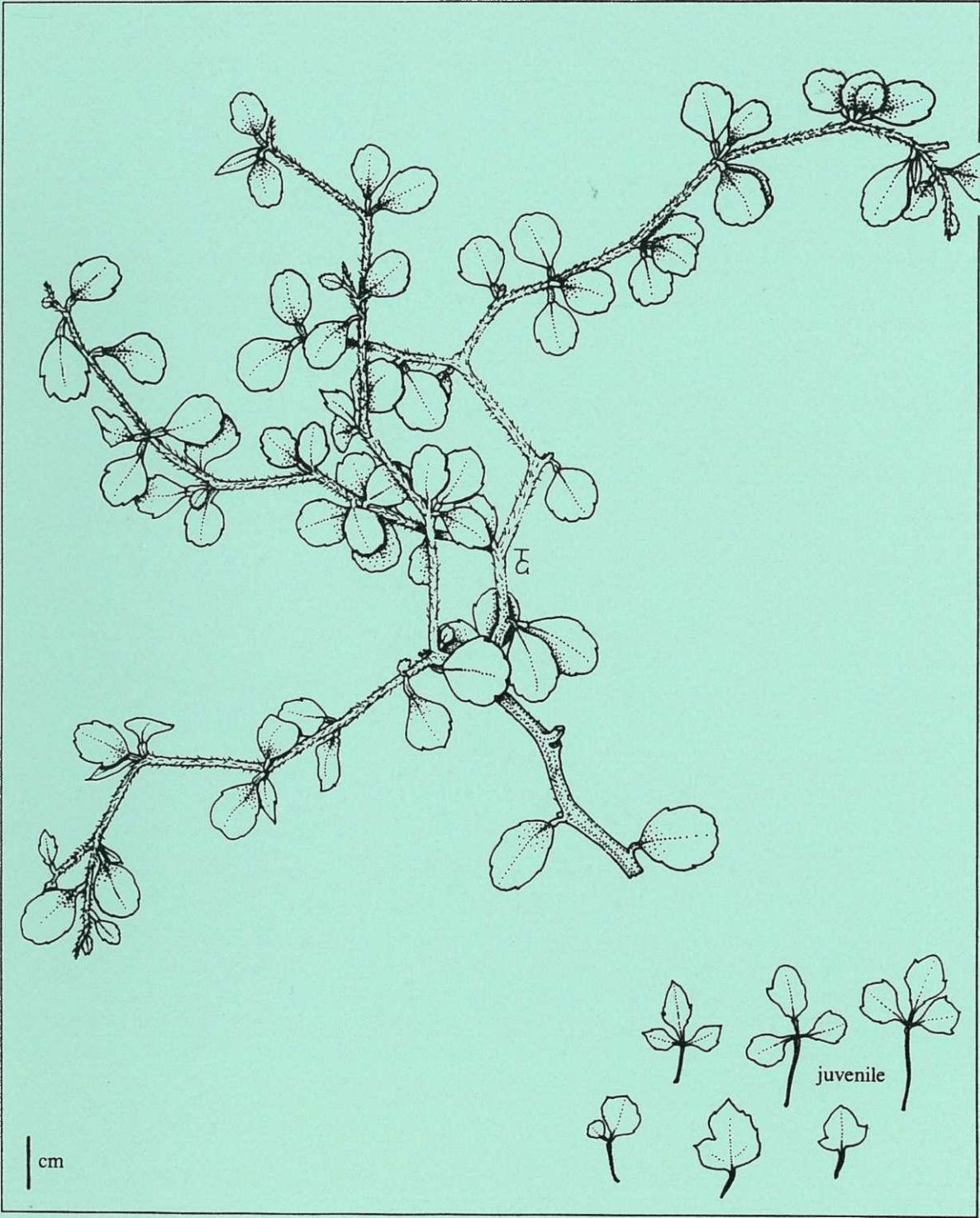


NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 50

DECEMBER 1997



NEW ZEALAND BOTANICAL SOCIETY
N E W S L E T T E R
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New Zealand Botanical Society

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Secretary/Treasurer: Anthony Wright
Committee: Bruce Clarkson, Colin Webb, Carol West,
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Subscriptions

The 1998 ordinary and institutional subs are \$18 (reduced to \$15 if paid by the due date on the subscription invoice). The 1998 student sub, available to full-time students, is \$9 (reduced to \$7 if paid by the due date on the subscription invoice).

Back issues of the *Newsletter* are available at \$2.50 each from Number 1 (August 1985) to Number 46 (December 1996) and \$3.00 each from Number 47 (March 1997) to Number 50 (December 1997). 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 1998 issue (Number 51) is 27 February 1998.

Please forward contributions to:
Ewen Cameron, Acting Editor
NZ Botanical Society Newsletter
C/- Auckland Museum
Private Bag 92018
AUCKLAND

Contributions may be provided on an IBM compatible floppy disc (in Word Perfect 5.1) or by e-mail cameron@akmus.org.nz

Cover Illustration

Raukawa anomalous (*Pseudopanax anomalous*) a divaricating shrub up to 3m tall belonging to the ivy family (Araliaceae). See checklist by Ewen Cameron p13 on new names and combinations from the journals. Illustration by **Tim Galloway** from *Small-leaved Shrubs of New Zealand* by Hugh Wilson and Tim Galloway, Manuka Press, P.O. Box 12179, Christchurch.

NEWS

New Zealand Botanical Society News

■ Editorial

With the completion of this the 50th issue of the newsletter and the 20th issue we have edited, we have decided to step down as editors. A lot has happened in the botanical world during the 5 years between Issue 31 (March 1993) and the present Issue 50 (December 1997). Most notable has been the re-emergence of New Zealand plant systematics after a low point brought on by government science reorganisation. This is clearly evident in recent issues of the *New Zealand Journal of Botany* with a raft of papers naming new entities and/or revising previous work. It is reflected in our newsletter by the valuable contribution made by Ewen Cameron in summarising and keeping us up to date with the changes and by professional botanists contributing many popular articles describing the results of their work or informing us about work in progress. Amateur botany too is healthy as shown by the continuing contributions received from the regional societies from Auckland in the north to Wakatipu in the south. Thanks to all the contributors who provided us with material to keep the newsletter going and make it the valuable communication resource it is for botanists throughout New Zealand. Special mention needs to be made of the support we have had from two contributors - Graeme Jane and Eric Godley. Every 3 months, and always on time, Graeme made us envious of the activities of the Nelson Botanical Society with his detailed accounts of superb field trips. Similarly, Eric Godley provided his copy perfect Biographical Notes which are building towards a comprehensive account of the people associated with New Zealand plant names. To all the authors we let down with our imperfect editing skills and failure to return floppy disks, we apologise. Finally, we wish all our readers compliments of the season.

Bruce Clarkson and Bev Clarkson, 7 Lynwood Place, Hamilton

■ From the Secretary

Preliminary notice of botanical symposium

The New Zealand Botanical Society proposes to organise a 2-day botanical symposium in June 1999 to celebrate and honour Dr Eric Godley's eightieth birthday. This is particularly fitting since the Society was 'conceived' following the 'Godley Gaudeamus' held in May 1984 to mark Eric's retirement from Botany Division of DSIR.

The symposium will encompass a range of themes reflecting Eric's major botanical interests, e.g.

- Reproductive biology
- Conservation
- Biogeography
- Plant morphology and function
- Systematics and collections
- Botanical history
- Popular botany.

We envisage invited keynote speakers for each theme chosen, some from overseas, as well as offered papers. The symposium is likely to be staged at Lincoln, Canterbury, using the facilities of Lincoln University and Landcare Research, with accommodation available at the University Halls of Residence.

An interim organising committee of David Galloway, David Penman, Colin Webb and Anthony Wright are preparing a first circular for mailing early 1998 which will seek preliminary indications of interest, offers of possible presentations and other suggestions.

Committee and Newsletter Editor 1998

Nominations received for the 1998 Officers and Committee positions for the New Zealand Botanical Society were:

President:	Jessica Beever
Secretary/Treasurer:	Anthony Wright
Committee:	Bruce Clarkson, 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.

Bruce and Bev Clarkson have decided to stand down as *Newsletter* Editors as of this issue. We thank them for the excellent job they have done; our thanks are also due to the 'technical editing' team of Ewen Cameron and Antoinette Nielsen who produce and mail the publication.

Until a replacement editor has been appointed, Ewen Cameron has kindly agreed to act as editor for the first issue of 1998, due in March. The deadline for copy and his address for submissions are given on page 2.

Subscriptions 1998

Accompanying this *Newsletter* is a subscription invoice for 1998 subs. Increased printing costs and larger newsletters necessitate an increase in subs to \$18 (reducible to \$15 for prompt payment) for ordinary members and \$9 (reducible to \$7 for prompt payment) for student members.

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

Regional Botanical Society News

■ Auckland Botanical Society

September Meeting

It was proposed by Ross Beever, and seconded (in absentia) by Anthony Wright, that Sandra Jones be elected as an Honorary Life Member. Lead by Jessica Beever, the entire assemblage sang of their gratitude for 17 years of secretarial efficiency. A beautiful painting by Mary Taylor of the wild west Karekare coast was an appropriate memento.

This presentation was followed by a talk by Gabriele Schmidt-Adams on her study on pohutukawa. She identified three threats to this northern taonga:

1. The interrupted population of what used to be a continuous fringe.
2. Possums.
3. Poor regeneration.

With the aims of increasing knowledge about pohutukawa and providing information to help conservation, Gabi spoke of seed production, stigma receptivity, the production of nectar and breeding systems.

September Field Trip

Steven McCraith was the leader of a walk along the Wairoa Valley Track, Hunua. Some of the highlights were the *Alseuosmia macrophylla* just coming into flower, and the vines of *Clematis paniculata* still flowering. There were some magnificent examples of miro, kawaka and tawa, and one tree of *Pseudopanax edgerleyi* was seen in this valley of quite pleasing diversity.

September Combined Field Trip

Thirty-five people on a combined Bot Soc/Forest & Bird field trip cruised up the Hotoe River to view the flowering kowhai. The unpredictability of the flowering season meant that only about 30% of the flowers were open, and it was a little early also for the male flowers of the lowland ribbonwood to be at the peak of pollen production. However, listening to the tuis while drifting up Dingles Creek for lunch, made for a relaxing trip up this botanical corridor.

October Meeting

Two speakers gave insights into the research undertaken for their thesis.

Bec Stanley spoke on population dynamics and ecology of *Myosotis oreophila*. Bec worked for a B. Sc. Hons thesis over two seasons. Her work was part of an ongoing study by Otago University on the Dunstan Range in North Otago. She described problems determining the taxonomy of *Myosotis* before the ecological study could begin, and discussed the methods used for measuring populations and some of the field problems that arose. Population changes were measured over the two years and in this time some adult plants disappeared and new seedlings germinated.

Sandra Anderson spoke on the birds and the bees and the flowers and the trees. As this title suggests, her research for a M. Sc. thesis was based on the relationships between plant species, their pollinators and the ecosystem. The main study was carried out on Tiritiri Matangi Island in the Hauraki Gulf where native bird species have been released and are thriving. A comparative study was done on the mainland at nearby Wenderholm where there are fewer native bird species. Sandra measured bird and insect visits to a range of flowering native plants and correlated this with, among other things, pollination and subsequent seed set.

October Field Trip

At the Auckland Botanic Gardens, after an introductory talk by Steve Benham, half the party visited the shade houses to see the plants being grown in the *ex-situ* threatened plant programme. The plant tagged *Peperomia* "purple vein" was viewed with favour, as it made such a pleasing subject for a pot plant. The others wandered through the NZ plants in the garden collection, with Brent Torrens as guide, and enjoyed the variety of plants ranging from trees to ground covers. After lunch it took a short drive to Totara Park to meet up with Mike Wilcox. This attractive piece of bush has miraculously survived the development which has overtaken large areas of South Auckland. The only jarring note was provided by some inappropriate plantings along the edge of the bush.

November Meeting - The Lucy Cranwell Lecture

Professor Barry Tomlinson, Harvard University, delivered this year's Lucy Cranwell Lecture. His subject, "What is pollen for? The rise and fall of the male gamete", dealt with the saccate pollen of conifers and podocarps. The pollination of conifers is of huge commercial value, as well as scientific interest. Wind pollination is very successful where there are large numbers of the same plants, as in plantations. Podocarps, with single ovules, must have an efficient method of receiving pollen, and this Professor Tomlinson illustrated with slides.

November Field Trip

The highlight of the field trip to Tawharanui Regional Park was the prostrate manuka which grows on Tokatu Point. Although the peak of flowering had passed, there were still some plants in flower, and one plant with double flowers was found. The various forms excited some discussion. *Caladenia* aff. *carnea*, *C. chlorostyla* and *Thelymitra longifolia* were all flowering nicely, and a small tree and some seedlings of *Streblus banksii* were seen along the ecology trail.

November Camp

Te Pāki in the Far North was the area chosen for this four day camp, and it was timed for mid-November in the hope that *Metrosideros bartlettii* would be in flower. This hope was realised on the first day, when a walk into the Kohuronaki scrub revealed that the large tree on the edge of a swampy gully was at the peak of flowering, the snowy crown just alive with the humming of bees. Radar Bush, Spirits Bay and the Te Werahi walk were also visited. Some other botanical highlights were *Pomaderris polifolia*, *Christella* sp., *Hibiscus diversifolius*, *Ranunculus urvilleanus*, *R. acaulis*, *Gastrodia sesamoides*, *Ipomoea pes-caprae*, *Mimulus repens*, *Thelymitra aemula*, *Todea barbara*, and *Colensoa physaloides* with wondrous blue flowers and fruit.

Forthcoming Activities

Evening Meetings:

4 March - AGM Ethnobotany (Sue Scheele)

Field Trips:

January - Anniversary Weekend to Kaweka Range (Mike Wilcox)

21 February - Omeru Reserve, Makarau Covenanted bush (Maureen Young)

21 March - Noises Islands (Ewen Cameron)

18 April - Huapai University Reserve & Ernest Morgan Reserve (Ewen Cameron & Anne Grace)

16 May - Ethnobotany Trip. Cascade Kauri area.

Maureen Young, 36 Alnwick Street, Warkworth

■ **Canterbury Botanical Society**

September meeting

Four taxonomists from Landcare Research, Lincoln, Ilse Breitwieser, Allan Fife, Peter Heenan, and Steve Wagstaff described their current work, and outlined their plan for an excursion flora for vascular plants in

the future. Ilse also spoke about the work of the fifth member of the team David Glenny, who was unable to come. The contributions of associated workers at Landcare and elsewhere was acknowledged.

September field trip

Woodstock Station, Waimakariri River. Two distinct sites were botanised. First a sunny, dry terrace beside the homestead where we saw *Pseudopanax ferox*, *Melicope simplex*, *Streblus heterophyllus* and some intriguing hybrids, *Melicytus micranthus* x *M. ramiflorus*, all under a canopy of black beech, matai and totara. The second site, only a short distance away, was a poorly-drained terrace harbouring a range of species tolerant of waterlogged soils: kahikatea, pokaka, *Lophomyrtus obcordata*, weeping matipo, and plenty of cryptic coprosmas. An exciting find was a thriving population of *Coprosma* species (v), which has violet fruit pendent on slender stalks and occurs only on very waterlogged sites. Supplejack (*Ripogonum scandens*) was seen, and one very mature hinau on an island. The obvious enthusiasm and caring attitude of Woodstock's managers, Ann and Roger Loffhagen, left us in no doubt that these precious plant communities will be well looked after.

October meeting

Val Kirby, a landscape architect at Lincoln University, initiated us in the theory of garden design, applying this to the use of natives in our gardens. Content (the plants), process (what happens when they interact), form (overall result). Try it!

October field trip

An example followed when we visited the garden of David Hobbs at Broadfields on the plains. The garden's principal designer Robert Watson explained the plan dating from 1992. About half of a four-hectare paddock has been developed into a show garden of New Zealand natives and New Zealand bred plants, including rhododendrons and camellias. The structure is often quite formal. Totara hedging will eventually provide much of the spatial division. We were impressed by the vigorous growth rates, and by the wide range of species used.

November meeting

The three awardees of our Society's student grants spoke on their thesis topics. This is an eagerly awaited item on our annual programme. Stephen Ulrich spoke on aspects of the coexistence of beech and podocarps, based at Mt Harata, Grey Valley. Sarah Hurst spoke on mycorrhizal infection in podocarp and broadleaved angiosperm seedlings, based at North Okarito Forest. Matthew Easterbrook reported results on the spread of *Nothofagus* into grassland at Middle Bush, Cass.

November field trip

Led by Mike Kwant, forest ranger for Carter Holt Harvey Forests, we visited the Omihi Rata Reserve on the summit of Mt Ararat, North Canterbury. The reserve of 1.93 ha is managed jointly by DoC and CHH. A vigorous population of southern rata (*Metrosideros umbellata*), from seedlings to well-grown trees, has recently been released from the clutches of wilding pines (*Pinus nigra* and *P. radiata*). Some tall pines remain to be dealt with. Mike discussed his management plan, and we made some additions to a species list for the reserve.

Forthcoming activities:

- 5 - 7 December - Camp based at Raincliff Scout Camp, midway between Geraldine and Fairlie, South Canterbury. Contact Miles Giller (03) 313 5315.
- 3 - 10 January - Camp based at School of Forestry Field Station, Harihari, Westland. Field programme organiser David Norton. Contact Pat Morris (03) 326 7423.
- 13 February 8pm - Richard Duncan will speak on "Invasions and extinctions: using historical records to answer ecological questions."
- 14 February - Snowdon Station wetlands, upper Rakaia River. Contact Bryony Macmillan (03) 351 9241.
- 6 March 8pm - Rob Allen will speak on regeneration after fire on Mt Thomas, North Canterbury.
- 7 March - Trip to Mt Thomas led by Rob Allen. Contact Miles Giller (03) 313 5315.

Bryony Macmillan and Miles Giller, P.O.Box 8212, Riccarton, Christchurch

■ Nelson Botanical Society

September Field Trip Report - Bark Bay

Two boat loads (28) enjoyed an excellent day alongside the water at Bark Bay. Before lunch we wandered to the head of the inlet and back through beech forest with rich swards of kidney fern and large specimens

of *Dendrobium cunninghamii* on rocks. Plants of particular interest included *Pimelea aridula*, *Botrychium biforme*, huge kanuka and almost unrecognisable canopy trees of tutu.

On the way to Sandfly Bay after lunch, the first encounter was with a large rock with a rich covering of *Trichomanes endlicherianum*, *T. venosum*, *Hymenophyllum flexuosum*, *H. rarum* and *H. flabellatum*. Near the bach, the forest understorey was a carpet of *Microlaena polynoda* and occasional plants of *Anemanthele lessoniana*. After the uphill climb and a change to low scrub, orchids such as the delicate *Cyrtostylis reniformis*, (in full flower), *Acianthus sinclairii*, and the seedlings of flowering *Pterostylis alobula* were quite common. The descent to the bay included sightings of the last of the winter's flowers of *Metrosideros fulgens*.

October Field Trip Report - Rameka Track

Only 20 turned up to enjoy the Rameka track. The tall red and silver beech forest there contained a great diversity of ferns including the locally uncommon *Hymenophyllum ferrugineum* and *H. rufescens*. Other plants of interest included *Alseuosmia macrophylla* which was abundant amongst the similar looking pepperwood seedlings. Also spotted was a hybrid between *Pseudopanax anomalus* and *P. simplex*. At the other end of the track, a rapid change to lowland vegetation was noted as species such as *Alseuosmia macrophylla*, silver fern, toro, and mahoe appeared. After lunch, on the short steep return uphill walk allowed detailed examination of the forest at that end of the track. Plants of interest included hybrids between *Asplenium hookerianum* and *A. bulbiferum*, *Blechnum colensoi* and ribbonwood. Opportunity was also taken to compare the dull *Cyathea colensoi* fronds with the shiny ones of *Cyathea smithii*.

November Field Trip Report - Howard Valley

The day was a real challenge, with a confusing range of small-leaved shrubs, some distinguished only with difficulty. At the first stop *Coprosma wallii* was soon found with its distinctive double fruits and a single stout stem. Not far away was *Coprosma rigida*, with a leaf with a blunt or notched hair tip contrasting *C. wallii* with its often continuously hairy leaf margins. Then *C. obconica* was found to have a double fruit, but a distinctive obconic shape. The next find was *Melicytus flexuosus* with masses of creamy flowers on the stems. Another "tangle plant", *Pseudopanax anomalus*, also added to the confusion there. Just across the river, *Melicytus flexuosus* seedlings were often mixed with the similar looking *Aristotelia fruticosa*.

Next, a small patch of red and silver beech forest provided a few ferns and native herbs, and orchids including *Pterostylis irsoniana*, *P. banksii*, *P. australis* and *Caladenia lyallii*. From there, the walk along the Porika road to the first ford led to a dense tangle of shrubs containing all the species seen to date plus *Olearia virgata* and two species of *Pittosporum*. A heavy perfume drew attention to tiny yellow flowers amongst dark shiny leaves on *P. anomalum*, in one place growing alongside *P. divaricatum*, also in flower. Another perfume in the area was from *Clematis forsteri*, which straggled through the shrub tangle. By this stage of the day most people were fully saturated and a homeward course soon followed.

Forthcoming trips:

December 2 - Mt Riley

January 18 - Hope Range

February 15 - Ben Nevis/Red Hills

March 15 - Lodestone

Graeme Jane, 136 Cleveland Terrace, Nelson

■ **Rotorua Botanical Society**

Obituary: Barry Spring-Rice, 1932-1997

As most of you will already know, our Treasurer, Barry Spring-Rice died suddenly at Rotorua on 17 October. Barry was a very active member of our society; besides being treasurer, he organised many field trips and contributed greatly in many other ways.

Barry "retired" to Rotorua with his wife, Barbara, after running a successful business manufacturing electronics components. He had a great interest in botany and starting almost from scratch about 1980, he very quickly developed his botanical knowledge to the point where he was in demand for botanical surveys and other work. His growing knowledge of central North Island botany, and his magical penchant for organisation and for getting on with everybody, led to his employment on many commercial jobs for Landcare Research, the Department of Conservation and the Forest Research Institute. It is sad that he did not live to see the publication of his latest and greatest botanical work, the Atiamuri Ecological District

survey report for the Protected Natural Areas programme, soon to be published by the Department of Conservation.

He also made an important contribution to New Zealand botany by setting up the software systems for the herbarium databases at the Forest Research Institute Herbarium, University of Waikato Herbarium, and Massey University Herbarium. His skill at solving computer problems will be greatly missed, especially if any serious problems develop with any of these databases.

Barry started Venturereks with Wally Romanes and used his experience in leading trips to Nepal and other places to organise some botanical trips to Australia. Many members will have very fond memories of these recent trips to Australia.

Another of his great passions was in electronics, and more recently in time-lapse video camera systems where he found a pursuit that combined electronics with his interest in New Zealand's flora and fauna. At the time of his death he was the main assembler of time-lapse video camera systems for the whole country, and he was also the main servicing port to whom people turned when things went wrong. These "systems" consisted of small, security-type video cameras, time-lapse video recorders, infra-red lights, portable television sets, 12 volt batteries and battery chargers, all lightweight but robust and weather proof. He imported the components and made systems that filmed short-tailed bats visiting *Dactylanthus* flowers, possums eating kukupa eggs, hedgehogs eating banded dotterel eggs and feral cats taking white-fronted tern chicks, and many other events that are providing new and important information for the conservation of our flora and fauna. New Zealand would now lead the world in the use of time-lapse video for conservation research, thanks largely to Barry. Barry didn't just make his video systems, he also used them in the bush and knew what was required to make them very practical for use under demanding climatic conditions ranging from very wet to very cold.

Barry was also into bee-keeping, radio hamming, tramping, photography, kite-flying, caving, canoeing, car rallies, jet-boating, 4WD, skiing, mountain biking, ski-patrolling (for 17 years on Ruapehu!), and Search and Rescue. Barry proved his ability at organisation as a Field Search Controller at the time of the 1963 crash of the DC3 in the Kaimais. He was a life member of the Alpine Sport Club.

Barry was a perfectionist and projects he was involved with always worked. He had a wonderfully infectious humour and couldn't stay serious for long! We will always greatly miss his genial nature, endless stories, and expertise.

John Innes, Chris Ecroyd and Bruce Clarkson, Rotorua Botanical Society, C/- The Herbarium, Forest Research Institute, Private Bag 3020, Rotorua

NOTES AND REPORTS

Plant Records

■ A shallow dive at Lottin Point reveals two significant range extensions

Lottin Point is on the northernmost coast of East Cape. Fully exposed to northern and eastern winds, it experiences sea temperatures of about a degree higher than the same latitude on the west coast (Chiswell 1994).

These warm sea surface temperatures are due to the south-eastern transport of subtropical water by the East Auckland Current (Harris 1985). The East Auckland Current is in fact part of the East Australian Current, which flows from the east coast of Australia across the Tasman, and brushes against the east coast of the North Island. New Zealand is the only place in the world in which a separated western boundary current reattaches to a land mass in this way (Chiswell 1997).

On 1 June 1997 due to an approaching cyclone, diving conditions were poor. Nevertheless a short dive yielded two very interesting records of red algae (Rhodophyta).

Nesophila hoggardii Nelson et Adams, the only New Zealand representative of the family Rhizophyllidaceae, has a flattened, dichotomously branched thallus (Fig.1). This plant alternates in its life

history between morphologically similar gametophytic and sporophytic phases. When fertile, the sporophyte develops distinctive sori of tetrasporangial tissue on the thallus surface (Fig. 2).

Until now, *Nesophila* has been known only from northern offshore islands, i.e. Three Kings Islands, Poor Knights Islands, Mokohinau Islands, White Island and the Aldermen Islands. Adams (1994) notes that it is confined to the offshore islands of the North Island east coast where the water temperatures are raised by the seasonal influx of tropical water.

This Lottin Point collection is therefore the first on the New Zealand mainland, and the southernmost record. The plants, common at 4.5 metres depth, were fertile and of a good size for the species (8 cm high).

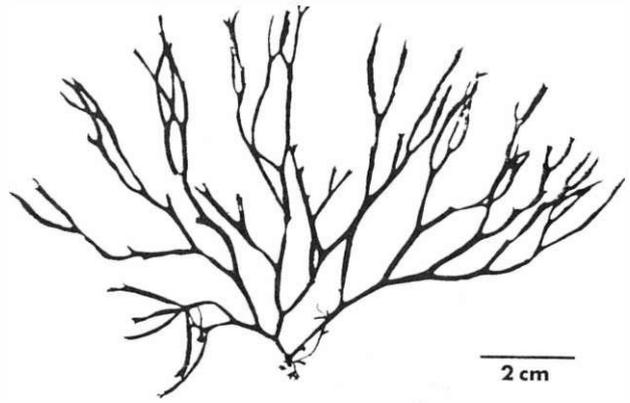


Figure 1. *Nesophila hoggardii* specimen (infertile) collected at 4.5m depth, Lottin Point, 1.6.97.

Curdiea codioides Chapman is a distinctive alga that produces cushion-like masses of overlapping prostrate branches (Fig.3). At Lottin Point it was large (10 cm across) and abundant, overgrowing coralline algae on rock at 3 metres depth.

Previous records of *C. codioides* range from the Three Kings Islands to Whangamata in the western Bay of Plenty, so its occurrence at Lottin Point is a significant extension to the south and east.

Lottin Point is under-collected with respect to marine algae, due to its isolation. These collections have indicated that this area may yield further aberrant records.



Figure 2. *Nesophila hoggardii* sporophyte, showing raised tetrasporangial sori.

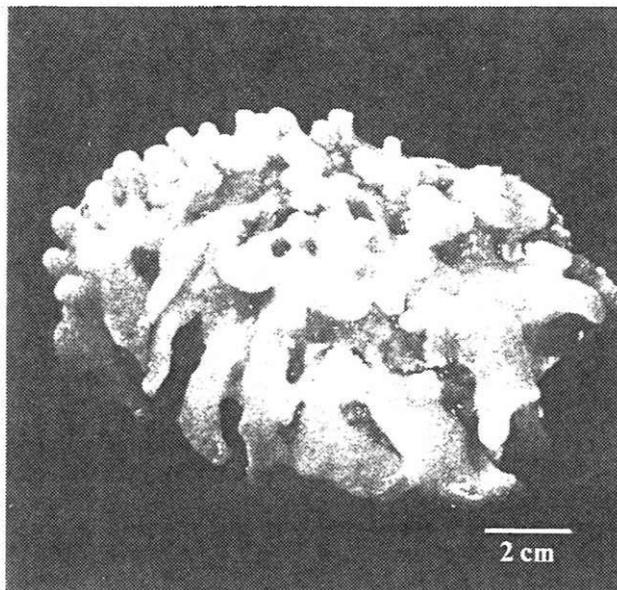


Figure 3. *Curdiea codioides* forms cushions of overlapping prostrate branches.

Acknowledgements

I wish to thank Wendy Nelson for overall supervision of this work. The field work was funded by FRST Contract MNZ602.

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Glenys Knight, Museum of New Zealand/Te Papa Tongarewa, P.O. Box 467, Wellington

Comment

■ Forest gems in Hawke's Bay's mainland island - an appreciation of Pat Grant's contribution

In the north of Hawke's Bay lies the Maungaharuru Range. Thrust up like a great limestone wave by colliding crustal plates. High land cut off from the main axial ranges by the mighty Mohaka River. In secret upland folds in the range are red tussock grasslands, mountain holly forests, cushion bogs and alpine daisy fields. Around its flanks are remnant pockets of enormous spreading baobab-like totara, and nikau palms in gullies. There is still a surprising richness of birdlife, geckos and insects. Nothing like the wealth described by Herbert Guthrie-Smith (Tutira), who knew the place when it was alive with kiwi and whio. Even less like the fauna (moa, giant harriers, frogs, petrels and wrens) being unveiled by palaeoecologist Richard Holdaway in his excavation of overhangs at the south end of the range, but rich nevertheless.

On the north-east of the Maungaharuru lies Boundary Stream Mainland Island. An 800ha remnant of forest in a dramatic landscape of cliffs and streams, it is the site of an intensive ecological restoration project led by Department of Conservation. The ecological overseeing of the project has been my baby for about three years. One of my first tasks was to map the vegetation, and I discovered just how complex and interesting it is. Because of the rugged topography, great span of altitude (300-1000m asl) and history of volcanism, fire, logging and browsing, there's now a mosaic of forest to rival Northland in diversity. Tall tawa with great emergent podocarps, clifftop black beech, dense kamahi with protruding red beeches, tall kanuka and rewarewa, lush lowland titoki and kawakawa, giant broadleaf, cabbage trees and black maire, gnarled Hall's totara and wind-sculpted moss-draped mountain holly.

I and the Boundary Stream team have discovered a surprising array of floral gems in the mainland island. Kowhai ngutu-kaka (kakabeak, *Clianthus puniceus*) is one, a pink-flowered bush at the top of a 60m waterfall being the southern-most kowhai ngutu-kaka known in the wild. Guthrie-Smith knew this land when the cliffs were red with their flowers in spring. Yellow mistletoe (*Alepis flavida*), rare now in the North Island, is another. There is one tree of neinei (*Dracophyllum latifolium*), well south of its recorded southern limit. There are tawari (*Ixerba brexioides*) and tawheowheo (*Quintinia serrata*), both at southern limits too. Most surprising of all is silver beech, happily growing a long way from its strongholds in the axial ranges.

How did these plants get to Boundary Stream? Why are the podocarps so huge in girth but shattered in their crowns? How come there is a scattering of emergent beeches throughout the tight-canopied kamahi forests?

Pat Grant, retired hydrologist, has provided answers. For decades he has roved the Hawke's Bay landscape on hydrological research business, probing into forests, gullies, mountains, swamps, scree, volcanic tephra and dunes. He has cored hundreds of trees to age them. He has mapped the stratigraphy of layers of erosion deposits and carbon-dated buried charcoal and logs. He has traced the imprint of wind-thrown trees and sweeping fires across the land. Forty years of meticulous observation and careful record-keeping.

Rather than let this information languish in notebooks, Pat has compiled it all in a book, published this year and entitled *Hawke's Bay Forests of Yesterday*. In this book are the answers to the Boundary Stream questions, and much much more. Pat can tell us that the huge matai earmarked for a community hall but not felled because the saws weren't big enough is 700 years old, the oldest known tree in Hawke's Bay and a survivor of two great gale periods that flattened most of Hawke's Bay's forests. That those winds blew from the westerly quarter he knows from studying the many pits and mounds, caused by fallen trees, still visible in the landscape. He can postulate that the winds were sufficient to transport seeds of silver beech, mountain holly and neinei from the main ranges (Kaweka, Ahimanawa) to outlying places like the Maungaharuru Range, and that the direction was right. He can tell of the great fires, set by lightning, that swept through the dry fallen forests and provided the opportunity for new plants to establish. He can

demonstrate that there has been a descent of upland plants into lower country in recent centuries as a result of the gales and fires. He can show that the emergent beeches are the same age as the kamahi, though much bigger: they are better at taking advantage of the nutrients in the newly exposed pumice soils.

All this makes excellent sense to me. It tallies with what I have seen and thought about in 13 years of working in the area as an ecologist, and explains a lot. It draws on the wisdom of the other great observers and thinkers of the region: William Colenso, Herbert Guthrie-Smith, Norm Elder, Ash Cunningham, John Nicholls, Tony Druce, Geoff Rogers, John McLennan, Jim Watt. It ties in with other such observations elsewhere in New Zealand, and with global climate information. It appears to mesh with the reconstructions of the palynologists and sediment profilers, though the linkages have yet to be properly explored.

Pat's work has opened the door for us to understand the dramas that have shaped our landscapes and the forests we now see. Here in the Bay we are very grateful.

Geoff Walls, Advisory Scientist, Department of Conservation, Napier

Research Reports

■ Stomatal densities and frost resistances of some New Zealand mistletoes

Published research on New Zealand mistletoes has focused primarily on their life histories, biology and ecology (e.g. Stevenson 1934, Ladley et al. 1997, Norton et al. 1997), responses to browsing (e.g. Owen & Norton 1995) and anatomy (e.g. Condon & Kuijt 1994). The few ecophysiological studies include examination of leaf nitrogen concentration of mistletoes and their hosts (Bannister 1989) and some work on water and nutrient transport (e.g. Coetzee & Fineran 1987) and field water relations (King 1987). We are currently working on the photosynthesis and water relations of *Ileostylus micranthus* and *Tupeia antarctica*, but take this opportunity to present some preliminary information on two other aspects for which there are no published data: stomatal density and frost resistance.

Stomatal Density. The conventional view of mistletoes is that they are water spenders, extracting xylem water and its dissolved nutrients from their hosts by losing water more rapidly than their hosts. As transpiration rate is a product of the diffusive conductance of the leaf and the vapour pressure gradient between leaf and air (which is likely to be similar for mistletoe and host), it follows that the diffusive conductance of mistletoes must be high. Stomata are the main conduit for water loss, so that a high diffusive conductance could be the result of either high stomatal densities and/or wide stomatal apertures. With this in mind, we determined stomatal densities for most New Zealand mistletoes, either from fresh material collected locally in the Dunedin area or from herbarium specimens, by examining nail varnish peels taken from their leaves or photosynthetic stems. The density was usually determined as the mean of five counts from each of five leaves. Counts of host stomata were made whenever possible (herbarium specimens did not always include host material and *Alnus incana* was leafless at the time of sampling).

Leaves of all the loranthaceous mistletoes, except *Trilepidea adamsii*, were amphistomatous. Neither of the two specimens of *T. adamsii* had any stomata on the upper (adaxial) surfaces of the leaves examined. In *Ileostylus micranthus* and *Peraxilla colensoi*, there were considerably fewer stomata on the upper surfaces of their leaves (particularly in shaded specimens) but other species showed similar numbers on both surfaces and the specimen of *Alepis flavida* had more stomata on the upper surface of its leaves. The *Korthalsella* spp. had an equal distribution of stomata on their stems, but stomatal impressions on peels from *K. salicornioides* could not be counted properly. The stomatal counts for mistletoes (average for both surfaces) ranged from 43 - 139 mm² and, in all pairs except for *I. micranthus* on *Ribes sanguineum* and *Teline monspessulana*, stomatal densities were higher on the host than on the mistletoe. The high leaf conductances of mistletoes would not appear to be related to their stomatal density. Indeed, when cut shoots of mistletoes and their hosts are desiccated separately in a common environment, the water loss of mistletoes is less than that of their hosts, indicating considerable stomatal control over water loss (King 1987; Strong, unpublished data).

Frost resistance. Frost resistances of mistletoes in the Dunedin area (*I. micranthus*, *P. colensoi*, *T. antarctica*, *K. lindsayi*, *K. salicornioides*) were measured in winter (July, August 1997). This mild winter may not have allowed mistletoes to develop their maximum winter resistance to frost. In the loranthaceous mistletoes, the frost resistance of the previous season's leaves was measured although the frost resistance

Table 1. Stomatal densities (mm⁻²) in some New Zealand mistletoes obtained from both herbarium specimens and fresh material collected from the field (ab = abaxial, ad = adaxial, nd = not determined, + present, but not countable).

Mistletoe species	stomatal density			Host	stomatal density mean	Herbarium #	Location
	ab	ad	mean				
<u>Loranthaceae</u>							
<i>Alepis flavida</i>	98	125	112	<i>Nothofagus solandri</i>	169	AK 221725	Lord's Bush, Canterbury
<i>Ileostylus micranthus</i>	90	60	75	<i>Ribes sanguineum</i>	53		Puraukanui, Otago
	94	55	75	<i>Kunzea ericoides</i>	343		Puraukanui, Otago
	121	48	85	<i>Teline monspessulana</i>	55		Puraukanui, Otago
	77	26	52	<i>Coprosma propinqua</i>	101		Allans Beach Road, Otago Peninsula
	184	44	114	<i>C. propinqua</i>	143		McKay Road, Otago Peninsula
	172	44	108	<i>Alnus incana</i>	nd		Northern Cemetery, Dunedin
<i>Peraxilla colensoi</i>	88	55	72	<i>Nothofagus menziesii</i>	267	AK 221739	Tuatapere Scenic Reserve
<i>P. tetrapetala</i>	142	135	139	unrecorded		AK 104084	Waimanuio
<i>Trilepidea adamsii</i>	107	0	54	unrecorded		AK 14748	Thames
	149	0	75	unrecorded		AK 22157	Waiheke Island
<i>Tupeia antarctica</i>	102	92	97	<i>Carpodetus serratus</i>	111		34 Lynwood Ave, Dunedin
<u>Viscaceae</u>							
<i>Korthalsella lindsayi</i>	43	42	43	<i>Melicope simplex</i>	141		Botanic Gardens, Dunedin
<i>K. salicornioides</i>	+	+	nd	<i>Kunzea ericoides</i>	306		Northern Cemetery, Dunedin

Table 2. Winter frost resistance (LT₅₀ - temperature (°C) producing 50% tissue damage) of mistletoes collected from the Dunedin area in July-August 1997. Host species and locations as in Table 1, but with *I. micranthus* from the Northern Cemetery and *P. colensoi* from Waipori Gorge.

Species	plant material	mistletoe	host
<u>Loranthaceae</u>			
<i>Tupeia antarctica</i>	previous season's leaves	-5.4	-6.4
	new season's leaves	-2.6	nd
	immature flowers	-2.6	nd
<i>Ileostylus micranthus</i>	previous season's leaves	-4.8	nd
	immature flowers	-6.0	nd
<i>Peraxilla colensoi</i>	previous season's leaves	-10.2	nd
<u>Viscaceae</u>			
<i>Korthalsella lindsayi</i>	whole plant	-3.4	-5.7
<i>K. salicornioides</i>	whole plant	-5.2	-5.2

of developing flowers and young current season's leaves were measured when present. Whole plants of the viscaceous mistletoes were used. The freezing procedure follows that previously described by Bannister (1990) and results are expressed as the mean temperature causing 50% damage to the tissue.

Except for *Peraxilla colensoi*, the examined mistletoes appeared somewhat frost-sensitive (Table 2). Newly emerging leaves and flowers of *Tupeia antarctica* were particularly tender but the immature flowers of *I. micranthus* were more resistant than the previous season's leaves, implying an ability to survive over winter. Plants of *Korthalsella lindsayi* appeared to be more sensitive than those of *K. salicornioides*, although the latter species extends further north than *K. lindsayi*. Their low frost resistances suggest that they will be confined to warmer areas and should be predominantly coastal in their distribution. Recently published maps (de Lange et al. 1997) suggest that the distribution of the investigated loranthaceous mistletoes matches their measured frost resistance. *Tupeia antarctica* and *Ileostylus micranthus* are predominantly coastal in the South Island, extend more inland in the North Island, and have relative low frost resistances, whereas the frost resistance of *Peraxilla colensoi* is in accord with its distribution in silver

beech forests, which often occur in colder inland and montane areas. Although the frost resistance of its host was not measured in 1997, a maximum winter frost resistance of -11.7°C has been measured in leaves of *Nothofagus menziesii* from the same area (Neuner & Bannister 1995). Where the frost resistances of hosts were measured, they were at least as frost resistant as the paired mistletoe, and mostly somewhat more resistant.

In conclusion, the greater diffusive conductance of mistletoe leaves cannot be attributed to greater stomatal densities than in their hosts' leaves and must be related to more open stomata in attached mistletoes. Frost resistance, however, appears to be correlated with the distribution of the mistletoes examined. Finally, we particularly thank the Auckland Institute and Museum (AK) for loaning us specimens of mistletoes and allowing us to remove (a few!) leaves for examination, especially from *Trilepidea adamsii* which appears to have been the only hypostomatous New Zealand mistletoe.

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■ New names, combinations or comments from the journals (5)

"*Polygonum sensu lato* (Polygonaceae) in Australia" by K.L. Wilson: *Telopea* 3(2): 177-182 (1988). *Fallopia*, *Persicaria*, and *Reynoutria* are recognised as separate genera from *Polygonum* s.lat. A new combination in *Persicaria* is made for the Australasian *Polygonium salicifolium* [*Persicaria decipiens* (R.Br.) K.L. Wilson] because *Persicaria salicifolia* has already been used for a British taxon. Also see Wilson: Some widespread species of *Persicaria* (Polygonaceae) and their allies. *Kew Bull.* 45: 621-636 (1996).

"A new, rare species of *Meliccytus* (Violaceae) from New Zealand" by B.P.J. Molloy & B.D. Clarkson, *N.Z.J.Bot.* 34: 431-440 (1996). *Meliccytus drucei* Molloy & B.D. Clarkson is described as a threatened endemic shrub restricted to a narrow range of waterlogged soils on Mt Taranaki.

"*Blechnum blechnoides* (Bory) Keys. (Blechnaceae), formerly *B. banksii* (Hook.f.) Mett. ex Diels, a fern from salt-spray habitats of New Zealand and Chile" by T.C. Chambers & P.A. Farrant, *N.Z.J.Bot.* 34: 441-445 (1996). The New Zealand endemic *Blechnum banksii* is considered conspecific with the Chilean *B. blechnoides*. The Chilean name has priority.

"Four subspecies of the fern *Blechnum penna-marina* (Blechnaceae: Pteridophyta)" by T.C. Chambers & P.A. Farrant, *Fern Gaz.* 15(3): 91-100 (1996). Only subsp. *alpina* occurs in the Australasian region whereas all the subspecies occur in South America.

"(1248) Proposal to conserve the name *Homalanthus* (Euphorbiaceae) with a conserved spelling" by H-J Esser, *Taxon* 45: 555-556 (1996). The genus *Omalanthus* is based on the Greek words *homalos* (= equal, even) and *anthos* (= flower). It was corrected into *Homalanthus* by Reichenbach (1828), but he has not been followed consistently. This is why Esser is asking for an official decision on the spelling of the genus.

"*Hebe brevifolia* (Scrophulariaceae) - an ultramafic endemic of the Surville Cliffs, North Cape, New Zealand" by P.J. de Lange, *N.Z.J.Bot.* 35: 1-8 (1997). Cheeseman's variety of *Veronica speciosa* *Hebe macrocarpa* var. *brevifolia* is raised to specific rank: *Hebe brevifolia* (Cheeseman) de Lange based on several characters including a different chromosome number from the above two species.

"Revision of the genus *Wahlenbergia* (Campanulaceae) in New Zealand" by J.A. Petterson, *N.Z.J.Bot.* 35: 9-54 (1997). One native and nine endemic species are recognised from New Zealand, of which three are described as new: *W. akaroa*, *W. violacea*, *W. vernicosa*. Also five New Zealand endemic subspecies are described as new: *W. albomarginata* subsp. *decora* and subsp. *olivina*, *W. congesta* subsp. *haastii*, *W. pygmaea* subsp. *drucei* and subsp. *tatarua*. Also two new combinations are made: *W. albomarginata* subsp. *flexilis* (Petrie) J.A. Petterson and subsp. *laxa* (Simpson, J.A. Petterson). *Wahlenbergia gracilis* and *W. marginata* are not considered to be present in New Zealand.

"Transfer of *Cassinia leptophylla* (Compositae) to *Ozothamnus*" by I. Breitwieser & J.M. Ward: *N.Z.J.Bot.* 35: 125-128 (1997). The New Zealand endemic shrub *C. leptophylla* s.lat. is placed in *Ozothamnus* for the first time. Note - if you think *C. vauvilliersii* requires separating from *C. leptophylla* s. lat., the combination *Ozothamnus vauvilliersii* Hombr. & Jacq. was made in 1853.

"*Selliera rotundifolia* (Goodeniaceae), a new, round-leaved species from New Zealand" by P.B. Heenan: *N.Z.J.Bot.* 35: 133-138 (1997). This new species is described as endemic to the western coast of the Wellington province and was earlier treated as an ecotype of *S. radicans* rather than a species by J. Ogden in 1974.

"The reinstatement of *Utricularia protrusa* for New Zealand and an assessment of the status of the other New Zealand bladderworts based on seed characters" by C.J. Webb & W.R. Sykes: *N.Z.J.Bot.* 35: 139-143 (1997). The authors accept three indigenous species for New Zealand: *U. protrusa* (reinstated for plants erroneously referred to as *U. australis*), *U. delicatula* (a New Zealand endemic distinct from the Australian *U. lateriflora*), and *U. novae-zelandiae* (including *U. monanthos*). Also the name *U. gibba* (instead of *U. biflora*) is accepted for the single naturalised species. This means that the only name to survive from Flora of New Zealand vol. IV is *U. novae-zelandiae*.

"*Rachelia glaria* (Compositae), a new genus and species from the South Island of New Zealand" by J.M. Ward, I. Breitwieser & J.D. Lovis: *N.Z.J.Bot.* 35: 145-154 (1997). *Rachelia glaria* J.M. Ward & Breitw. previously known as "Z. ombi" is a tufted perennial herb found on scree in the north-east of the South Island.

"*Gahnia howeana* (Cyperaceae), a new species from Lord Howe Island" by R.O. Gardner: *N.Z.J.Bot.* 35: 155-157 (1997). *Gahnia xanthocarpa* is now considered endemic to New Zealand.

"*Carex tenuiculmis* comb. et stat. nov. (Cyperaceae), a threatened red-leaved sedge from New Zealand" by P.B. Heenan, P.J. de Lange & B.G. Murray: *N.Z.J.Bot.* 35: 159-165 (1997). Petrie's variety of *C. secta* is raised to specific rank.

"Recognition and lectotypification of the name *Helichrysum alpinum* Cockayne and status of *Helichrysum alpinum* N.A. Wakef. (Compositae)" by J.M. Ward, A.D. Wilton & D.S. Glenny: *N.Z.J.Bot.* 35: 251-253 (1997). The Cockayne name for a North Island alpine taxon, previously included in the *H. bellidioides* complex, is shown to be validly published by Cockayne.

"*Asplenium cimmeriorum*, a new fern species from New Zealand" by P.J. Brownsey & P.J. de Lange: *N.Z.J.Bot.* 35: 283-292 (1997). This new octoploid species is described as growing on calcareous substrates from Waitomo (North Id) and Oparara Valley (South Id).

"*Macropiper* (Piperaceae) in the south-west Pacific" by R.O. Gardner: *N.Z.J.Bot.* 35: 293-307 (1997). Subsp. *peltatum* is described as new for *Macropiper excelsum* from the Three Kings and Poor Knights Islands, and the forms on each of these island groups, f. *delangei* and f. *peltatum*, respectively, are also described. Subspecies *psittacorum* is now considered restricted to Lord Howe Id, Norfolk Id, and Kermadec Islands. *Macropiper melchior* is redescribed.

"Reinstatement of *Raukaua*, a genus of the Araliaceae centred in New Zealand" by A.D. Mitchell, D.G. Frodin & M.J. Heads: *N.Z.J.Bot.* 35: 309-315 (1997). *Pseudopanax anomalus*, *P. edgerleyi* and *P. simplex* are separated into the reinstated genus *Raukaua*, the new combinations *R. anomalus* and *R. simplex* are made, and the new variety combinations *R. edgerleyi* var. *serratus* and *R. simplex* var. *sinclairii* are also made.

"*Gratiola pedunculata* (Scrophulariaceae): a new addition to the New Zealand flora" by P.J. de Lange: *N.Z.J.Bot.* 35: 317-322 (1997). An Australian species is recorded in northern New Zealand for the first time and is considered to be indigenous.

"*Winika*, a new monotypic genus for New Zealand orchid previously known as *Dendrobium cunninghamii* Lindl." by M.A. Clements, D.L. Jones & B.P.J. Molloy, *The Orchadian* 12: 214-220 (1997).

"Three new species and a new combination in *Caladenia* R.Br. (Orchidaceae) from New Zealand" by D.L. Jones, B.P.J. Molloy & M.A. Clements, *The Orchadian* 12: 221-228 (1997). New species: *C. atradenia*, previously known as *C. carnea* var. *minor* f. *calliniger* Hatch which the authors claim is *nom. illeg.*; *C. chlorostyla*, previously known as *C. "green column"*; and *C. nothofageti*, part of the *C. catenata* complex. *C. bartlettii* is a new combination based on: *C. carnea* var. *bartlettii* Hatch.

"New taxa, new combinations and an infrageneric classification in *Pomaderris* (Rhamnaceae)" by N.G. Walsh & F. Coates: *Muelleria* 10: 27-56 (1997). This revision includes: 16 new Australian taxa; a new subspecies (subsp. *maritima*) for *Pomaderris apetala* from Victoria, central and northern Tasmania, and Mokau area in New Zealand; and *P. phyllicifolia* var. *ericifolia* is sunk into *P. phyllicifolia* (as *P. ericifolia* is shown to be a synonym of *P. phyllicifolia*).

"Achene morphology and pericarp anatomy of the type specimens of the Australian and New Zealand species of *Bolboschoenus* (Cyperaceae)" by J. Browning, K.D. Gordon-Gray & S.G. Smith: *Australian Systematic Botany* 10: 49-58 (1997). *Bolboschoenus* achenes of *B. caldwelli*, *B. fluviatilis* and *B. medianus* were studied and the results suggested that *B. medianus* is of hybrid origin.

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Herbarium Report

■ Auckland Museum Herbarium (AK) Report for 1 July 1996 to 30 June 1997

Caring for the collections

The biggest achievement for the year was shifting the Botany Department, including the herbarium, to the Museum's old Bird Hall in April. After much planning the shift went smoothly and was completed in ten days. The new herbarium compactors which move with finger-tip control are a much welcomed improvement. As is the increased storage and general work space. The collection benefits by now being temperature controlled, and in the near future humidity controlled as well.

It has taken nearly 8 years to data-base 51% of the herbarium specimens (118172 specimens) and it is a relief to pass the halfway point. With the assistance of Lottery Board funding the native dicot data-basing was almost completed. A new Lottery grant has resulted in the start of the data-basing of the New Zealand adventives. A grant from The New Zealand Lion Foundation enabled the accessioning of the donated A E Wright Fern Herbarium into AK to be completed (1549 specimens with many duplicates).

All databased taxa have now been coded into whether they are native, adventive, cultivated or foreign.

The Auckland University herbarium (AKU) was finally returned in June when they had room to accommodate it once more. The vascular plant specimens (21,099) were data-based on the AKILLES system while at the Museum. The Lindauer algae collection remained at AK on long term loan.

Increasing time is being given to planning for five new Natural History galleries for the Museum's first floor which are due to open at the end of 1998.

Fieldwork/Research

Ewen Cameron joined Peter de Lange and Peter Heenan for an 8 day camp on Aorangi Island, Poor Knights Islands; and Rhys Gardner had two visits to New Caledonia. Rhys has continued his research on New Zealand *Macropiper* and Fijian *Selaginella*.

Acquisitions & donated specimens

About 1000 lichen specimens collected primarily from subantarctic islands plus some from other areas of the world were received as a gift from MICH. Other specimens were received from Jessica and Ross Beever, Steve Benham,, Gillian Crowcroft, Peter de Lange, Lisa Forester, Lance Gofford, Max Goodey, Graham Hambly, Dan Hatch, Alistair Jamieson, Janis Komsars, Wendy Patterson, Graeme Taylor, Alan Tennyson, Dick Veitch, Mike Wilcox, Linda Winch and Maureen Young.

Staff

Curator	Ewen K. Cameron
Honorary Botanist	Lucy M. Cranwell
Honorary Research Associates	Rhys O. Gardner, Jeanne Goulding
Technician	Douglas Rogan
Technicians (contract)	Steve McCraith, Maree Johnston, Sharon Alderson

Volunteers

Botany volunteers contributed 1180 hours. All new specimens (4642) were mounted and packeted by Chris Ashton, Joan Dow, Kay Haslett, Vic May, Nina Smeets (2 months) and Meryl Wright. Wendy Patterson again proofed thousands of new AKILLES labels. Rhys Gardner assisted with numerous difficult plant identifications. Jagath Wijeratne worked 3 half days a week from 16 April mounting specimens and re-boxing part of the herbarium on Community Taskforce funding.

Visitors

D.J. Blanchon, P. Ming, G. Rutherford, J. Salter from Auckland University; Z Park-Ng from Victoria University; P.J. de Lange, M.J. Heads, E. Syme from Department of Conservation; B.S. Parris from NZ Fern Research Foundation; J. Dyer from Fish and Game Council; D.A. Norton from Canterbury University; M. Dawson, D. Glenn, P. Wardle from Landcare Research; M. Horrocks from Environmental Science and Research; A. Watkins from Otago University; C.D. McCullough, M. Merrett from Waikato University; P.D. Champion from NIWA; A. Julian, H. Cox, A. Stubbs, F. Maseyk, S. Wilmott from Auckland City Council; M. Doyle & A. N'Yeurt from SUVA; L. Holmgren & H. Wanniorck from Sweden; J. Cheeseman from Illinois; J. Curnow, D. Jones, H. Legg from CANB; T.C. Chambers from NSW; J. Smith-Dodsworth, M. Taylor and L.M. Cranwell. Eleven special interest groups visited the herbarium, varying 5-38 in numbers.

Statistics

New accessions:		(1995-1996)
30 June 1997	232,630	
30 June 1996	<u>227,988</u>	
	4,642	(5,038)
Records on AKILLES electronic database		
30 June 1997	118,172	
30 June 1996	<u>104,110</u>	
	14,062	(10,974)
Exchange specimens		
Inwards:	382 specimens from 3 institutions	(217 from 4)
Outwards:	630 specimens to 7 institutions	(310 to 6)
Loans of specimens		
Inwards:	39 [959 spec.] from 11 institutions	(31 [1826] from 20)
Outwards:	91 [2872 spec.] to 28 institutions	(67 [1496] to 23)
Total number of specimens out on loan = 7197 (173 loans)		(4500)

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BIOGRAPHY/BIBLIOGRAPHY

■ Tribute to Mavis Davidson pioneer forester, field ecologist and mountaineer

Until recently there have been few women researchers in forestry. Indeed, even in the late 1950s women were considered unacceptable for research in forestry. Mrs Mavis Melville Davidson (née Gedye, b.1910) and Miss Mary Sutherland (1893-1955) are two pioneer women in New Zealand forestry. Mavis is also a pioneer field ecologist and mountaineer.

Mavis was born at Te Karaka, Poverty Bay, the seventh child in the family of 3 daughters and 6 sons of Thomas James Gedye and Dagmar Martha Melville Gedye (née Hansen). Her maternal ancestors were Norwegian and her paternal side were Cornish. Mavis's schooling at Tokomaru Bay, Gisborne (Mangapapa and Te Hapara) and Wairoa District High School concluded in 1925 at the Brain's Commercial College in Auckland. She worked for a period as a shorthand-typist-ledger keeper in Auckland and Wellington. In 1940 she commenced studies at Victoria University College though her studies were suspended in 1942 when she joined the WAACs and was posted to the Army Officer Cadet Training Unit and was commissioned as a subaltern and served with the 10th Coast Regiment at Fort Dorset and then Palmer Head - 70th Coast Battery (1) where the guns guarding the entrance to Wellington Harbour were installed, plus the searchlights (20). Mavis finished her service in the army at Burnham Military Camp and returned to complete her University studies at Victoria University College. In 1946 she was appointed a Demonstrator and later a Junior Lecturer in zoology at Victoria.

Mavis graduated B.Sc. (1946), studying both botany and zoology, though English had been her great love (12). She completed an M.Sc. (1950) in zoology from Victoria University College and her thesis was entitled "The New Zealand mudfish (*Neochanna apoda*)". After a period in the TAB Head Office, Wellington, in 1958 Mavis was appointed biologist in the N.Z. Forest Service which she explains as follows (12), "My employment with NZFS was the result of Lucy Moore's [Dr Lucy B. Moore, 1906-1987] suggestion to Lindsay Poole [Mr A.L. Poole, Director-General, b.1908], and I don't think would have happened without my tramping/climbing background. At first I was attached to the Opossum Unit, but then, happily, got onto my own sika deer research project".

During her career in the N.Z. Forest Service Mavis's major research has involved the study of introduced deer, and especially the small shy Japanese sika deer (*Cervus nippon*). She became a world authority on sika deer. Her major study areas were in the Oamaru Valley (Kaimanawa-Kaweka Forest Parks) from 1963-66 and Kuripapango in the southern Kaweka Range from 1967-74 (1).

After retirement Mavis and her husband W.E. Davidson (1908-1990) moved to Leigh in Northland in 1983 where she continues to assemble for publication her research on sika deer. Mavis maintains her international contacts relating to her field of research and in 1991 attended the fifth International Sika Society Conference in Mohnesee, Germany.

As well as her research on deer, Mavis is a noted pioneer mountaineer and trumper, activities that nicely complemented her research activities. She joined the Tararua Tramping Club in 1934 and the N.Z. Alpine Club in 1949 and is especially famous as the leader of the first all-women ascent of Mount Cook in 1953. Other members of the party were Sheila MacMurray (née McLean) and Doreen Pickens (formerly Urquhart now Murie) who is incorrectly given as Pickers in 20 (p.31). This feat of pioneer mountaineering by women was achieved at the time Mt Everest was conquered by Hillary and Tenzing and received less publicity than the pioneering feat justified. Mavis's great love of the mountains is reflected in her life membership of the N.Z. Alpine Club, and over 50 years' membership of the Tararua Tramping Club where she has served as Vice-President and Hon. Treasurer (1). She was for several years Secretary and Treasurer of the Federated Mountain Clubs of New Zealand. Mavis with her co-author L.R. Hewitt (1913-1964) has written two books on New Zealand mountains, "The Southern Alps (Part II) Mount Cook Alpine Regions" (16) and "The Mountains of New Zealand" (17). A second edition of the former book was published in 1973 (18). Mavis is an accomplished photographer and these books include her photographs.

Mavis is an internationally-respected authority on sika deer and this status has been gained by her seminal publications in the N.Z. Journal of Forestry Science (4,5,6) and other publications which are based on research in the two study areas mentioned above. Mavis has published some 24 articles in New Zealand journals, including a chapter "The larger wild mammals" in "The Natural History of Canterbury" (3) which was an extract from a more extensive N.Z. Forest Service publication (2), and four chapters in "The Handbook of New Zealand Mammals" (9,13,14,15): "Sika deer", "white-tailed deer", "Fallow deer", and

"Moose". In addition, her research on sika deer has been published internationally in four chapters in "Sika *Cervus nippon* Temminck, 1838" published by the International Sika Society, Mohnesee, Germany (7,8,10,11): "New Zealand", "New Zealand Kaimanawa State Forest Park", "Social groupings of Sika (and red deer (*Cervus elaphus*), Oamaru Valley, Central North Island", and "Variation of rutting cries in Sika deer (*Cervus nippon*)". Mavis has also published 20 articles relating to the mountains in the journal Tararua between 1947 and 1963. In addition, she has prepared three major unpublished reports for the N.Z. Forest Service: "The use of 1080 by the N.Z. Forest Service" (1958), "The introduction, present distribution and spread of each introduced animal, the control of which is the responsibility of the N.Z. Forest Service" (1958), and "N.Z. Forest Service Tararua Survey 1958-1959".

Mavis is a pioneer woman field ecologist in a difficult and demanding field of research. The challenges of this research are exemplified by her studies in the Oamaru Valley (off the Desert Road in the central North Island). Every month for 3 years Mavis spent an average of 10 days (up to 21 days in the rutting season) in her hut in the Oamaru Valley. Two hunters would accompany her and she amassed much field data about the sika deer, including how to snare deer using collars that then broke from the snare and remained around the neck of the deer. She set 12,000 snares over a 12-year period though only 100 were returned to her by hunters with appropriate information of the animals species, sex, age, and where it was shot (19). Mavis is the New Zealand President of the International Sika Deer Society.

Mavis's interest in the field of botany commenced with the Botany Circle of the Tararua Tramping Club and she was a foundation member of the Wellington Botanical Society in 1939.

Her honours include an O.B.E. in the 1992 New Year's Honours List for services to science and mountaineering. She was awarded a Gold Badge of Honour for her research on the sika deer by the International Sika Society. At the Forest Research Institute 50th Jubilee (1947-97) in April 1997 Mavis received a Research Pioneer Award. Mavis was also elected a Fellow of the N.Z. Institute of Foresters and Chavasse (1) refers to Mavis, "One of the most remarkable members of our Institute [N.Z. Institute of Forestry] is Mavis Davidson, a woman of extraordinary energy, initiative, industry and critical intelligence, who has indefatigably tramped over a great many of the rugged places in New Zealand and still, after 40 years' mountaineering, skiing and trout fishing, remains a keen trumper and canoeist." Mavis comments on the situation of a woman in a predominantly male-oriented organisation (12), "Mary [Miss Mary Sutherland] was not the only one 'distanced from her colleagues by chauvinistic pride and the practicalities of accommodation'. It extended down to my years, and may be happening still. While it raised no comment (that I know of) if I shared a tent with my hunters, I was banished to some accommodation elsewhere (even to driving to and fro in a 3-ton truck on one occasion), when I attended a conference".

Mavis in her 80s still goes to the mountains in Fiordland and elsewhere and maintains world-wide contacts in relation to sika deer and a wide circle of friends, especially from mountaineering days. There could be few more dedicated and active pioneer field scientists and mountaineers in New Zealand. Her 80th birthday was celebrated by friends and colleagues at Bay View, Hawkes Bay in February 1990 and this was also the occasion for a sika deer research reunion organised by Ashley Cunningham (b.1928) and other former N.Z. Forest Service colleagues with Peter Logan as M.C.

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A.D.Thomson, Centre for Studies on New Zealand Science History, 5 Karitane Drive, Christchurch 2

■ Biographical Notes (28) : George Simpson FLS, FRSNZ, FNZIV (1880-1952)

George Simpson, master-builder, valuer, and botanist was born in Dunedin on 14 October 1880 (1,2). His father, George Simpson Snr., was born in Leuchars, Fife, Scotland, and came to Dunedin on the "Timaru" in 1879 with his wife Catherine (born Russell). He first worked as a journey-man builder and then, in 1886, founded a building and contracting business which thrived. He became a member of the Otago Harbour Board, a member of the first Drainage Board, and Chairman of the Arthur Street School Committee (2,3). Young George was dux at Arthur Street and then joined his father's business. At age 25 he married Annabel Annand of Christchurch (1,2). In 1912 he and his father were first listed as members of the Otago Institute (TNZI 44) and remained members for life. George Snr. was on the committee of the Technological Branch of the Institute from 1914 to 1919 (TNZI 46-51); and George Jnr. was a member of the Council from 1927-40; 1943-46; 1951-53, President in 1931, and Vice-President in 1932 and 1936 (11).

Outside family and business George's most important relationship was with John Scott Thomson (1882-1943), industrial chemist at Thomson & Co., the cordial manufacturers. Simpson lived in Belgrave Crescent, Roslyn, at no distance from Thomson in Cromwell Street, Wakari, and both were keen cultivators of native plants. Simpson's business premises were in Crawford Street and Thomson's nearby in Crawford and Police Streets.

By 1925 Simpson and Thomson were well known to Cockayne and Allan, who called them "The Firm"; and for the next 18 years, until Thomson died in 1943, they were among the leading botanists in the country. An outline of their botanical explorations and research is given in the Biographical Note on J.S. Thomson (4). Three milestones were their election to membership of the New Zealand Alpine Club in 1929 on a botanical qualification; their election as Fellows of the Linnean Society of London in 1930; and their award of the Loder Cup in 1936 "for outstanding botanical exploration, surveys, research, cultivation, photography, and lectures in respect of the native flora".

In 1934, when their father died, George and his brother John succeeded to what was one of the oldest building businesses in Dunedin, G. Simpson & Co. Ltd., Builders and Valuers. Mr Owen Watson, who served his apprenticeship from 1945 to 1950 with the firm, recalls that "it consisted of George and John Simpson and a Miss J. Miller in the office; a joinery shop employing about 3 joiners and a machinist (including George's son Archie); and about 6 carpenters on outside work. In that era most of the work was office and warehouse alterations along with some shop fittings. Indeed we seemed to work for most of the well-known and old established Dunedin firms" (5).

Dan Hatch recalls that "George Simpson was a 'character'. His office in Crawford Street contained, besides the expected plans and specifications, odd pots of *Celmisia* which 'might be different', trays with germinating *Carmichaelia* seed, twigs of dried *Dracophyllum*, and assorted hanks of tussock. His home up in Roslyn was much the same, the garden (in 1944) largely given over to experimental *Carmichaelia* groves. He was to me most helpful, cheerfully generous, and nothing was too much trouble." (6).

Thomson died in 1943 and in 1945 Simpson published the monograph on *Carmichaelia* for which they had collected material for many years. He divided the genus into 8 sub-genera and called one of them *Thomsoniella* in memory of his friend (TRSNZ 75).

Simpson also continued his interest in the Alpine Club. At Easter, 1940, he had helped build the Mt French bivouac, and in 1941 helped build the Jumboland Hut. But – as J.A. Simm tells us – "his greatest service to the Club was possibly in connection with the building of the Aspiring Hut in 1946. By some means he managed to get a building permit issued; to assist in obtaining the many materials that were in short supply;

to give hours of his time in advising on the plans and specifications; to assist in the provision of transport when this was difficult; and finally to do a considerable amount of work on the hut itself. When it is considered that hut building trips are generally a marathon of endurance, this active work on the hut itself was no mean performance on the part of a man 66 years of age." (7).

Throughout the last decade of his life Simpson kept up his extensive private practice as a Valuer. In addition he was one of a select band in Dunedin chosen to assist the Crown in the administration of the 1942 Land Sales regulations. These were an attempt to stabilise values and protect the interests of ex-servicemen; and Simpson was chosen because of the large emphasis placed on replacement values. His skill in this field was considerable because of his building business. He worked as a Crown Valuer from c. 1943 until some months after the regulations were abolished in early 1950. He also acted as Valuer for the Otago Harbour Board in the renewal of the very large number of leaseholds which the Board enjoyed as lessor (8).

In 1949 George Simpson was elected a Fellow of the Royal Society of New Zealand. His last paper, in 1952 (*TRSNZ* 79) tells us that he had been cultivating material sent by L.M. Cranwell (Auckland); N. Potts (Opotiki); and W.B. Brockie (Christchurch & Wellington) and had collected with Brockie in Nelson. It also included distribution records from James Langbein and Peter Wardale (*sic*). The latter had met Simpson through his great-uncle while still at Waitaki Boys High School (9) and sent records from Breast Hill, Lake Hawea, near his home.

George Simpson died in Dunedin on 16 May 1952, after a short illness (1). The "Otago Daily Times" (10) noted that he had been associated with the Dunedin Amenities Society for many years and President for several years; and also that he was a prominent Rotarian and a member of the Management Committee of the Otago Museum. Tributes also came from his friends: H.H. Allan (11); Lucy B. Moore (12); and J.A. Simm (7).

After the deaths of George and then John Simpson, the firm was carried on under the same name by Archie Simpson until it closed about 1965. The building was bought by A.L.S. Cassie Ltd, Engineers' merchants, and altered to a retail shop and engineering supplies warehouse. Approximately half of the Crawford Street frontage was demolished and replaced with a reinforced concrete front incorporating display windows. The office section remains more or less intact, but with a plastered exterior (5).

Eponymy

- 1926 *Ranunculus simpsonii*. "Bold Peak (near Lake Wakatipu) c. 1800 m, abundant, G. Simpson & J. Scott Thomson!" L. Cockayne & H.H. Allan *TNZI* 57: 58.
- 1961 *Ourisia sessilifolia* var. *simpsonii*. "This var. is named for G. Simpson of Dunedin who, at the time of his death, was nearing the end of a detailed study of *Ourisia* and had made many useful herbarium annotations". L.B. Moore in H.H. Allan "*Flora of N.Z. 1*: 869, 974.
- 1961 *Wahlenbergia simpsonii*. "Named in honour of Mr George Simpson of Dunedin, who discovered this plant and had it in cultivation for several years". J.A. Hay *ibid.* 793, 976.

Acknowledgements

I am very grateful to the following people for help with this note: Miss Rona Simpson (Waitati) daughter of George Simpson; Mr J.O. Macpherson FNZIV, District Valuer, Government Valuation Department, Dunedin 1950-58 (Dunedin); Mr Owen Watson (Dunedin); Dr A.D. Thomson (Christchurch); and Dr P. Wardle (Christchurch).

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PUBLICATIONS

■ Book reviews

Common names of plants in New Zealand, compiled by E.R. Nicol, published by and available from Manaaki Whenua Press, P. O. Box 40 Lincoln (Special price to New Zealand Botanical Society members: \$23.95).

This 115 page A4 softcover book is a compilation of more than 6500 common names of plants in New Zealand. It comprises two large lists: one with Latin equivalents given for common names, and a second listing ordered by scientific names from *Abelia* to *Zostera* for easy cross referencing. For many species several or more common names are provided; as no attempt has been made to prioritise the alternatives, the final choice of which name to use is left to the user. The emphasis is on names which have been used by "New Zealand botanists or the wider horticultural community" which accommodates Maori common names in many instances but does not accord adequate recognition of the first available commonly used name in others e.g., the Rekohu (Chatham Islands) flora. A useful compilation to keep beside your copies of the Flora of New Zealand and other botanical books.

Checklist of the mosses of Banks Peninsula, by B.H. Macmillan, published by and available from Manaaki Whenua Press, P. O. Box 40 Lincoln (Special price to New Zealand Botanical Society members: \$20).

This 80 page half A4 softcover booklet provides a comprehensive annotated checklist of the mosses of Banks Peninsula derived from field work and associated collections of Bryony Macmillan begun in the 1960s. Supplementary data comes from other herbarium collections. A useful introductory section provides background information on physical features, climate, vegetation (including an indication of characteristic mosses for each type), and an analysis of endemism. This booklet is a valuable contribution to a biodiversity inventory for Banks Peninsula.

Proceedings of a workshop on scientific issues in ecological restoration, compiled by M.C. Smale and C.D. Meurk, published by and available from Manaaki Whenua Press, P. O. Box 40 Lincoln (Special price to New Zealand Botanical Society members: \$22).

This 80 page A4 softcover book is a compilation of 17 papers presented at a workshop on ecological restoration held at Lincoln in February 1995. The papers vary from general overviews of the principles of ecological restoration to specific reports of the treatments/species used and the results obtained in restoration trials. Some of the contributions are abstracts or extended summaries while others are the full text of the presentation. A large amount of valuable information for the increasing numbers of restoration enthusiasts.

New Zealand lichens: checklist, key and glossary, by W.M. Malcolm & D.J. Galloway, published by Te Papa Press, Museum of New Zealand/Te Papa Tongarewa, P.O. Box 467, Wellington. 192 pp. (Retail price: \$39.95)

New Zealand Lichens provides an update of New Zealand lichenology since the publication of the Lichen Flora in 1985. During this period there has been a rapid expansion of knowledge and a 23% increase in the number of lichens documented. New Zealand Lichens lists 1190 taxa in 273 genera, whereas the Flora has 966 taxa in 210 genera.

The publication is in four main parts: checklist, colour plates, illustrated keys to the genera, and an illustrated glossary. The checklist arranges the genus and species in alphabetical order, and also includes information on order, family, synonyms, and consulted literature. There are separate alphabetical lists for epithets and synonyms. As the latter list is 16 pages long, it is particularly useful for amateurs who haven't yet caught up with the extensive name changes that have occurred in the last few decades.

The 16 colour plates consist of 149 high quality photographs and paintings, each with its own scale. We were especially taken by the photograph of an abandoned Morris Minor covered in parmelioid lichens.

There are 11 illustrated keys to the genera, all clearly set out in sequentially numbered couplets, and with ample illustrations alongside. These keys are to be used in tandem with a similarly well illustrated glossary so that obscure and/or technical terms can be easily understood.

A feature of the book is the large number of illustrations (coloured and black & white) throughout, which are designed to simplify identification of lichens as much as possible. The pages are spirally bound, which enables easy leafing through the book from one page to the next.

The authors should be congratulated for producing such a useful and attractive book, which will serve not only to educate, but also to stimulate interest in New Zealand lichenology. They have succeeded in making the identification of lichens, traditionally a highly specialised field, so much more accessible to both the professional lichenologist and the amateur enthusiast.

Editors

A practical guide to soil lichens and bryophytes of Australia's dry country (By David Eldridge and Merrin E Tozer and published by Department of Land and Water Conservation, Sydney, Australia, 1997. ISBN 0 7313 0302 4, 80 pages. Available from Information Centre, Department of Land and Water Conservation, Sydney, New South Wales 2001, Australia).

This small booklet is based on detailed studies of the biological soil crusts that form the surface covering in the rangelands of New South Wales, and are replicated in other low rainfall areas of Australia. Such crusts, in which miniature forms of plant life are intimately associated with soil particles, are shown to be of great importance in what, to a casual observer, is considered to be barren country.

An account is given of the main components of the crusts, namely the cyanobacteria (blue-green algae), bryophytes (mosses and liverworts) and lichens. Aid in distinguishing these major plant groups is provided by keys, descriptions of morphology and reproduction, and by illustrations in the form of line drawings. Adaptations to life under dry conditions are also noted.

For the more common species within each group there are additional keys, descriptions and excellent colour photographs. References are given for anyone seeking more information and these are listed in the bibliography.

There is informative discussion of the influence of soil crusts on the stability and productivity of dry areas as well as of the effect of human activities (such as grazing, burning, road construction and mining) on crusts and their constituent organisms.

Although written primarily for Australians, the booklet is of interest to readers in New Zealand, partly as a detailed study of an unusual and fascinating plant community and partly as an introduction to the various forms of plant life present in drier areas, since the differences between them are clearly explained in a manner readily understood by laymen and amateur botanists. Of the species mentioned, one half of the lichens, two thirds of the mosses and two of the liverworts occur in New Zealand also, while most of the others are represented at genus level.

Excellent line-drawings by Karen Maling and colour photographs by Heino Lepp add to the value of the booklet. Those of lichens, taken in a region of low rainfall, complement the ones in W.B. Malcolm and D. J. Galloway's "New Zealand Lichens", just published by the Museum of New Zealand, Wellington, most of which are from regions of much higher rainfall.

Ella O. Campbell, Department of Plant Biology and Biotechnology, Massey University, Private Bag 11-222, Palmerston North

DESIDERATA

■ Darwin's barberry (*Berberis darwinii*) - Information needed

Berberis darwinii is a small tree, native to Chile, which has naturalised in several parts of New Zealand, including Wellington. It may be a serious threat to regeneration of indigenous plant communities. In Wellington it is widespread on farmland reverting to scrub, particularly on the western Karori hills.

I am studying for an M.Sc. in plant ecology through Massey University. My thesis topic is the potential threat of *B. darwinii* to natural succession, particularly in Wellington. I would like any information you can provide on the following:

1. The distribution of *B. darwinii* on a national scale.
2. Any reference to *B. darwinii* in written works.
3. Any other information on the ecology of *B. darwinii* that you think might assist me in my study.

Andrew White, 39d Bengal Street, Khandallah, Wellington (Ph (04) 8013615 (w); Ph (04) 4798011 (h); Fax (04) 8013009; Email: White1a@WCC.Govt.NZ)

FORTHCOMING CONFERENCES/MEETINGS

■ SCICON 98: The eleventh biennial Conference of the New Zealand Association of Science Educators (NZASE)

Dates: 5 - 9 July 1998
 Website Address: <http://nzase.org.nz/scicon/htm>
 Venue: Nelson, New Zealand
 Contact Address: SCICON
 Conferences & Events
 P O Box 1254, Nelson, New Zealand
 Phone: 64 (0)3 5466022
 Fax: 64 (0)3 5466020
 Email: scicon@confer.co.nz

Intended audience: Primary, intermediate, secondary and tertiary teachers

Speakers:

Professor David Phillips, Professor of Chemistry, Imperial College, London UK.
 Geoffrey Haines-Stiles from the USA's "Live From" programmes funded by the National Science Foundation.
 Ruud Kleinpaste, Entomologist, writer, tutor, and broadcaster with Television NZ and Radio NZ.
 Daphne Lee, Geologist Otago University.

Workshops: There will be over 100 workshops to select from at conference. Expressions of interest in presenting a workshop are invited. Please write to the above address for further information.

■ The 12th New Zealand Fungal Foray

Pureora Forest Park Lodge, Pureora Forest Park, evening of Tuesday 14 April to morning of Sunday 19 April 1998

Pureora Forest Park Lodge is located in the Pureora Forest Park 55 km NE of Taupo at 38°28'S 175°34'E. (About 275 km SSE of Auckland). The Park contains one of the largest stands of lowland podocarp forests remaining in New Zealand consisting of rimu (*Dacrydium cupressinum*), matai (*Prumnopitys taxifolia*), totara (*Podocarpus totara*), miro (*Prumnopitys ferruginea*) and tanekaha (*Phyllocladus trichomanoides*). This forest began to develop 2000 years ago after the previous vegetation was destroyed in the Taupo eruption. The forest also has significant populations of native birds including one of the few remaining habitats of the kokako (*Callaeus cinerea*).

The cost of accommodation will be about \$15 per night, plus the additional cost for food (all meals supplied).

A limited number of grants towards the daily cost and/ or transport to the foray are available for students. More information is available from Geoff Ridley.

Geoff Ridley, NZ Forest Research Institute, Private Bag 3020, Rotorua, New Zealand; tel: + 64 7 347 5899; fax: + 64 7 347 5333; e-mail: ridleyg@fri.cri.nz

Registration for the 12th New Zealand Fungal Foray, Pureora Forest Park, 14-19 April 1998

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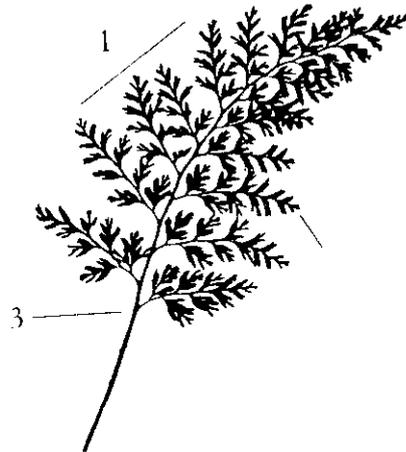
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