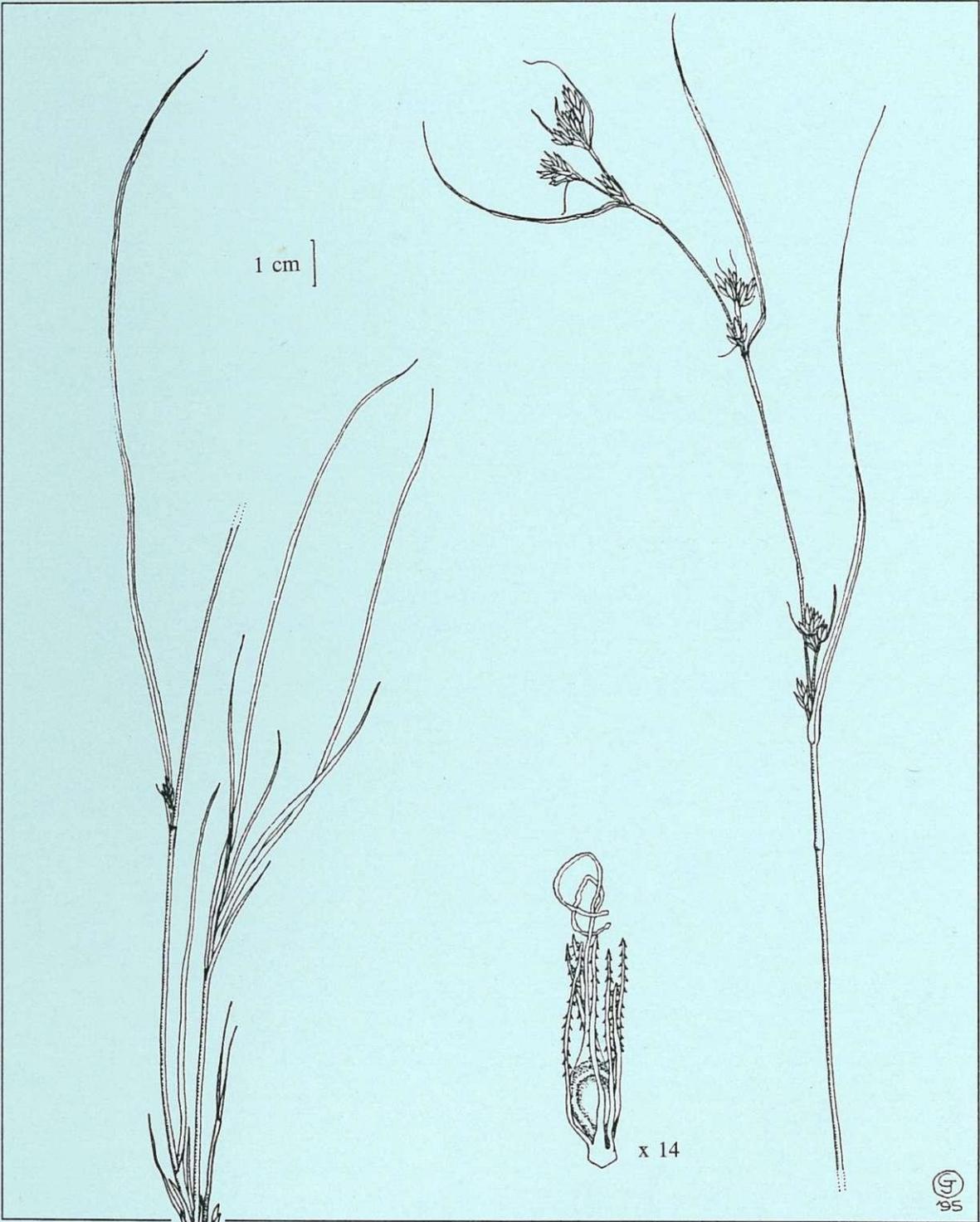


NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 43

MARCH 1996



New Zealand Botanical Society

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Subscriptions

The 1996 ordinary and institutional subs are \$14 (reduced to \$10 if paid by the due date on the subscription invoice). The 1996 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 42 (December 1995). 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 June 1996 issue (Number 44) is 30 May 1996.

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

Contributions may be provided on floppy disc (preferably in Word Perfect 5.1) or by e-mail (ClarksonB@Landcare.CRI.NZ).

NEW ZEALAND BOTANICAL SOCIETY
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Cover illustration

Rhynchospora capitellata, a sedge recently recorded in New Zealand. See article p 7. Drawing by **Cathy Jones**, Department of Conservation, Nelson. Left: Plant habit. Centre: Beaked achene showing retrorsely barbellate bristles. Right: Culm with spikelets.

NEWS

New Zealand Botanical Society News

■ Balance sheet for the financial year 01 January - 31 December 1995

INCOME		EXPENDITURE	
B/fwd from 1994	3017.69	Printing <i>Newsletter 39</i>	1153.13
1995 subscriptions	3355.00	Postage <i>Newsletter 39</i>	178.40
1995 student subscriptions	59.00	Printing <i>Newsletter 40</i>	1102.50
Donations	281.25	Postage <i>Newsletter 40</i>	177.60
Back Issue Sales	225.00	Printing <i>Newsletter 41</i>	1108.13
Subs in advance	61.00	Postage <i>Newsletter 41</i>	184.80
Sale of abstracts booklets	20.00	ECO Subscription	100.00
Interest chq a/c	0.19	Bank fees	3.00
Interest investment a/c	<u>197.73</u>		
	7216.86		<u>4007.56</u>

Excess income over expenditure of \$3209.30 (represented by chq a/c balance of \$16.20 and investment a/c balance of \$3193.10) is carried forward to 1996. Note that payments totalling \$1460.88 for *Newsletter 42* (December 1995) were not processed until early 1996 therefore are not included in the 1995 balance sheet; I am extremely grateful to Antoinette Nielsen of Auckland Museum for her outstanding administration of NZBS finances and for the preparation of this statement.

Anthony Wright, Treasurer, New Zealand Botanical Society

January 1996

■ Congratulations to Anthony Wright

Anthony Wright, Secretary/Treasurer of the New Zealand Botanical Society, has been appointed Director of Canterbury Museum.

Anthony trained at the University of Auckland as a botanist and geologist, and was appointed Curator of Botany at Auckland Museum in 1980. There he was responsible for a major upgrade of the storage and management of the Museum's botany collections, including the introduction of compactor storage units and a computerised herbarium management system.

Aside from collections management, Anthony was involved in the wider botanical community, giving lectures and talks, leading field trips, serving on the committee and as President of the Auckland Botanical Society, and initiating and organising the New Zealand Botanical Society. His research interests centred on the exploration and documentation of the flora and vegetation of the offshore islands of northern New Zealand, with a special focus on lichens and threatened plants. He has published some 85 papers.

For the past five years, Anthony has held a variety of management posts at Auckland Museum directly concerned with the planning and delivery of the \$40 million redevelopment of that Museum that is now underway. For seven months in 1994 Anthony was Acting Director of the institution, and since then has been Assistant Director Collections, responsible for 55 full-time staff and volunteers who undertake the Museum's collections curatorial, research and public access functions.

We wish Anthony success in his new post.

Editors

Regional Botanical Society News

■ Canterbury Botanical Society

Forthcoming activities

April Meeting: Friday 11 April. "The Work of Raoul". Speakers: Margaret Bulfin and Warwick Harris.
December Camp: 6-8 December 1996. Mount Vernon Lodge, Akaroa.

New Year Camp: 31 December 1996 - 10 January 1997, Borland Lodge, Fiordland National Park.

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

■ Nelson Botanical Society

December Field Trip: Gordon Knob

The long climb was through red beech forest at first with dense regeneration, then towards the top the forest changed to mountain beech. The highlight of the ascent was the discovery of three 3m tall *Pittosporum patulum*. From the forest we emerged on to carpet grassland (*Chionochloa australis*). Quite a few of the species were in flower including *Euphrasia monroi*, *Caladenia lyallii*, *Raoulia grandiflora* and several *Gaultheria* species.

Christmas Camp: Branch/Leatham

The first afternoon we wandered the Leatham River close to camp. The first unusual plant encountered was *Olearia odorata* but much time was spent sorting out *Corokia cotoneaster* and *Helichrysum aggregatum*. Abundant *Dryopteris filix-mas* was unusual for the Nelson area.

On the 27th the first place visited was Kowhai Point, on the Wairau. There kanuka or kowhai dominate with a dense understorey of small-leaved shrubs. Interesting plants included adult *Pseudopanax ferox*, huge *Lophomyrtus obcordata* with stems over a metre in circumference, and a lawyer with a stem 20cm in diameter. At the next stop near the Wash Bridge plants of interest included hedgehog grass (*Echinopogon ovatus*) and *Dryopteris filix-mas* again. The last walk was near the Six-mile Creek. Here the ultramafic plants included *Olearia serpentina*, *Carex devia*, the local unnamed *Colobanthus* and an unnamed gentian.

On the 28th we visited the Leatham valley. The first stop was an old limestone quarry. The cliff areas were heavily endowed with *Helichrysum parvifolium*, *Heliohebe pentasepala* and *Gingidia montana*. The tall rank spring weed growth hid the native herbs and the *Australopyrum calcis* was seen at only one site. The second stop at Caves Bluff was mostly open cliffs and grassland. New species included the hot rock ferns *Pellaea calidirupium* and *Cheilanthes sieberi*.

On the 29th it was on to the Raglan Range. At the road end (1460m), mixed with pines, carpet grass dominated and in more open areas *Raoulia grandiflora*, *Kelleria dieffenbachii* or *K. multiflora*, *Neopaxia "calycina"* and *Parahebe cheesemanii* or *Luzula traversii* were common. Rocky areas contained *Raoulia bryoides*, *R. eximia* and *Leucogenes neglecta*. Lower down *Hebe* aff. *rigidula*, *Celmisia incana*, *Coprosma "alpina"* and *Dracophyllum pronum* appeared. In amongst the shrubs *Pterostylis montana* was still in flower. Large patches of *Celmisia spectabilis* shared space with two spaniards (*Aciphylla aurea* and *A. glaucescens*).

On the 30th we headed out for Beebys Knob. We pursued armchair botany as we drove slowly through the fog. Ghostly mounds of low growing *Halocarpus bidwillii* drifted by in the fog and seedlings turned out to be *Hebe tetragona*. Several short forays from the "armchairs" to the continuous carpet grassland revealed large patches of *Celmisia sessiliflora*, *Phyllachne colensoi* and *Euphrasia monroi* in full flower; *Gentiana bellidifolia* with buds almost open; mounds of *Coprosma perpusilla* with fruit hidden by the leaves; and *Euphrasia zelandica*. Near the hut *Pittosporum anomalum* in full flower and *Coprosma ciliata* with its shade and open growth forms provided interest.

On the 31st the Red Hills were tackled from the main road. The lower shrublands *Adenochilus gracilis*, *Thelymitra hatchii* (in flower) and *Exocarpus bidwillii* in fruit were noteworthy. Near the hut *Celmisia "rhizomatous"*, the sundew, *Drosera arcturi*, and *Bulbinella hookeri* were in full flower. Above the hut a tall creamy white flowered *Myosotis* (possibly *M. laeta*) occurred amongst *Chionochloa defracta* and *Notothlaspi* competed with *Neopaxia "calycina"* for showiness.

On New Year's Day our destination was Island Pass on Molesworth. Along the way *Olearia odorata*, *Traversia baccharoides*, dead sticks (*Helichrysum depressum*) and penwipers (*Notothlaspi rosulatum*) were abundant on the roadside. At Island Saddle "The Scree" was a mass of *Stellaria roughii*, *Lignocarpa carnosula*, *Notothlaspi rosulatum*, *Myosotis traversii*, *Lobelia roughii* and *Leptinella dendyi* in various stages of flowering. On the return journey we stopped at Berts Creek waterfall for *Dolichoglottis scorzonerooides*, *Helichrysum parvifolium*, *H. coralloides*, *Melicactus alpinus* and the pipe cleaner (*Melicactus "Kaikoura"*).

On the last day we investigated Six Mile Scenic Reserve, a place dominated by red beech with some silver beech. The highlights were seeing the mistletoe *Peraxilla colensoi* in flower and a *Pseudopanax anomalus* and *P. simplex* hybrid. Finally in a swamp *Peraxilla tetraptera* in full flower made a suitable end to the trip.

January Field Trip: Rainbow Skifield

The first stop was just below the treeline *Ranunculus insignis*, *Coprosma serrulata* and *Celmisia bellidioides* were particular treasures. Later from the main carpark wet soaks contained an abundance of *Dolichoglottis lyallii*, *Gentian* "australis" and *Celmisia* "rhizomatous" in flower. Nearby bluffs contained *Raoulia rubra*, *Helichrysum microphyllum* and *Cheesemanian fastigiata*. On the shores of the tarn low mat species included *Coprosma niphophila* and in the water *Isoetes alpinus* was abundant. Beside the large tarn *Chionohebe pulvinaris* was common. Along the main ridge line vegetable sheep and scree plants included *Raoulia eximia* var *rubra*, *Myosotis traversii*, *Leucogenes grandiceps*, *Haastia sinclairii* and *Cheesemanian latisiliqua*.

Anniversary Weekend Camp: Cobb Valley

On the first day our path led towards Mt Peel. At first it was easy walking on carpet grass with gentians (*G. vernicosa*, *G. coriacea* and *G. montana*), *Parahebe lyallii*, *Pimelea* "aff. sericeovillosa" and *Aciphylla polita*. Where the ridge more defined *Cheesemanian latisiliqua*, *Brachyglottis bidwillii*, *B. adamsii*, many small hebes, *Haastia pulvinaris*, *R. rubra*, edelweiss, *C. bellidioides*, *Coprosma serrulata*, *Myosotis macrantha* were present. On the descent, *Coprosma obconica* and *C. rugosa* occurred in the forest.

On Sunday Iron Lake was explored via the Lake Sylvester Track. The clearings in the upper forest proved particularly interesting with mistletoe (*Peraxilla tetraptera*) in full flower, two species of sundews and a good selection of the small celmisias. Near the hut five *Astelia* species were seen growing close together and not far away the jelly bean plant (*A. linearis*) added to the tally. Above the lake *Brachyglottis bidwillii* was quite common but *B. adamsii* was quite rare and on the odd *Haastia sinclairii* and *Raoulia eximia* var. *rubra* were present.

On Monday we examined a wide range of divaricating shrubs between Trilobite Hut and Chaffeys Hut. Several species were often in one bush. Particularly "tricky" plants included *Aristotelia fruticosa*, *Pittosporum anomalum*, *P. divaricatum*, *Olearia virgata*, *Coprosma propinqua* and *Coprosma obconica* and *C. "paludosa"*. At several points we saw good populations of *Pittosporum patulum*, some now nearly 3m tall.

February Field Trip Report: Tennyson Inlet-Nydia Walkway

A few hours were spent paddling in the rain. The filmy ferns were especially lush in the wet and the forest full of interesting odours. The nikau gullies looked especially tropical with nikau accompanied by pukatea and grand mamaku or gully tree fern.

Forthcoming Trips

March Pearce
April Wairoa ultramafics
Easter Waimanagaroa - West Coast
May Abel Tasman - Te Pukatea to Watering cove

Graeme Jane, 136 Cleveland Terrace, Nelson

■ **Wakatipu Botanical Group**

Forthcoming activities

Saturday 23rd March: (Note date). Skippers area. The track around to the Nuggets battery on the Shotover River has recently been opened up. We will be able to find many interesting plants as well as see a bit of local history. It will also be a chance to look at the *Hebe cupressoides* plants at Deep Creek on the way in.

Wednesday 10th April: Sue Bennett, a country member and also member of the Southland Conservation Board has recently been to the Subantarctic Islands - all of them, wow! She describes them as awesome places and although it was a bit early for many flowering plants the *Damnomenia* and *Bulbinella* were in flower. If you want to know what these plants look like then come along and see Sue's slides.

Saturday 13th April: A day somewhere in the Taringatura Ecological District where Neill is engaged in a survey at present. We may even be able to help survey a small area. More later.

Lyn Clendon, Secretary, P O Box 478, Queenstown

■ Wanganui Museum Botanical Group

Among the interesting evening meetings in the second half of 1995 was an illustrated talk by Geoff Rogers, Landcare Research, Hamilton on the loss of diversity from New Zealand forests caused by possums. He showed that, while the possum-infested forests may appear to be thriving, the very diverse understorey was being replaced only by species unpalatable to possums. Also, Fiona Pitt from the Museum of New Zealand talked of her work as Collection Manager, Botany. It was good to know what her work involved and also what happens to herbarium material sent to the Museum. Phil Knightbridge of Landcare Research, Palmerston North talked of propagation experiments with northern rata.

Forthcoming activities

2 April: Cliff Lawrence, a dairy farmer and landscaper, will give us an illustrated talk on his travels in South America.

7 May: Arthur Bates will show glimpses of Israel, Egypt and Jordan.

4 June: John Barkla and Colin Ogle will talk on 'Aberfeldy mistletoes'. These have been studied over several years. Alf King will talk on a plant family or group of families.

Field trips

Saturday 30 March: Bushy Park. We hope to add to Stan Butcher's plant list.

Sunday 5 May: Corballis' Bush (Marangai).

Saturday 1 June: Little Sutherlands/Lairds Bush, Turakina Valley.

Sunday 30 June: Virginia Lake, St John's Hill, Wanganui.

Trip reports

Kaitoke Nursery and Pine Forest - 4 November 1995.

Lee Rastrick gave us a guided tour and talk at the Prison Nursery. We were impressed with the large numbers of healthy native plants being grown for conservation projects, and also the huge vegetable garden being tended by the inmates. Lunch was in the nearby pine forest and interspersed with searches for native orchids. Particularly memorable were the abundant flowering *Chiloglottis cornuta*, and some pink caladenias and wine coloured spider orchids (*Corybas trilobus*).

Taupo Weekend - 2/3 December 1995.

Six members went to Iwitahi, east of Taupo. Perfect weather enabled us to explore pine forests for native orchids. We saw about 13 different species. *Caladenia iridescens* was one we had not seen before. Crimson *Chiloglottis validus* was flowering prolifically under wire cages which protected them from rabbits and other browsers. On our return to Wanganui we saw large numbers of blue *Thelymitra pauciflora* along road sides near Turangi. We also walked in Tongariro Forest near Mangatepopo School. There we enjoyed a range of forest types, including areas of pink pine (*Halocarpus biformis*) and kaikawaka, and also shrublands, tussock and wetlands.

Group details

Chairman: Ian Bell. Secretary: Robyn Ogle, 4 Brassey Road, Wanganui, phone (06) 345 8593. Meetings first Tuesday of each month in the Museum Davis Lecture Theatre commencing 8pm summer time; 7.30pm winter time (April-September).

Robyn Ogle, 4 Brassey Road, Wanganui

Herbarium News

■ AK's database reaches 100,000!

On 8 February 1996 the Auckland Museum's Botany Department celebrated a record achievement. At a special function the 100,000th record was added to the herbarium database, making it the largest of its kind in New Zealand.

The AKILLES (AK, Information, Loans & Labels Electronic System) database system was developed in 1987 from Advanced Revelation software by Jack Mackinder to fulfil three major functions: (1) herbarium label production; (2) loans management; and (3) information retrieval.

Since 1989 all new herbarium accessions have been added to the database. Contract staff have assisted in the project, databasing the pre-1989 specimens, funded mainly by grants from the Lottery Grants Board. New Zealand natives have been the primary target and to date all lichens and bryophytes and the following New Zealand natives have been databased: Pteridophytes, gymnosperms, monocots, about half the dicots and some algae.

The usefulness of the system has been well demonstrated with the database being used to extract records from requested localities, the localities of threatened plants for the Department of Conservation, environmental weed records for Regional Councils, and details of collectors for biographers. All without handling the specimens.

To date the AKILLES system is also used in three other New Zealand herbaria and is being trialled in another two. It took exactly seven years to database the 100,000 specimens (14,286 specimens per year) and during that time the hardware has grown from two stand-alone computers to five networked machines. With almost half the herbarium now databased I am hopeful the next 126,000 records will be achieved at an even faster rate because label information of the foreign specimens will only partly be recorded.

Ewen Cameron, Herbarium Curator, Auckland Museum, Private Bag 92018, Auckland

NOTES AND REPORTS

Plant Records

■ Two new records of Asteraceae from Tongariro National Park

The diverse family Asteraceae (Compositae) is often considered difficult by lay botanists and therefore is liable to be ignored. Thus the representatives of the family in a particular country are perhaps not enjoyed as they may deserve. If the species are tiny, grow in alpine habitats, and have inconspicuous flower-heads, the possibility that they are passed unnoticed by the mountaineer or trapper is even greater. This is often the situation for *Abrotanella* (Tribus Senecioneae) and *Leptinella* (Tribus Anthemidae).

Field work in 1995 has turned up two small herbaceous composites in Tongariro National Park which were not recorded in previous lists (1). The two species newly recorded here from Tongariro National Park are both small creeping herbs with tiny insignificant capitula.

1. *Abrotanella fertilis* Swenson
= *A. caespitosa* Auctt., non Petrie ex Kirk

Mt Ruapehu, in a small creek ravine, north of track to Blyth Hut, about 500m east of main road from Ohakune, 1180m, 39°20'S, 175°30'E, Swenson & Martinson 352, 27 Jan. 1995, AK, CHR, K, S, UPS.

Among the places visited by one of us (U.S.) on a recent field trip to New Zealand was Tongariro National Park. Previously no collection of *Abrotanella* was known from this park and, thus, there was no expectation of finding any. Surprisingly, along a small creek in a *Nothofagus* forest on the south-western slope of Mt Ruapehu, a large patch of *A. fertilis* was found just near a cushion of sphagnum. The most northern record in New Zealand is from the Pouakai Range, Egmont National Park (2, 4) at about 39°15'S.

With this discovery, *A. fertilis* is distributed on the North Island on all high mountain ranges, except for Huiarau and Raukumara Ranges, and should be fairly easy to come across. Its presence on the two latter ranges is plausible but still not known. In the South Island it is known from North-west Nelson and a single collection near Lake Sweeney in South Westland.

Abrotanella fertilis is the species previously misidentified as *A. caespitosa* Kirk. It was described recently by Swenson (4). *A. caespitosa* is found in eastern and southern South Island, and has recently been referred to as *A. "Rock and Pillar"* (4).

2. *Leptinella dispersa* (Lloyd) Lloyd et C. Webb

Mt Ruapehu, headwaters of Mangaturuturu R., 1595m, 39°18'55"S, 175°35'35"E, P.J. Garnock-Jones 2216, 9 Jan. 1995, WELTU 16808.

The specimen is a very small fragment of a female plant. The following diagnostic characters were noted: Rhizome with 4 vascular bundles. Leaf with midrib not raised on ventral surface; lamina brownish proximally, adaxial surface punctate. Capitula globose, c. 2mm diameter; phyllaries in 3 series, equal in length; outer phyllaries ovate with short sparse whitish hairs, brownish green with dark purple tips; middle series similar, shallowly fimbriate at apex; inner series membranaceous, pale, purple at apex. Pistillate florets c. 10 per capitulum, green. Corolla cylindrical, equalling ovary, teeth very short. Style green; stigma tips purple.

This very small creeping *Leptinella* has been recorded previously from scattered sites in the North Island, the nearest being the Napier-Taihape road (subsp. *dispersa*) and from Castlecliff near Wanganui (subsp. *rupestris*) (3). The population was on an almost level area of fine gravel and sand, flushed by seepage, where it was the only species present over several square metres.

Plants were difficult to place in either subsp. *dispersa* or subsp. *rupestris*, seeming to combine features of both subspecies. The leaves were very small, less than 10mm long, and only slightly fleshy. Pinnas were in 2-3 pairs, acute at the apex but not toothed.

News reports suggest the Mangaturuturu Valley has been the site of at least one lahar flow during last year's eruption of Mt Ruapehu so streamside communities such as this population of *Leptinella* may have been disturbed.

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- (1) Atkinson, I.A.E. 1989: Checklist of indigenous vascular plants recorded from Tongariro National Park. Unpublished checklist, Botany Division, DSIR.
- (2) Clarkson, B.D. 1986: Vegetation of Egmont National Park, New Zealand. *National Park Scientific Series* 5. Science Information Publishing Centre, Wellington.
- (3) Lloyd, D.G. 1972: A revision of the New Zealand, Subantarctic, and South American species of *Cotula*, section *Leptinella*. *New Zealand Journal of Botany* 10: 277-372.
- (4) Swenson, U. 1995: Systematics of *Abrotanella*, an amphi-Pacific genus of Asteraceae (Senecioneae). *Plant Systematics and Evolution* 197: 149-193.

Ulf Swenson, Institute for Systematic Botany, Uppsala University, Uppsala, Sweden; **Phil Garnock-Jones**, School of Biological Sciences, Victoria University of Wellington, P O Box 600, Wellington

■ *Rhynchospora capitellata* (Michx.) Vahl - record of a new sedge genus for New Zealand

In March 1995, while on a walk in the Kaimai-Mamaku Forest Park, northern Bay of Plenty I came across an unfamiliar sedge which I was later unable to match with anything in our floras. However, Chris Ecroyd, curator of the NZFRI Herbarium, was able to identify it as *Rhynchospora capitellata* (see cover illustration) using keys in North American literature, and Rhys Gardner confirmed the identification against specimens from overseas held at the Auckland Museum Herbarium. No previous records have been found of this genus in New Zealand.

The genus

The name *Rhynchospora* is from the Greek - *rhynchos* meaning beak and *spora*, seed, referring to the distinguishing feature of the genus, the tuberculate or beaked achene. The common name is, consequently, beak sedge or sometimes, less appropriately, beak-rush. The genus as described by Gleason (1974) comprises about 200 species, and is mainly in warm regions in both hemispheres. There are about 26 species in North America, including *R. capitellata* which occurs widely in bogs and wet sands. Although approximately 17 species are present in Australia, of which 5 are endemic, *R. capitellata* has apparently not been recorded there.

The species (from Gleason 1974)

A tufted perennial 30-80cm tall, with narrow linear leaves, 2-3mm wide. The glomerules, or clusters of spikelets, terminal and axillary, are sub-globose, and the spikelets are 2-5 flowered. The terminal cluster may be up to 15mm wide but the lateral clusters are somewhat smaller, often on paired or branched peduncles. The achenes are dark brown, obovate, 1.2-1.5mm long and about two-thirds as wide, with the

sides scarcely concave near the margin, and often much paler at the centre. The tubercle, or dilated style base persistent on the nut, is much widened at the base, and 0.8-1.4mm long. There are 6 bristles, retrorsely barbellate (with backwardly-directed minute barbs), about equalling the tubercle (see cover illustration).

The upright, fine-leaved tussock-like clumps, with leaves green at the base but yellow-brown towards their tips, together with the chestnut-brown spikelets in spiky clusters, were the features which caught my eye. The prominently beaked achene and the six retrorsely barbellate bristles were the key features distinguishing this specimen from known New Zealand sedge genera.

Distribution

The beak-sedge was on the edge of a clearing beside an old tramline track (from the end of Whakamarama Road, north of Tauranga), used to bring logs out of the bush in the early part of this century. Considerable disturbance to the area must have occurred during these logging operations. Clearings surrounded by young regeneration are evident, especially near the road end. The track is now a popular bush access route and one of several tracks on the coastal slope of the Kaimai Ranges.

On a very recent (24 February 1996) return visit to the *Rhynchospora* site, the species was relocated in the third clearing from the road and its distribution observed. There are approximately 10 clumps confined to the track margin along 15 metres of track; all except the furthestmost clump from the road are on the left side of the track if travelling inland. The surrounding dense, grassy sward may discourage establishment away from the path. The distribution would suggest that the species is a fairly recent casual introduction. I am not aware of any further sightings in the Bay of Plenty.

Voucher specimens are lodged at the NZ Forest Research Herbarium (NZFRI 21536), Auckland Museum Herbarium (AK), and Manaaki Whenua - Landcare Research (CHR).

Acknowledgements

I am grateful to Chris Ecroyd and Rhys Gardner for identification and confirmation of the specimen, to Elizabeth Edgar and Barbara Knowles for comments and advice and to Ron Maunder for choosing the track beside which it was found. I wish to thank Cathy Jones for preparation of the illustrations.

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- Harden, G.J. 1993: Flora of New South Wales. Volume 4. New South Wales University Press, Kensington, NSW, Australia. 775 p.
- Humphries, C.J. and Press, J.R. 1979: Grasses, sedges and rushes in colour. Blandford Press Ltd., Poole, Dorset, Great Britain. 175 p.

Elizabeth M. Miller, Herbarium, New Zealand Forest Research Institute, Private Bag 3020, Rotorua

Research Reports

■ Uptake of arsenic by watercress (*Rorippa nasturtium-aquaticum*)

It is widely known that some aquatic macrophytes growing in the Taupo Volcanic Zone and Waikato River contain high concentrations of arsenic (Reay 1972, Liddle 1982). Robinson *et al.* (1995) reported 1000 $\mu\text{g/g}$ (ppm) arsenic (dry weight) in samples of *Egeria densa* and *Ceratophyllum demersum* growing in the Waikato River system. This arsenic is derived from geothermal activity to some extent exacerbated by commercial exploitation of geothermal power.

Liddle (1982) conducted experiments involving the uptake of arsenic by *Ceratophyllum demersum*. He found that plants grown in arsenic solutions with $\mu\text{g/mL}$ arsenic (III or V) reached equilibrium in one or two days, while plants in 0.5 $\mu\text{g/mL}$ of this element, needed up to a week to reach equilibrium. Plants grown in more concentrated solutions had accumulated more arsenic. Plants grown in arsenic solutions, contained far less arsenic than plants taken from water with similar concentrations of arsenic in the Waikato River. A plant grown in 0.5 $\mu\text{g/g}$ of arsenic reached an equilibrium content of 67 $\mu\text{g/g}$ arsenic (dry weight). It was noted that the majority of the arsenic in the plant was stored in the leaves.

In the course of our work on the uptake of arsenic by water plants and other organisms in the Waikato River system (Robinson *et al.* 1995), we observed an inordinate accumulation of arsenic in watercress (*Rorippa nasturtium-aquaticum*; MPN 23380) samples taken from the river at a site near a geothermal power station (Ohaaki near Broadlands). At this site the arsenic content of the plant averaged 412 $\mu\text{g/g}$ (dry weight) and prompted further studies on this plant as it is used as a food source and its metal content could have serious implications for public health as this amount is well in excess of the WHO limit for arsenic in foodstuffs (2 $\mu\text{g/g}$ fresh weight).

The predominant form of arsenic in the environment is As(V) since As(III) is oxidized by atmospheric oxygen (Pepper *et al.* 1987). For most of the year, over 90% of the arsenic in the Waikato River is present as As(V) (Aggett & Aspell 1978), but in the summer months the levels of As(III) increase, probably because of bacterial action (Freeman 1985). In this experiment As(V) was used because it represents the commonest oxidation state of arsenic in the river.

The aim of this experiment was to determine if watercress accumulated arsenic, and if so what was the maximum level of arsenic in the surrounding water before arsenic levels in the watercress exceeded 2 $\mu\text{g/g}$, the WHO limit for arsenic in foodstuffs.

Watercress, water and sediment samples were obtained from a site near Ohaaki (Broadlands) on the Waikato River in late February 1994. As a control, samples were taken from the Tiritea Stream near Massey University. Plant material was washed thoroughly in the river and placed in plastic bags until return to the laboratory where further washing in distilled water was carried out.

Material for chemical analysis was then weighed fresh, dried at 40°C, and then reweighed.

For arsenic uptake experiments, the excess water was removed from the fresh material, and approximately 12g portions of plant weighed out. They were then floated in 1 L beakers containing 800 mL of arsenic solution. Each beaker contained an aerator for ensuring adequate oxygen. The experiments were conducted out of direct sunlight. The average temperature of the water during the day was approximately 22°C.

The arsenic solutions were prepared by taking a measured amount of 1000 $\mu\text{g/mL}$ of sodium arsenate standard and making the volume up to 800 mL with distilled water. Plants were grown in solutions containing, 0.05, 0.1, 0.2, 0.4 and 0.8 $\mu\text{g/mL}$ arsenic. There were three replicates of each of six treatments and the experiment lasted 8 days. The control consisted of a beaker containing 800 mL of 0.8 $\mu\text{g/mL}$ of arsenic but no plant. Aliquots of 4 mL of solution were taken from each beaker initially at the start of the experiment and then at 48h intervals, to determine when the plants had reached equilibrium.

At the end of the experiment, the plants were removed from their beakers, rinsed in distilled water, and dried at 40°C.

All samples of plant material, sediment, and waters were analyzed for arsenic using hydride-generation atomic absorption spectrometry. The limit of detection was about 4 ng for loadings of up to 5 mL of sample (i.e., 0.8 ng/mL [ppb] for waters and 4 ng/g for sediments and plant material). The relative standard deviation was about 10% at concentrations of arsenic close to the limit of detection.

Arsenic concentrations in watercress, sediments, and waters from the Waikato River sampling site are summarised in Table 1. The same table gives values for the water plant *Ceratophyllum demersum* for comparison purposes.

Table 1. Arsenic concentrations in waters, sediments and aquatic plants (dry weight basis) from the Waikato River and from a control site (Manawatu district).

Sampling site	Water (ng/mL)	Watercress ($\mu\text{g/g}$)	<i>C. demersum</i> ($\mu\text{g/g}$)	Sediment ($\mu\text{g/g}$)
Broadlands	68	306, 273, 659	950	93
Tiritea stm.	<1	<0.2	4	<1

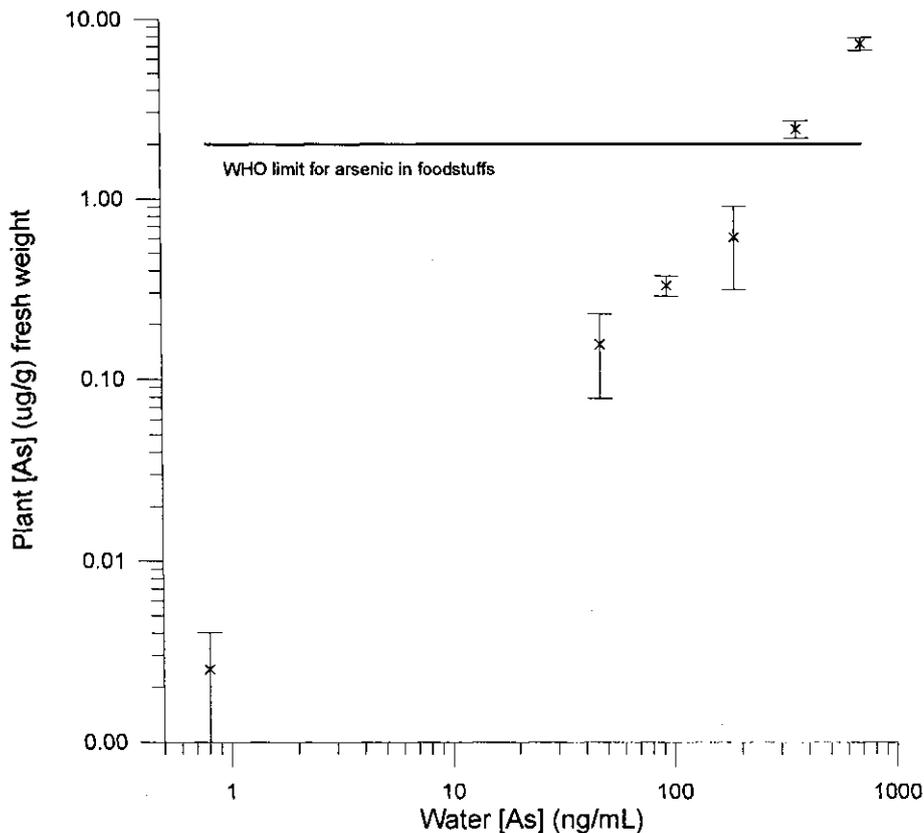


Fig. 1. Arsenic concentrations in water cress vs that of the surrounding solution.

Although the arsenic contents of the watercress from Broadlands are highly variable, this is the usual pattern for water plants in the Waikato River. For example, Liddle (1982) reported arsenic values ranging from 265-1121 $\mu\text{g/g}$ for *Ceratophyllum demersum* growing in nearby Lake Ohakuri. Our own value for this latter species was 950 $\mu\text{g/g}$ at Broadlands (just over twice the average of 412 $\mu\text{g/g}$ for the watercress). Assuming that this ratio pattern is repeated elsewhere in the Waikato River system, we may expect values in watercress to average 400 $\mu\text{g/g}$ from Wairakei to Atiamuri. Even when this concentration is converted on a fresh-weight basis to 30 $\mu\text{g/g}$, the resultant level is still fifteen times the maximum value permitted in foodstuffs by the WHO.

At the completion of the laboratory trials, the arsenic levels in all plants had reached equilibrium, indicated by constant arsenic concentrations in the surrounding solutions. The arsenic levels in plants at the end of the laboratory trials ranged from 0.02 (control) - 106 $\mu\text{g/g}$ dry weight (Table 2) and 0.0018 - 7.79 $\mu\text{g/g}$ fresh weight (Fig 1). The fresh weight arsenic concentration was calculated using the percentage water that the plants contained (an average of 92.7% with a standard deviation of 0.4%). The arsenic concentrations in the plants were strongly positively correlated ($r = 0.96 P$) with the arsenic concentrations of the surrounding water. There was a slight increase in the arsenic concentration in the control beaker, this probably being due to evaporation (Table 2).

All the plants in the arsenic solutions accumulated this element, the plant : water arsenic ratio increasing exponentially from 3:1 to 10:1 as the arsenic concentration in the surrounding water increased from 0.05 - 0.8 $\mu\text{g/mL}$ (Table 2). This type of increase is usually associated with active exclusion, at low concentrations the plant is able to exclude the element, and this barrier breaking down at higher concentrations.

At equilibrium, the arsenic concentrations were about five-fold less than in plants taken from the Waikato River, even though both were in arsenic solutions of similar concentrations. This is similar to the findings of Liddle (1982) for *Ceratophyllum demersum*. A possible reason for the difference is that the watercress in this experiment was free floating, whereas in the river it is rooted to the sediment layer. Sediments from the Waikato River have been found to contain on average 35 $\mu\text{g/g}$ arsenic (Robinson *et al.* 1995). If this

Table 2. Arsenic concentrations in watercress and surrounding solutions in laboratory trial. Standard deviations are shown in brackets.

Initial solution (ng/mL)	Final solution (ng/mL) 'A'	Watercress ($\mu\text{g/g}$) (D.W.)	Watercress ($\mu\text{g/g}$) (F.W.) 'B'	Ratio (B:A)
800 (control)	820	-	-	-
<0.8	<0.8	0.02	0.0001	-
50	48 (2)	2.1 (1.4)	0.15	3.1 : 1
100	94 (1)	4.5 (0.8)	0.33	3.5 : 1
200	189 (9)	8.4 (5.7)	0.61	3.2 : 1
400	361 (4)	33.1 (5.1)	2.42	6.7 : 1
800	701 (29)	98.6 (8.1)	7.20	10.3 : 1

is a major source of arsenic to the plant, then it would be expected that the plants growing in a high arsenic sediment would have a higher arsenic content. Further work could be conducted to explore this possibility.

Despite the lower arsenic concentrations in the watercress of this experiment, plants grown in arsenic solutions of $0.4 \mu\text{g/mL}$ or greater, were above $2 \mu\text{g/g}$ (the WHO limit for arsenic in foodstuffs). Robinson (1995) showed that arsenic concentrations in geothermal waters that flow into the Waikato River and other lakes of the Taupo Volcanic Zone contain as much as $6 \mu\text{g/mL}$ arsenic. Watercress growing near these outlets is also likely to have arsenic levels above the WHO limit.

To conclude, watercress takes up arsenic. Typically, the average arsenic concentration in the fresh plant is 4 to 10 times the concentration of the solution. The accumulation of arsenic by watercress is of concern to human health. Although the plants in this experiment did not concentrate arsenic to the same extent as plants growing in the natural environment in the Waikato River, some had arsenic levels above the WHO limit. There is clearly a need for a wider investigation of the arsenic content of watercress growing not only in the Waikato River system, but also in lakes and their outflowing tributaries associated with the Taupo Volcanic Zone. Until such work is undertaken and completed, it is recommended that watercress growing in water that at any time has $0.05 \mu\text{g/mL}$ arsenic, should not be consumed by humans.

Acknowledgments

We gratefully acknowledge a grant from the New Zealand Department of Health which made this work possible.

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BIOGRAPHY/BIBLIOGRAPHY

■ Biographical Notes (21): Henry Blencowe Matthews (1861-1934)

Blen Matthews, dairy-farmer and botanist, was born at Kaitaia on 23 June, 1861, the eldest son of Richard Henry and Clarissa Isabella Matthews. As the Kaitaia School did not open until 1875 it is presumed that Blen was educated at home by parents or grandparents. In 1882 he married Evelyn Subritzky of Houhora, but after some 9 years of marriage and 6 children there was a divorce. Then, in 1901, Blen married Evelyn's sister, Elizabeth Eleanor Matthews, the widow since 1888 of his youngest uncle, Samuel Hayward Ford Matthews (1,2,3).

In the Electoral Roll for Bay of Islands, 1896, H.B. Matthews is listed as "farmer, freehold 270 acres, Kaitaia", and in 1899 as "Kaitaia, farmer, residential". Blen's land was part of the 1170 acres granted to his grandfather, Joseph Matthews, in 1859 (4) and lay on either side of Commerce St., the main street of Kaitaia. His house was near the northern boundary of his land, and can still be seen (refurbished) at 4 Farrimond Place. In 1901 a Dairy Company was established in the district and in 1904 Blen was elected chairman, holding the position until he resigned in 1914 (5).

In 1893 Blen's father, Richard Henry, and Harry Carse, the local school-teacher, began to study the plants around Kaitaia (4). Richard Henry drew on the help of his sons, particularly as he grew older, and the following references in letters to Cheeseman probably involve Blen. On 26 January, 1904, he promised to send "one of the boys" to look for *Pterostylis squamata*; on 26 January, 1910, "my son and I" went to the north side of Lake Tongonge to look for *Lepyrodia* [*Sporadanthus*]; on 5 September, 1910, the boys were off to the west coast after the new *Thelymitra*; and on 20 September, the boys were "delighted about *Thelymitra matthewsii*".

Harry Carse was only 4 years older than Blen Matthews and they became good friends. Carse's "Flora of Mangonui County", read on 22 November, 1910, was derived "partly from my own observations, and partly from those of my friends Messrs. R.H. and H.B. Matthews and Mr. H. Bedggood"; and he noted that Blen had recently refound *Lycopodium drummondii* (TNZI 43, 1911). On 28 November, 1911, Cheeseman described *Corysanthes carsei* collected between Lake Tongonge and the coast by Carse and Blen Matthews (TNZI 44, 1912); and on 11 December, 1912, Carse announced additions to his county list including records of flower colour variants in *Caladenia minor* and *Thelymitra imberbis* by "Mr H.B. Matthews who is following in his late father's footsteps as an orchidologist -" (TNZI 45, 1913).

Blen's father had died on 25 May, 1912, leaving him his presentation copy of Cheeseman's 1906 "Manual of the New Zealand Flora". I saw this in the early 1960's at the house of Mr Ronald Hayward Matthews of Kaitaia, Blen's cousin and step-son. It was autographed "R.H. Matthews, 5 Sept. 1906", and "H.B. Matthews, June, 1912", and is now in the possession of Mrs F.R. Petrie (Whangarei) Mr Ronald Matthews's daughter (6). On 12 August, 1912, Carse wrote to Cheeseman: "I understand that a good while ago [September, 1909] you promised the late R.H. Matthews a copy of the illustrations of New Zealand plants which you are preparing when published. May I suggest that, he being dead, you should transfer a copy to his son H.B. Matthews, to whose quick eye we are indebted for a considerable number of the new botanical finds of the North within the last 10 or 12 years". Cheeseman agreed and Blen acknowledged the 2 volumes on 30 May, 1915, pleased to see *Corysanthes matthewsii* among the illustrations.

Blen Matthews's first letter to Cheeseman was from "Blenville Farm", Kaitaia on 2 July, 1912. It thanked Cheeseman for his sympathy on the death of Blen's father. On 7 August, 1912, Blen sent specimens, describing himself as just a "tyro botanist"; and on 14 October, 1912, he asked to be addressed as H. Blen Matthews to avoid confusion with several other H.B.M.'s in Kaitaia. On 11 October, 1914, he sent a novel *Pterostylis* from near Kaitaia, which Cheeseman called *P. matthewsii* and wrote: "I have much pleasure in dedicating the plant to its zealous discoverer, who, with his father, the late R.H. Matthews, has done excellent work in investigating the orchid flora of the extreme northernmost portions of the Dominion" (TNZI 47, 1915). More detailed extracts from Matthews's letters to Cheeseman about orchids are given by Hatch (7).

On 11 October, 1914, Matthews also told Cheeseman that "I have sold my place bar 40 acres (the homestead) -"; and told him on 30 May, 1915, that "since Bell brothers bought my place and cut it up for a township the place is making rapid progress". Co-operation still continued with Carse, who described *Dracophyllum latifolium* var. *matthewsii* "a neinei discovered by Mr H.B. Matthews" in Mangonui County (TNZI 48, 1916); and exploration expanded. Blen told Cheeseman on 21 June, 1915, that he had been

collecting at Kennedy Bay, towards the Umbrella Rocks; and in January, 1916, he and Carse "saw plenty of *Ixerba* in flower on the summit of Te Aroha". Blen's visits to Kennedy Bay are possibly related to the fact that his youngest brother, Walter Lambly Matthews, had moved to the Coromandel Peninsula (6).

On 26 May, 1916, Blen's address changes to Clonbern Road, Remuera, Auckland, and he told Cheeseman that he had bought a residence at the corner of Clonbern and Station Roads for the benefit of his youngest daughter's and son's education. "I have bought my valued botanical books, papers, and most of my specimens to Clonbern, and some time when you are at liberty I should like you to see my mosses etc". "I still have close on 50 acres up north and go up about once a month". And the remainder of his life was shared between Auckland and Kaitaia, with occasional forays southwards with friends such as Petrie or Carse.

Petrie described *Pittosporum matthewsii* in 1920 from a Kennedy Bay collection by Matthews (TNZI 52); and in the first half of January, 1920, they were at Te Whaiti ("55 miles south of Rotorua"), leading Blen to tell Cheeseman (23 January) that "Mr Petrie is an omnivorous collector and brought home a lot of different specimens".

After Te Whaiti Blen joined Carse, and told Cheeseman on 5 February, 1920: "Mr Carse and I were away 5 weeks. — We spent two nights on Hauhangatahi and a week at the "Haunted Whare", the balance of the time having been spent on the Waimarino Plains, Erua, and Raurimu".

In 1924 Blen Matthews was a link on the chain which led to a correspondence of several years between Carse and Mrs Amy Hodgson. She was the wife of the manager of the Hendley Station at Patoka, Hawkes Bay, and mother of 4 young children. Through a friend in Auckland, Ruby Crawford, who had married Gerald Wilfred Matthews, she sought help with her growing interest in native plants; and the request was handed on to Blen who was Gerald's cousin and step-son. Blen, in turn, asked Carse to help with identifications, other than orchids, and Carse was of considerable help and encouragement to her, including arranging an introduction to G.O.K. Sainsbury when the Hodgsons moved to Wairoa, and where her pioneer work on liverworts blossomed (8).

In January, 1913, Matthews and Carse collected *Fuchsia procumbens* at Scotts Point (CHR), the northern extremity of the Ninety Mile Beach. They may not have gone further because when Blen sold his land in 1914 he told Cheeseman that "before settling down I hope to have a good look round and that I shall be able to do the North Cape trip when the press of work is over". This may not have happened until the last years of his life. On 4 October, 1927, Carse reported that "over a year ago" Blen had discovered *Coprosma macrocarpa* (hitherto known only from the Three Kings) "a little south of Cape Maria van Diemen, and later he and I found it not uncommon in a wood in Tom Bowling Bay, near the North Cape" (TNZI 59, 1929).

During his last visit to Kaitaia Blen Matthews was taken ill, and died in the Mangonui Public Hospital on 12 March, 1934 (9). He was taken back to Auckland, probably on the "Clansman", the last of his many trips, and buried in the Purewa Cemetery (2). He left his collection to the Auckland Institute and Museum as the "H.B. Matthews Herbarium 1934". There are also other specimens in AK which he collected but are not part of his herbarium. So far 2731 specimens have been databased, all of them vascular plants except for 272 mosses. The final total will be in excess of 3000 (10).

Blen Matthews was both step-grandfather and first cousin once-removed to Dame Miriam Dell ONZ and the late Professor R.E.F. Matthews ONZ, FRS, the children of Gerald and Ruby Matthews.

For help with this note I am very grateful to Malcolm Matthews (Kaitaia), the late Dick Matthews (Auckland), and Ewen Cameron (Auckland Institute and Museum).

(1) Birth Certificate; (2) Florence Keene *The O'Donnell, Davis, Matthews Ladder* 1995; (3) S.C. & L.J. Matthews *Matthews of Kaitaia* 1940; (4) E.J. Godley *Richard Henry Matthews (1835-1912) N.Z. Bot. Soc. Newsletter* 42, Dec. 1995; (5) Seventy years of service: Oruru, Fairburns, and Herekino Dairy Companies; (6) Malcolm Matthews *pers. comm.*; (7) E.D. Hatch *Auckland Bot. Soc. Newsletter* Jan. 1990; (8) E.J. Godley *Eliza Amy Hodgson Proc. R.S.NZ*, 112, 1984; (9) Death Certificate; (10) Ewen Cameron *pers. comm.*

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PUBLICATIONS

■ Review of: Mosses and Liverworts of Rainforest in Tasmania and South-Eastern Australia

By S.J. Jarman & B.A. Fuhrer and published by CSIRO Australia and Forestry Tasmania, 1995. ISBN 0 643 05685 8. 134 pages. Available from CSIRO Publications Sales, P O Box 89, East Melbourne, Victoria 3002, Australia. The price is A\$24.95 plus \$6.00 postage and handling fee.

This small-size booklet is a welcome addition to the available literature on bryophytes in the region, mainly because of the beautiful colour photographs of 50 species of mosses and 70 species of liverworts. Since there are many similarities between the rainforest of Tasmania and of New Zealand it is not surprising that of the species illustrated all but 2 of the mosses and 14 of the liverworts occur in New Zealand as well.

Included in the booklet is a general account of the structure, reproduction, life cycle, evolution and classification of bryophytes, along with a brief account of the complex and varied rainforest vegetation of Tasmania with its extremely rich and diverse bryophyte flora. Various features which distinguish the different groups of bryophytes and which distinguish bryophytes from other plant groups are noted and illustrated by black and white photographs. A list of names arranged in families is given for 81 moss and 136 liverwort species found in the Tasmanian rainforest, and for 120 of these there is an illustration in colour accompanied by a brief description of its habit and habitat.

Anyone requiring more detailed information on individual bryophytes, on bryophytes generally or on rainforest could consult the useful list of references. The present book complements these earlier works and will have a wide appeal to everyone interested in the rainforest of either Tasmania or New Zealand. It concludes with a glossary of terms used in the book and with an index.

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■ Journals received

New Zealand Native Orchid Group Journal 58
(March 1996; ISSN 1170-4543). Edited by Ian St George. 44pp.

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20. *Corybas*, albino, epiphytic and humungous - also missed chances. Eric Scanlen.
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Editors

■ *Tane* vol. 35, 1995

Tane vol. 35 has been published by the Offshore Islands Research Group (OIRG) which was founded by ex-Auckland University Field Clubbers to continue their offshore island research interests. OIRG agreed in early 1995 to take over the administration and publication of the Journal from the deceased Auckland University Field Club. OIRG members hope that this will be a caretaker role, and that sooner or later the Auckland University Field Club will be resurrected.

The following botanical articles are included in volume 35:

Flora of Karewa Island, Bay of Plenty, by A.J. Tennyson

Vascular plants, vegetation and wildlife of Matapia Island, Far North, New Zealand, by L.J. Forester and P.J. Anderson

Flora and fauna of Needle Rock, eastern Coromandel, by G.A. Taylor

Flora and fauna of Tatapihi (Groper) Island, Mokohinau Islands, by P.J. de Lange, E.K. Cameron and G.A. Taylor

Mosses of Waiheke, by J.E. Beever

Asperococcus bullosus - a new record for northern New Zealand of an adventive marine brown alga, by W.A. Nelson and G.A. Knight

Fossil forests preserved in volcanic ash and lava at Ihumatao and Takapuna, Auckland, by J.J. Hayward and B.W. Hayward.

The future of *Tane* depends on a solid subscription base. Please order your copy from: The Editor, *Tane* Journal, C/- Collections Division, Auckland Museum, Private Bag 92018, Auckland.

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(surface postage free within New Zealand).

Invitation to contribute

It is intended to publish volume 36 towards the end of 1996 and priority is given to articles resulting from field work in northern New Zealand and New Zealand's offshore islands. Contributions are welcomed from all-comers, particularly undergraduate students. All intending authors should consult the Editor as soon as possible. The deadline for 1996 *Tane* papers is 31 August 1996.

E.K. Cameron, Convenor of *Tane* editorial committee, C/- Auckland Museum, Private Bag 92018, Auckland

FORTHCOMING CONFERENCES/MEETINGS

■ **Activities honouring the botanical work of Etienne Louis Raoul**

The Canterbury Botanical Society is, in 1996, celebrating the contribution made to the botany of Canterbury by Etienne Louis Raoul, a naval doctor attached to the French settlement in Akaroa, 1840-1843. Raoul was an assiduous collector of plants. On his return to France he worked on the specimens and, in the *Annals of the Museum of Natural Science in Paris*, and in "Choix de plantes de la Nouvelle-Zelands" (1846), published a substantial number of species. They include *Coprosma robusta*, *Discaria toumatou*, *Drimys* (now *Pseudowintera*) *colorata*, *Hoheria angustifolia* and *Veronica* (now *Heliohebe*) *lavaudiana*. The genus *Raoulia* Hook f. is named after him as is *Veronica* (*Heliohebe*) *raoulii*.

Throughout this year the Society is holding a series of meetings on aspects of Raoul's work, mainly focusing on the botany of Banks Peninsula. A field day at Hinewai-Otanerito, led by Hugh Wilson, in early March will cover some of the territory in which Raoul collected. Meetings on some less-well-known plant groups include a Christchurch based workshop on lichens in May led by David Galloway and, in December, a workshop in Akaroa, examining seaweeds; bryophytes and other plants (leaders Bryony MacMillan and Murray Parsons). A major event, on November 23rd at the University of Canterbury in Christchurch, is a full day symposium during which nine invited speakers will expand on the significance of Raoul's work. More details on this will be advertised later.

Colin Burrows, C/- Plant Science, University of Canterbury, Private Bag 4800, Christchurch

■ **12th John Child Bryophyte Workshop (21 November-26 November 1996)**

1st Circular

The 1996 workshop will be held at Waitapu Forest Camp off Highway 5 between Rotorua and Taupo. The botanical features of this area are varied. We will have field trips to both thermal and forested areas.

Accommodation is in cabins with a maximum of 2 per cabin. Bedding is not provided. There is a large dining room and a separate room for use as a laboratory. The evening meal will be catered by local people. The makings for lunch and breakfast will be provided. Some domestic chores will be rostered.

The cost will be approximately \$100.

If you are interested in receiving the 2nd circular please fill in the attached form and return it to the address below.

Paula Warren, 26 Luxford Street, Berhampore, Wellington 6002, Fax: (04) 473 3656

<u>12th John Child Bryophyte Workshop</u>	
<input type="checkbox"/>	I definitely plan to attend the workshop - please send 2nd circular.
<input type="checkbox"/>	I am undecided, but want the 2nd circular.
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A fascinating new book
for all those interested in
our NZ environment...



"Microalgae are the basis of all life in the seas."

So wrote Sir David Attenborough in *The Private Life of Plants*.

In her own work, *Microalgae*, Dr Cooper exposes and discusses the life-cycles, habitats and roles of these important but little-known organisms:

- How do microalgae affect the planet?
- Are they vital producers of oxygen and food?
- What species are often found in lakes, ponds, rivers and oceans?
- Where do they live? How ancient are they?
- Which species might kill animals on land, and fish or shellfish in the sea?
- Can we survive without them?

About the book...

(Continued)

All these topics are dealt with in a readable book of over 160 pages, accurately referenced and profusely illustrated in colour and black and white — mainly from the author's own wide experience of these fascinating organisms in and around New Zealand.

Not a complicated taxonomic text, *Microalgae* is designed to assist students at universities, polytechnics and in secondary schools at levels 5 to 8.

It contains helpful information for the staffs of regional and city councils who are responsible for monitoring water quality, as well as for the interested lay public.

A glossary and appendices help readers to understand this challenging subject.

Suggested questions and activities are included for school science classes.

About the author...



A New Zealander by birth, Dr Vivienne Cassie Cooper, M.A., Ph.D., is particularly well qualified to write a book on microalgae found in New Zealand waters.

She was a practising researcher for nearly forty years with the former Department of Scientific and Industrial Research (DSIR) and has published some 50 scientific papers during her working life. Readers will find her practical, no-nonsense approach based on a lifetime of experience in the field helpful, informative and stimulating.

Now retired, she is an Honorary Research Associate of Manaaki Whenua Landcare Research N.Z. Ltd.

The Publications Manager
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P.O. Box 7054
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