolla lobes: *W. pygmaea*, *W. "vernicaosa"* "Hunua".
- c. Urceolate corolla, large calyx lobes: *W. cartilaginea*.
- d. Shortly campanulate corolla - tube one-fourth to one-third of corolla length: *W. "australis"*, *W. congesta* s.s.
- e. Short-lobed rotate corolla: *W. colensoi*.
- f. Long-lobed rotate corolla: *W. gracilis* (wide corolla lobes), *W. rupestris*, *W. "Akaroa"*

Seedlings from my pale blue parent specimens (ex Druce) are now coming into flower. They are segregating, some pale blue like the parents, others white, pale lilac, white with mauve tips, darker blue or paler blue, each colour on a different plant. All flowers are of the same shape and size as the original, just as Hugh described (H. D. Wilson pers. comm.).

Preliminary description of *W. "Akaroa"*: Robust free-flowering herb. Stems in cult. up to 45 cm long, decumbent, glabrous. Leaves alternate, sessile, oblanceolate to lanceolate, lowermost 40 x 10 mm, upper leaves smaller and narrower, margins undulate, not serrate. Flowers rotate, white or shades of blue, 2 - 3 cm diam, up to 2 cm long. Corolla lobes elliptic, acute, up to 18 X 10 mm long. Capsule obconic, 7 - 8 mm long. Unlike *W. rupestris* the flowers are "compact", the corolla lobes are wide enough to touch or overlap in the middle.

Representative specimens:

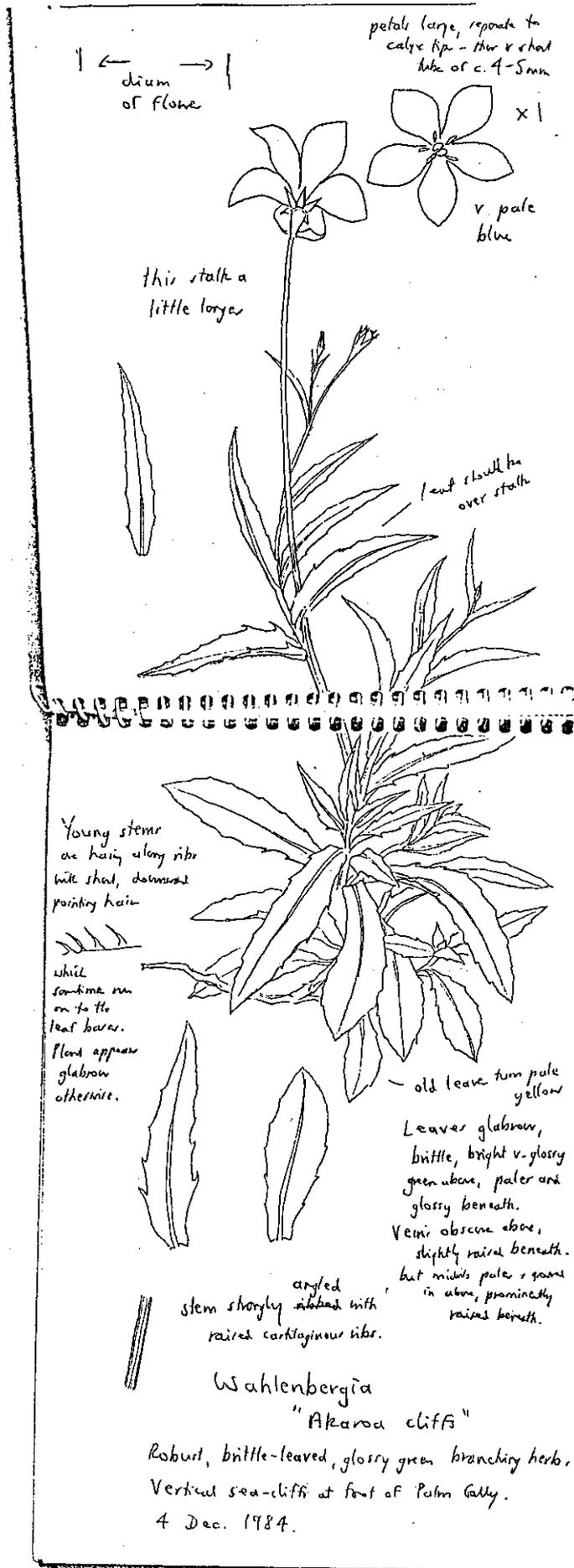
CHR 404376 collected at Hickory Bay, M.J.A. Simpson 26/4/83.

CHR 481407 Palm Gully, near Akaroa Heads, Hugh Wilson 4/12/84.

6. *W. "vernicaosa"*. This is distinguished by large glossy leaves, regularly serrate, completely glabrous. Flowers deeply campanulate, varying from pale blue to white. I have two plants, one collected by Tony Silbery at Three Kings Islands, given to Tony Druce who passed in on to me, and a seedling of one from Surville Cliffs, Northland collected by Colin Ogle. They are similar, not identical, in foliage.

"Three Kings": My specimen opens lilac, fading to white. Flowers deeply campanulate, 2 cm diameter, 12 - 15 mm long, corolla lobes 8 - 11 mm long, tube 4 - 5 mm long, calyx lobes 3 mm long. P.J. de Lange reports flowers deep blue, light blue or white on Three Kings, and also reports *W. "australis"* is found there, with smaller flowers and dull subentire leaves.

Fig. 2 W. "Akaroa" a sketch from Hugh Wilson's field note book, Banks Peninsula 17: 1005 4 Dec 1984



“Surville cliffs”: Colin Ogle reports mauve flowers on Surville Cliffs. My seedlings from him have pale blue deeply campanulate flowers of the same dimensions as “Three Kings”.

Similar looking specimens in CHR herbarium are from Cape Brett (Bay of Islands), Tiritiri Island and Motukakarikitahi (in Hauraki Gulf), Karekare (West Auckland), and Maungatapere near Whangarei. These are recorded with white or pale blue flowers.

“Hunua”: In inland places from Hunua northwards many dried specimens in AK have deeply campanulate flowers, mainly opposite leaves, not glossy, not glabrous. Flower colours vary in a range from bright blue to white.

These three may belong to *W. “vernicaosa”* or be a series of hybrid swarms with *W. “australis”*.

Hypothesis: Where *W. “australis”* contacts another species through habitat disturbance, the population becomes varied, while retaining the corolla shape of the other species.

For example, (a) Banks Peninsula, track through grassland from Godley Head to Taylor’s Mistake. *W. “australis”* X *W. rupestris* and a range of progeny in various pale blues and lilacs. All have the rotate starry flowers of *W. rupestris*. These are not the same as *W. “Akaroa”*, which has larger flowers with wide petals.

For example, (b) Pahaoa Gorge, Wairarapa: *W. “australis”* X *W. rupestris* with occasional progeny in varied shades all with the shape of *W. rupestris*, on the roadside.

For example, (c) Rarangi, Cloudy Bay: *W. “australis”* (2n = 72) X *W. trichogyna* (2n = 36) producing a swarm of sterile hybrids, retaining hairy capsule and long corolla lobes of *trichogyna*, but varying in size of flower.

In all three cases pure populations of *W. “australis”* are to be found. *W. trichogyna* (naturalised) has lost its habitat now, and most garden specimens are sterile or nearly sterile hybrids. At Taylor’s Mistake and Pahaoa gorge populations of pure *W. rupestris* are abundant.

Group 2 Rhizomatous species 2n = 36:

Long-lived perennial herbs, usually with slender, flexible interlacing underground rhizomes, which produce rosulate tufts of leaves at their tips. Flowers solitary on a short erect unbranched scape from each tuft.

To this group belong the following species (see Fig. 1):

1. *W. cartilaginea* J.D. Hooker (a very distinct scree plant confined to inland Kaikouras).
2. *W. matthewsii* Cockayne, differs from the others in sub-shrubby habit with many erect leafy branches and branched scapes.
3. *W. albomarginata* W.J. Hooker (with 6 proposed subspecies).
4. *W. congesta* N.E. Brown (with one subspecies).
5. *W. pygmaea* Colenso (with four geographic races).

Of these, *W. cartilaginea* and *W. matthewsii* are very distinct species, readily recognisable.

1. *W. cartilaginea* J.D. Hooker - very thick leaves, very large calyx lobes, almost hiding the short scented flower. Hybridises with *W. albomarginata*, indicating insect pollination. What insects are involved? Black scree butterfly? ants? small beetles? collembola?
2. *W. matthewsii* Cockayne - an excellent garden plant and easily propagated from seed. It is found only in limestone gorges near the Kaikoura coast, and in Gorge Creek, Takaka. The Takaka specimens have white flowers, the Kaikoura specimens have pale blue-lilac flowers. There are 180 km as the kea flies, of rugged and geologically varied terrain between Kaikoura and Takaka. No specimen recorded elsewhere, as far as I know. There are no recent specimens in WELT or MPN. Could annotated specimens be placed in CHR, WELT and MPN please, and send reports of other known localities to me.
3. *W. albomarginata* W.J. Hooker. Originally collected by Bidwill in the upper Wairau. The South Island group here included in *W. albomarginata* all have flowers with deeply campanulate corolla-tubes distinctly longer than wide, up to twice as long as wide. Six varieties or subspecies are proposed, based on herbarium evidence, and information is sought as to their validity on field

evidence.

- (a) subspecies *albomarginata* - glaucous entire leaves, usually elliptic-spathulate. Marlborough east of the Wairau River, and canterbury, tussock grassland, riverbeds, rocks. Drawn-up specimens from shade were named "flexilis" by Petrie. Starved dwarf specimens were identified as "pygmaea" by Cheeseman. (See Cheeseman Herbarium in AK).
- (b) subspecies "*olivina*" - leaves entire, thick-margined, dark olive green, often purple on the underside. Red Hills, Mineral Belt, and other serpentine areas in South Island. Retains its characters in cultivation. Plants vary in size according to water supply.
- (c) subspecies *brockiei* - narrow linear leaves, small flowers. Originally from limestone at Castle Hill, Canterbury. Is it peculiar to limestone? If so where else is it found? Is it just a starved form of *W. albomarginata*?

There is a good living plant in CHR's limestone rockery, distinguished by very narrow dark green leaves, and tiny narrow-tubed bell-flowers.

- (d) subspecies *laxa* - leaves glabrous, serrate or undulate margined, flaccid, never glaucous. Taxon confined to high rainfall areas of South Island. e.g. Travers Valley, Sabine Valley, Lake Rotoiti (Nelson), Buller Gorge, Hanmer, Lewis Pass, moist-habitat form of *W. albomarginata*? Why is it west of the Wairau when *W. albomarginata* is east of the Wairau. Climate? Substrate?
- (e) subspecies "*decora*" - very compact rosettes, bright blue flowers, scented. Nelson Lakes National Park above 4000 ft. This appears to be a distinct taxon.

Specimens from Nelson in CHR can be arranged in two groups according to altitude.

- (1) subsp. *laxa*, 55 sheets, lake shores and river flats, below 2500 ft. Nelson Lakes N.P. and N.W. Nelson.
- (2) subsp. "*decora*", 16 sheets, above 4000 ft, Nelson Lakes Nat. Park and N.W. Nelson.

There are no specimens from intermediate altitudes, because the slopes are in forest.

- (f) subspecies *simpsonii* - leaves orbicular-spathulate, sometimes in lateral rosulate tufts on the aerial stems. Grows near sea-level on limestone at Flaxborne River mouth and Weld Cone, Kaikoura coast. Sets seed freely in cultivation. Originally described from a cream-flowered specimen found inland from Kekerangu, collected and cultivated for several generations by George Simpson. More recent coastal collections have blue and white flowers like those of *W. albomarginata*.

There are two collections in CHR limestone rock-garden, one mat-forming in open ground, the other scrambling through a bush of *Carmichaelia* sp. Probably they are the same taxon. Both look totally different from *W. brockiei*, in the same garden, but critical comparison with living specimens of other related taxa is needed, especially *W. laxa* and *W. albomarginata*.

- 4. *W. congesta* N.E. Brown - Differs from *W. albomarginata* and *W. pygmaea* in the smaller, shortly campanulate flowers which are sessile or very shortly stalked. Leaves are orbicular-spathulate, glabrous, 2 cm long or less.

Found only on the west coast of South Island from Puponga in the north to Fortrose in the south, usually on coastal cliffs and bluffs and firm sand. A.P. Druce found it at Omaui, Invercargill, a new record for this species.

- (a) subspecies *congesta* - Flowers pale blue or pure white, 10 to 12 mm diameter, very shortly stalked, corolla shortly campanulate-rotate, with tube 3 mm long and wide, and ovate lobes 5 mm long. Capsules globose, 5 - 6 mm diameter, peduncle elongating to 3 cm as capsule ripens.
- (b) subspecies "*arenaria*" - flowers smaller, 6 - 8 mm diameter, completely sessile, funnel-shaped, with narrow-oblong lobes, white. Capsules 3 - 4 mm diameter, subsessile. Peduncle does not elongate.

We found subspecies "*arenaria*" in full flower at Ship's Creek Beach, near Haast, on patches of firm sand and also on the low shifting sand-dunes near the new boardwalk, January 1992. Cultivated plants flowered during the following autumn, and proved distinct from *W. congesta* from Omaui. There is a good specimen in the rockery near the CHR herbarium, collected by B. Given in 1991.

5. *W. pygmaea* Colenso "Plant of uniform size and pleasing appearance, a rather large drooping bell-flower springing from its little squarrose moss-like tuft of leaves" (Colenso). First collected in "Ruahine mountain range, west side near summit".

Differs from the South Island *W. albomarginata* in having deeply campanulate flowers in which the corolla tube is as wide as long, sometimes wider than long. The leaves are never entire or glaucous, but may be serrate or crenate or strongly undulate, often with red margins. *W. pygmaea* is confined to the North Island mountains.

When I first started this study I confused *W. laxa* with *W. pygmaea* on account of the serrate or undulate leaf margins. This confusion is apparent in Allan's treatment of these species, which was partly taken from my study at that time (1950 - 53) when both South Island and North Island sites were quoted for *W. pygmaea*. We had not noticed the difference in corolla shape then. I believe the short broad corolla tube is a constant feature in all North Island collections, but am open to refutation.

Several geographic races have been recognised in the field by Tony Druce who has confirmed these by cultivating them side by side for many years. The differences are in leaf shape and flower colour, usually too subtle to show in dried specimens. Every population differs slightly.

- (a) "Tararua" - flowers opaque white with a fine blue vein in the centre of each lobe on the outside. Leaves oblanceolate, crenate. Mt Holdsworth and Mitre. The only *Wahlenbergia* taxon in the Tararua summits, rare.
- (b) "Egmont" - last summer I collected for cultivation 12 different populations from Dawson Falls to Stony River, seeking a form with globose capsules. We found only obconic or barrel-shaped capsules. Those mentioned in Allan (1961, p. 793) with globose capsules (CHR 79085 cult. A.P. Druce 1958) are not, and cannot be, *W. congesta*. I have not found globose capsules again.

Three patterns of flower colour were found. In most populations the flowers have a white or cream central stripe in each lobe, and blue lateral margins, but those from Wilkie's pools have a different pattern with blue margin and tips, while those from Stony River, growing in moss, were very pale "as if bleached". All have leaves orbicular-spathulate, serrate, strongly undulate.

- (c) "Makirikiri N.W. Ruahines" - Flowers smaller and deeper blue, without pale stripe, but still with broad corolla tube, wider than long. Leaves oblanceolate, crenate.
- (d) Many specimens in herbaria from other sites in N.I. look more or less similar to one another, although probably each mountain range has its own form. This is to be expected with self-pollinating individuals. Flowers usually blue and white striped, with broad corolla tube.

Note: *W. pygmaea* in all its forms is a charming and rewarding rock garden plant, easy to transplant and propagate. The conservation status of "Tararua" should be studied.

KEY TO SPECIES OF *WAHLENBERGIA* FOUND IN NEW ZEALAND, including some proposed taxa not yet published.

- 1. Leaves all linear, uniform, 2 - 5 cm long, subentire, crowded on branching stems; flowers 2 - 4 cm diameter 8 *W. matthewsii*
 Leaves spathulate, oblanceolate or lanceolate, serrate or sub-serrate; flowers not more than 3 cm diameter 2
- 2. Plant tap-rooted, with branching stems and alternate leaves; flowers terminating leafy branches 3
 Plant with slender branching rhizomes; leaves radical and rosulate; flowers terminating near-naked scapes 9
- 3. Flowers blue-violet 4
 Flowers white or palest lilac 6
- 4. Calyx and upper stem hispid, capsule globular, flowers deeply campanulate 7 *W. trichogyne*
 Calyx and upper stem glabrous, capsule obconic, flowers rotate or shortly campanulate 5

5. Flowers shortly campanulate, rich blue-violet, 1-2 cm diameter 2 *W. "australis"*
 Flowers rotate, light blue, 2-3.5 cm diameter 5 *W. "Akaroa"*
6. Flowers 5-8 mm diameter rotate, sometimes 3 - 4 petalled; mature
 capsule less than 7 mm long 4 *W. colensoi*
 Flowers larger, capsules longer 7
7. Leaves glossy, as if varnished, regularly serrate, flowers deeply
 campanulate, colour variable 6 *W. "vernicaosa"*
 Leaves glabrous or hispid, not glossy; flowers rotate 8
8. Flowers palest lilac at anthesis, 1 - 2 cm diameter, corolla lobes
 broadly ovate, touching or overlapping 1 *W. gracilis s.s.*
 Flowers pure white, rotate, 2 - 3 cm diameter, corolla lobes separate
 to base 3 *W. rupestris*
9. Leaves 8 - 15 mm wide, ovate-spathulate, very thick, glaucous and
 cartilaginous; calyx lobes oblong, very thick, as long as corolla,
 scree plant 9 *W. cartilaginea*
 Leaves narrower and thinner; calyx lobes less than one-fourth as
 long as corolla 10
10. Corolla tube longer than wide 10 *W. albomarginata*
 Corolla tube as wide as, or wider than long 11
11. Capsules globose, plant always coastal S.I. 11 *W. congesta*
 Capsules obconic or oblong, plant of N.I. highlands 12 *W. pygmaea*

Acknowledgements

Thanks to Tony and Helen Druce, Hugh Wilson, Colin Ogle, Peter de Lange and Colin Clarke for information and living plants and specimens received, and to be received.

Judith Petterson, 24 Eruini Street, Waikanae

Biography/Bibilography

■ Biographical Notes (12): Samuel Delabere Barker (1848-1901)

Sam Barker was born at Rugby, England, on 6 February, 1848. He was the second son of Dr Alfred Charles Barker (1819-1873) surgeon on the *Charlotte Jane*, which arrived at Lyttelton on 16 December 1850. Sam attended Christ's College (founded 1851) from 1854 to 1864, where he played in the First Eleven (1863-64) and received the Divinity Prize (1864). And in the early 1860's a Master Barker, (presumably Sam) presented bird-skins and eggs to the fledgling Canterbury Museum (1,2,3,4).

Sam recalled that, in 1864, his father "determined to start Dick [the eldest son] and I farming on his land at Orari. So my last quarter at school came to an end in midwinter -". Dr Barker's property was actually at Ohapi, between Geraldine and Temuka near the Orari River; and Burdon described it as "some of the best land in the South Island, which eventually increased to some 1400 acres, sufficient to start the Barker family in their farming career" (1,5).

In 1869 Sam left the farm. He worked for a time on Sealy's survey at Oxford, and then joined the Union Bank of Australasia in Timaru. In 1870 he was buying gold for the Bank on the West Coast. Then, on 14 February, 1873, he sailed from Lyttelton for the Chatham Islands, where he stayed from 24 February to 28 April. Here he visited his friend Edward R. Chudleigh (1841-1922) who had leased 30,000 acres at Wharekauri in 1866; and from 7 to 14 March he stayed on Pitt Island with Frederick Hunt (*Brachyglottis huntii*) and recorded the family for posterity with his camera. For Sam Barker had inherited his father's well-known interest in photography (5,6,7).

On 21 April Barker received the news of his father's sudden death on 20 March. He returned with Chudleigh; and on 12 August they left for England and Europe via Australia and San Francisco. Chudleigh

came back in 1875; and Barker arrived home in May, 1876, after an adventurous African expedition inland from Delagoa Bay, where he contracted malaria and his companion committed suicide (5,8).

In October, 1878, Sam Barker married Frances Harriet Lean in Christchurch (9). They rented a farm from John Hayhurst and built a house near Temuka which they called "Kynnersley", an old family name. In 1886 they returned to Christchurch where Barker was appointed librarian of the Supreme Court in 1887. He was also Secretary of the St John's Ambulance Association, and of the Christchurch Domain Board, as well as supervisor of New Zealand University examinations in Christchurch (2,10).

Barker was a native plant enthusiast, keen to find novelties for his garden at "Ti Kouka", 238 Kilmore Street West in Cranmer Square, near the Botanic Gardens. In the summer of 1898 he found a prostrate form of *Rubus* on the forest floor at Inchbonny, near Lake Brunner, Westland (11). He grew this, and gave some to Cockayne, who described it in 1910 as a non-flowering species, *Rubus barkeri* (12). Also in 1898 Barker found a beautiful shrub on the Chathams - where his younger brother Jack, from Geraldine, had purchased the Kaingaroa Station in late 1892 (8) - and Cockayne named this *Veronica (Hebe) barkeri* (11). And in 1899 Kirk (13) described *Lagenophora (Lagenifera) barkeri*, "named in acknowledgment of S.D. Barker's valued assistance in botanical matters".

Barker liked to plant authentic material. Thus Cockayne noted that "Mr S.D. Barker has plants [*Notospartium torulosum*] from all the localities mentioned in the Students' Flora growing in his garden. The Mount Peel and Mason River plants look very similar, but the Waikare plants might very well be a different species" (14).

In his early work Cockayne received much help from Barker, seven years his senior. "Some of the most interesting of the seedlings described in this paper" he wrote, "were raised by Mr S.D. Barker, to whom I am much indebted for permission to use his rare and valuable material" (14). Cockayne was referring to *Convolvulus erubescens* (parent from Port Hills); *Carmichaelia angustata* ("seed sent by Mr T. Kirk F.L.S. and collected in the original habitat of the species") and *Notospartium torulosum* (parent from Mount Peel). Barker also gave Cockayne seedlings of the Chatham Islands *Sophora* (11) and seed of the Chatham Islands *Plagianthus* (ex Mrs Chudleigh) (15).

When the Christchurch Beautifying Association was formed in 1897 Barker became a committee member; and his contribution was described as follows in the Lyttelton Times for 23 August 1902. "On the northern side of the Avon stretching along the bank from Madras Street to Manchester Street there is a garden filled exclusively with New Zealand plants. Its official name is 'Barkers Avenue'. It is one of the earliest works taken in hand by the Beautifying Association, and it was designed, laid out, planted and attended to with assiduous care by the late Mr S. Barker, until his death about twelve months ago, when it was handed over to Mr Cockayne" (16). A detailed account of the plants is then given.

Samuel Delabere Barker died on 17 September, 1901, in his 54th year and was buried at Linwood (9). His second son, Hubert, became a wholesale nurseryman at Ashburton. And Hubert's daughter Mary, of "Kynnersley", Governor's Bay, worked in the University of Canterbury Herbarium, from 1965 to 1990, and kindly answered my questions about her grandfather.

(1) C.G. Burdon *Dr A.C. Barker 1819-1873* 1972; (2) *Cyclopedia of N.Z.* Vol.3, 1903, with portrait; (3) *The School List of Christ's College from 1850 to 1935*, 1935; (4) J. von Haast *TNZI* 14, 1882; (5) S.D. Barker diaries, 1870-75 University of Canterbury; (6) G.R. Macdonald, Dictionary of Canterbury biographies, Canterbury Museum; (7) R. Richards (Ed.) *Frederick Hunt of Pitt Island* 1990; (8) E.C. Richards (Ed.) *Diary of E.R. Chudleigh, 1862-1921, Chatham Islands* 1950; (9) Canterbury Public Library; (10) *Lyttelton Times* 18 September, 1901; (11) L. Cockayne *TNZI* 31, 1899; (12) L. Cockayne *ibid.* 42, 1910; (13) T. Kirk *The Students' Flora of N.Z.* 1899; (14) L. Cockayne *TNZI* 32, 1900; (15) L. Cockayne *ibid.* 33, 1901; (16) Beautifying Christchurch, How the work is carried on, Some interesting gardens *Lyttelton Times* 23 August, 1902.

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Publications

■ Books and journals received

New Zealand Native Orchid Group Journal 48

(December 1993, ISSN 1170-4543). Edited by Ian St George. 32 pp.

Contents include: editorial on ANOS conference and *Pterostylis linearis*, and articles on *Acianthus* and *Corybas* species from the Solomon Islands, *Corybas longipetalus*, Orchid artists (Owen Gibson, Digby Graham), and the first description of *Caladenia iridescens*.

Canterbury Botanical Society Journal 27

(1993, ISSN 01105892). Edited by David Norton and Colin Burrows. 50 pp.

Contents include: articles on ferns around the Boyle River Lodge, *Celmisia* x *Olearia* hybrids, bibract shoots, three new plant records, a primitive fern oddity, *Ginkgo biloba*, the dipterocarps, some southern Maori plant names, bioclimatic zones and Banks Peninsula, green arteries: a strategy for urban conservation, vegetation changes on the Hawdon River floodplain, clandestine plants and their ghosts, germination requirements of seeds of native trees, shrubs and vines, and vivipary and effects of maternal tissues on germination in some New Zealand seeds.

Small-leaved shrubs of New Zealand

by Hugh Wilson and Tim Galloway. Manuka Press, Christchurch. ISBN 0-473-01851-9. 307pp.

A review of this book will appear in the next newsletter.

Editor

■ New Zealand Herbarium Resources 1993

An account of New Zealand's public herbarium resources has been published by the New Zealand National Herbarium Network. The 32 page booklet contains accounts of the holdings of 16 herbaria containing over 1,325,000 plant and fungi specimens. With replacement costs placed at \$26 per specimen, this represents an investment of almost \$35 million in these plants collections.

If you would like a free copy of this publication, please send an 80c stamp to the Editor:

Anthony Wright, Auckland Institute and Museum, Private Bag 92018, Auckland

Book reviews

■ The names of acacias of New South Wales.

By Norman Hall and L.A.S. Johnson. Royal Botanic Gardens, Sydney. 1993. 69 pp. A\$15.

In their new multi-volume Flora Australiana are lucky enough to be given notes, always interesting and often useful, on the derivation, meaning and relevance of each generic name. Much of the booklet being reviewed here is indeed about the meaning of names, and is a kind of addendum to Norman Hall's previous larger work "Botanists of Australian acacias" (CSIRO, 1984). But its principal concern is introduced on p. 7.

"In Australia, and today in other English-speaking countries, botanical names are often pronounced very erratically. This was not always so, at least among educated users. It has largely arisen from the break in oral tradition that led many people to pick up names from written occurrences only; others then copied the ensuing misuse. Another cause was ... the confusion that arose when the 'English' pronunciation of Latin in schools was replaced by the approximated Roman (academic) pronunciation and subsequently by scarcely any teaching of Latin at all."

Lawrie Johnson then provides a solution, fifteen pages of an International Rules style exegesis of consonant and vowel sounds, the Latin system of syllabification (which is not based on etymological units of meaning,

hence "Pit tos po rum"), and placement of stress, a fairly complicated matter and a crucial one ("PitTOSporum"). His standpoint is that Botanical Latin, when used by English-speaking people, is actually part of what a specialist in Austronesian languages has called "the devilish world-language", i.e., English itself, and that:

"In English contexts (and equivalently in other language contexts) it is traditional to employ sound systems that represent the gradual assimilation of medieval Latin to the English matrix."

In this "traditional" English system the short vowel 'a' is pronounced as in "man" and long 'a' as in "lay" and "hey" - the academic 'ar' sound is to be avoided (HEY Mr Tallyman, don't tally me banARna). Short 'e' is as in "sex", long 'e' as in "legal", short 'i' as in "sib" (or as in "see" before another vowel), long 'i' as in "life", short 'o' as in "sod", long 'o' as "lode", short 'u' as in "sup", long 'u' as in "lute", short 'y' as in "sylph", long 'y' as in "lyrate", "xylem" and "xylophone". Diphthongs are a bit more variable though mostly they follow the usual English pattern. Most conspicuously, the "-ae" ending of family and other higher-taxa names should be pronounced as a long 'e', not as "eye".

Exceptions are found particularly where generic names are involved, since a high proportion of these are from personal names in a variety of languages; for these usage will usually prevail (*Bauera*, *Hookera*). Place-names and "barbarous words" may also demand exceptional treatment, and there are some words whose pronunciation is predetermined by the sound of related words that have come into English through other languages. For example, it sounds right to say "SITrus" (from the French "citron") rather than the more correct "SIGHtrus", and "oBLEEqua" (f. "oblique") rather than "oBLYqua".

Those wanting to adhere closely to the "traditional" rules will soon find numerous rather startling examples that run counter to general usage, e.g., "orsTRAYlis" (australis), "SIRpus" (*Scirpus*), "glaDYEolus" (*Gladiolus*), "eRYEcar" *Erica*, "PALmee", and "poLYEgonum". Not everything changes though - *Leptospermum*, *Juncus*, *Rosa* and "europEEus" most of us have right already, and shy *Pinus radiata* botanists will be relieved that the generic name must be pronounced just as in the English word, although he or she will have to face some disbelieving looks when the specific epithet is sounded "raydiAYta".

The remainder of the work is a glossary of New South Wales *Acacia* names and brief biographical material; along with the correct pronunciation of the names there is often a note as to which variations might or might not be acceptable. Since there are 230 taxa here this information is quite useful even to non-Australians in containing quite a number of widely-used epithets; *amoena*, *calcicola*, *coriacea*, etc. It can also act as a self-testing chapter.

The remarkable author and linguist Anthony Burgess proposed half-seriously that Latin should be the lingua franca of the European community, and there will be plenty of taxonomists there and in other places (particularly in South America) who do feel at home with Latin, though their pronunciation will usually be of the Church Latin or academic forms. But for many of us, and in particular for Third World workers, the use of Latin other than just in the name is a burden piled onto the need to master the precise forms of taxonomic English. The abolition of mandatory Latin descriptions might very appropriately be celebrated by a simultaneous adoption of the "traditional" pronunciation system.

This scholarly and attractive booklet is very good value for money (providing one obtains it direct from R.B.G. Sydney). The pronunciation section might well be reprinted in our Botanical Society Journals; wise editors, though, will first wait hopefully for a gladiatorial debate in the columns of *Taxon* etc.

R.O. Gardner, Auckland Institute and Museum, Private Bag 92018, Auckland

■ **People, plants and conservation: botanic gardens into the 21st century. Proceedings of a conference held in Wellington, 19-22 March 1992.**

Edited by P. Froggatt and M. Oates. Royal New Zealand Institute of Horticulture, Christchurch. 1993. 126 pp. \$20 (includes GST and postage).

This publication is a selection of 24 papers that were presented at a conference jointly organised by the Royal New Zealand Institute of Horticulture, the New Zealand Arboricultural Association, and the Centre for Continuing Education Victoria University of Wellington. The papers can be divided into three general groupings, which relate to the conference and publication title. Five refer to people as the users of Botanic Gardens; five are on plants and conservation; and fourteen are on Botanic Garden funding and management, and plant collection databases and management.

Three papers describe tourism and marketing of public gardens, a recent visitor survey undertaken at Wellington Botanic Garden, and the educational activities at the Christchurch Botanic Garden. It is evident that the larger public gardens are becoming user orientated, market sensitive, and market driven. The provision of interpretative and educational facilities has gone beyond the utilisation of existing facilities/plant collections and there is a very real hidden danger of the plant collections becoming secondary in importance.

The papers that relate specifically to Botanic Gardens cover a variety of current issues in New Zealand, including funding, collection and general garden management, and research. Each of these describes a particular approach or method that has been used at a particular garden. A common theme emerging from several of these is the value of plant collections for research. Clearly, living plant collections offer much untapped potential that could be used for the benefit of plant conservation.

The paper I found most interesting and encouraging was by Peter de Lange and Tony Silbery on the *ex situ* conservation of *Muehlenbeckia astonii*. They describe a recovery plan using urban traffic islands to conserve the genetic diversity of the species from the Wellington region. The formal development of a technique such as this has been long overdue in New Zealand and it must serve as a guide for conserving other threatened species. For those Botanic Gardens seeking to make their collections research orientated, a technique has been described and now awaits to be applied to other species.

Three overseas contributors provide a global perspective of the current activities of botanic gardens and plant conservation in Australia, at the Royal Botanic Garden Kew, and at the Chicago Botanic Garden. Particularly relevant to New Zealand is the description of the recently established (July 1991) Australian Network for Plant Conservation which aims to coordinate plant conservation in botanic gardens on a national basis and to establish multi-site endangered species collections.

Two of the papers are on the development of plant collections outside of the Botanic Garden system: rhododendrons at Pukeiti *Rhododendron* Trust garden and native plants at Percy's Reserve, Lower Hutt City Council. These stand apart from those that deal with Botanic Garden collections because they pragmatically discuss the development of new collections and they highlight the importance of collections outside the traditional Botanic Garden concept.

The conference was jointly organised by the New Zealand Arboricultural Association and it does seem unusual that no papers have been included with that particular emphasis. Also, the publication and conference title implies that some specific direction or planning may be provided as we head towards the 21st century, but this is sadly not so. In addition, it is somewhat unfortunate that there are not more papers on actual plants, as after all, these are the primary reason the Gardens and their collections exist. Is it not?

This publication provides an important insight into the current state of the Botanic Garden system in New Zealand. For those employed in a Botanic Garden, involved in the management of plant collections, or in plant conservation, it is a useful reference.

Peter Heenan, Manaaki Whenua - Landcare Research New Zealand Ltd., PO Box 69, Lincoln

■ **Wellington's living cloak: a guide to the natural plant communities.**

By Isobel Gabites. Wellington Botanical Society and Victoria University Press.
1993. 120 pp. \$29.95 (including GST).

What a splendid book this is! Not only very readable, it is also a mine of information about every plant community, not only on land but also in the salt and fresh waters of the Wellington region.

While Wellington's forests have many families of tropical affinity, Isobel's account does not allow us to forget the southern, exposed coasts where some alpine plants find suitable conditions.

The first prehistorical and historical chapter displays a high degree of scholarship. Her account of the ice-age vegetation is very real, and recalls landscapes of the present day western Straits of Magellan.

The use of archive illustrations certainly shows how much forest Wellington lost in the early days of settlement. The photo of Old Saint Paul's Cathedral shows the quality and size of what was milled locally in the 19th century. The lost forests are recuperating, as the time lapse photos on pages 16 and 17 show. This recovery is often with the help of New Zealand plants not native to the southern North Island and also by naturalised plants, such as gorse. The seed carriers of our larger trees are scarce now, so the new forests may be different from those we have lost. The loss of indigenous vegetation is well shown on the

maps of page 19. I believe this is the first published vegetation map of the Wellington area.

The chapter on coastal vegetation makes a good start with clear photos of seaweeds and an equally clear account of their zonation. On coastal lands it is a sad commentary on local extinctions that one third of these have been from unique coastal vegetation. It is a matter for urgent concern that goats have recently been liberated by "farmers" in an area whose landscapes recall the South Island high country. Some comment on the photographs is appropriate now. The closeup and middle range photos are excellently reproduced, but some more distant views have less brilliance. This fault affects the photo of the raised beaches at Turakirae Head. It is after peering at the photo that one realises that there is a series of lines, probably roads, not necessarily raised beaches. Possibly a fuller caption could have made this clearer.

The coastal forests are well treated and well illustrated. The persistence so far south of forests with such strong tropical affinity attests to the mildness of our oceanic climate, as does the vigorous and persistent growth of the nikau, the world's southern-most palm.

There are many good things in the chapter on inland broadleaved forests, especially the diagram facing page 57. The disastrous history of Barton's Bush, with totara felled as late as the 1940s shows us two things: the utter ignorance of local bodies and the scarcity of people around who could have protested. The passing of 50 years has certainly seen changes for the better on both sides.

As we read further into this book we run across more and more "green boxes", informative lists of localities about the vegetation being treated.

The beech forest chapter is good, but needs a clear statement early on that beech seed is far less mobile than those of podocarps and broadleaf large trees. Also the statement that black beech grows in waterlogged soils is strange - mountain beech does. Anyway what is so "enigmatic" about drought tolerant plants like manuka growing also in bogs, which also produce a water-absorption stress through physiological drought? Is there really little regeneration of silver beech in the Wellington area? Agreed, deer today have often prevented such regeneration, and the lack of regeneration after the 1936 storm could be related to a non-mast period. However, south of Dobson's Mistake, a fire of the 1890s was followed by dense regeneration, much of which was reburnt in 1938. Silver beech is regenerating at the margin of this second burn.

"Above the Treeline" is a short chapter, as the region studied is mostly below this climatic limit. But Mts. Alpha and Aston are included and both have true alpine treelines. A photo above the Mt. Alpha treeline to replace one of the pair of the formerly forested Mt. Climie would have given a fuller picture of our alpine vegetation.

The chapter on wetlands shows us how lucky we are around Wellington have any wetlands left at all. Go-cart tracks and a commercial vegetable garden at Pauatahanui have now disappeared under the efforts of volunteers. The photo of Taupo Swamp gives an idea of its size and the efforts by PD workers to rescue the wetland from inundation by willow. The more recent salvage of the Pencarrow Lakes is part of continuing saga of vegetation conservation and reclamation that forms a continuous theme in this book. It is not only a description of plant communities but a guide to conservation.

The chapter on island habitats illustrates clearly the two facets, conservation by control of fires and animals on Kapiti Id., and reclamation by planting on Mana and Somes Islands.

Wouldn't Leonard Cockayne be pleased to see Isobel's description of Otari's native botanic garden, complemented by old photos, and to know that rare native plants are now featured at the main Botanic Garden, as well as on the University's gale swept campus. The section on formal gardens is useful for the hurried tourist with "a day in Wellington".

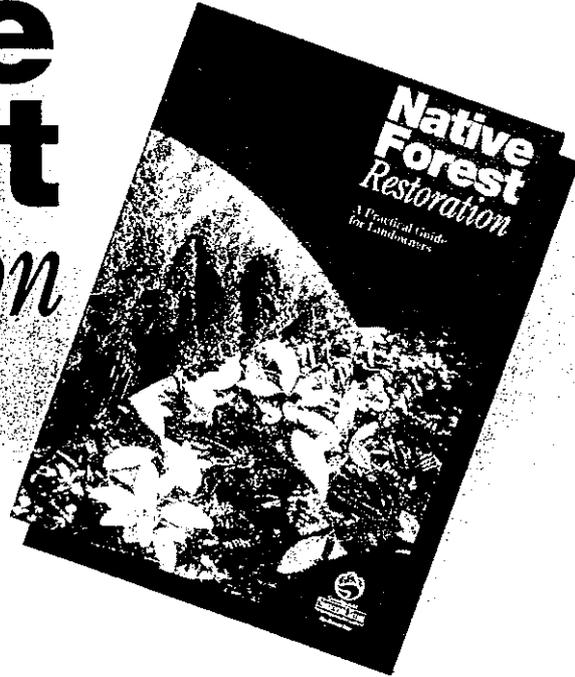
"Picking up the Pieces", the last chapter, covers well in a short space the efforts to help endangered species survive and to reconstitute endangered vegetation types. There is an informative table of natural succession to guide those who put in time, publicly, or on their own land, to regreen Wellington. The selection of invaders is short and wise. Mostly shade tolerant, the plants described are certainly threatening existing vegetation or liable to pervert natural successions away from their indigenous pathways.

... continued on page 25



Native Forest Restoration

by Tim Porteous



PUBLISHED by the Queen Elizabeth II National Trust, this practical handbook contains essential information for individuals and organisations managing and restoring areas of native forest. It also contains revegetation information for those wishing to create, enlarge or enhance areas of native forest on their land.

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The Queen Elizabeth the Second National Trust gratefully acknowledges the assistance of Monsanto (NZ) Ltd. in producing this handbook.

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Editorially there is little to criticise. There are a few minor typos and full date missing for one reference. The use of the index to translate plant names is good, and compact, but I could not find "gully tree fern".

Despite my criticisms, this book is outstanding. I hope that it will be a companion not only to the sedentary and the field botanists, but also to those who manage the Wellington region. It could also be a basis for teaching. I have rarely seen an account of plants and their ecology which is so well integrated and so easy to read.

Ross McQueen, School of Biological Sciences, Victoria University of Wellington

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