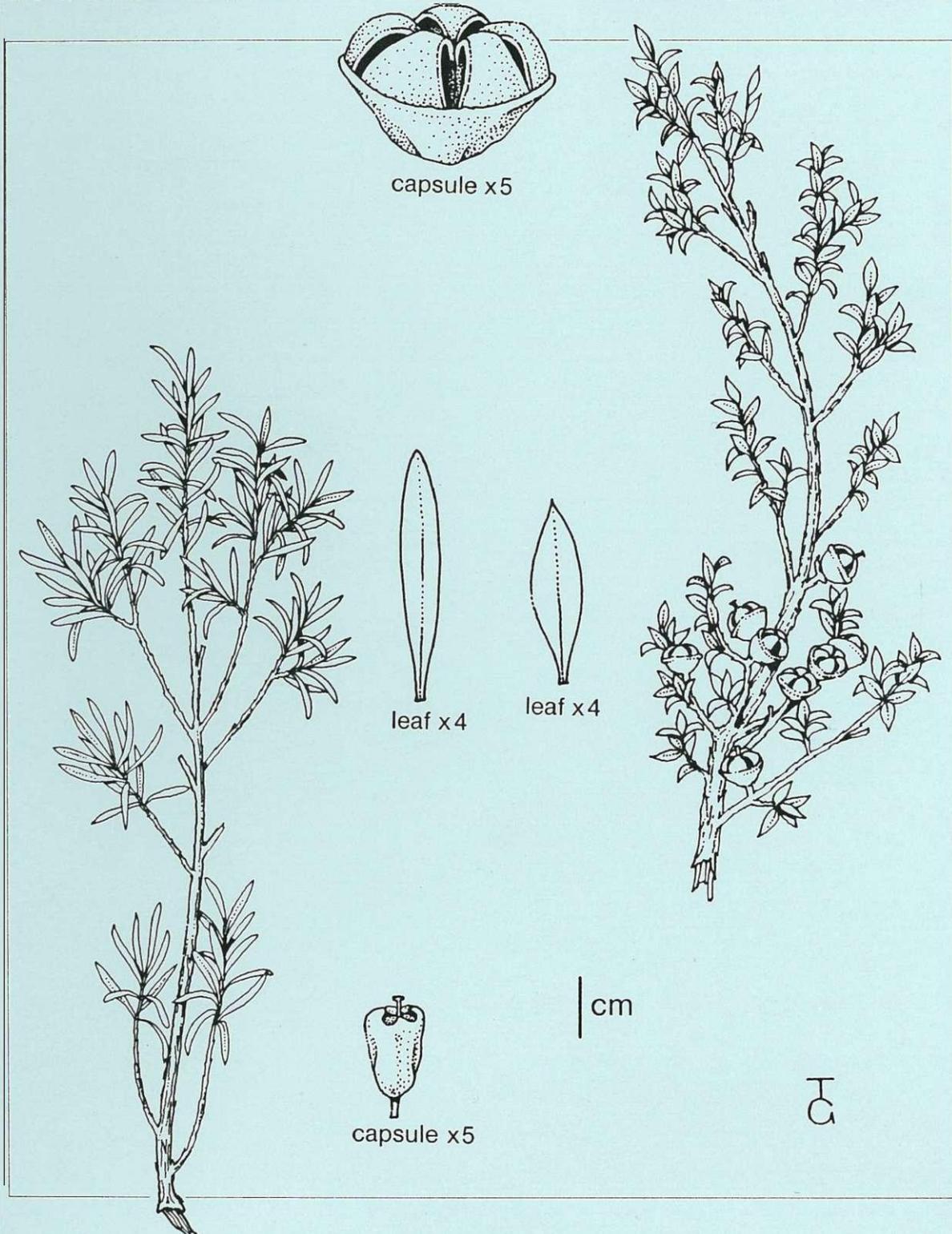


# NEW ZEALAND BOTANICAL SOCIETY NEWSLETTER

NUMBER 27

MARCH 1992



NEW ZEALAND BOTANICAL SOCIETY  
**N E W S L E T T E R**  
NUMBER 27 MARCH 1992

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## **New Zealand Botanical Society**

President: Dr Eric Godley

Secretary/Treasurer: Anthony Wright  
Committee: Sarah Beadel, Ewen Cameron, Colin Webb, Carol West

Address: New Zealand Botanical Society  
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Private Bag 92018  
AUCKLAND

## **Subscriptions**

The 1992 ordinary and institutional subs are \$14 (reduced to \$10 if paid by the due date on the subscription invoice). The 1992 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 27 (March 1992). 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 1992 issue (Number 28) is 28 May 1992.

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

## **Cover Illustration**

*Kunzea ericoides* (left) and *Leptospermum scoparium* (right) illustrated by Tim Galloway for the "Field Guide to New Zealand's small leaved shrubs" by Hugh Wilson. It is to be published this year by Manuka Press.

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## NEWS

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### New Zealand Botanical Society

#### ■ Balance sheet for the financial year 01 January - 31 December 1990

INCOME		EXPENDITURE	
B/fwd from 1989	3143.25	Printing No. 18	830.25
1990 Subscriptions	3178.00	Printing No. 19	832.50
1990 Student subscriptions	42.00	Postage No. 19	258.40
Donations	787.41	Printing No. 20	694.13
Back Issue Sales	116.40	Postage No. 20	196.80
1991 subs in advance	10.00	Printing No. 21	694.13
Interest chq a/c	0.68	Postage No. 21	180.80
Interest Inv a/c	323.59	Printing No. 22	928.13
		Postage No. 22	179.20
		ECO subscription	65.00
		O/draft interest chq a/c	2.80
		Envelopes	<u>2.00</u>
	<u>\$7601.33</u>		<u>\$4864.14</u>

Excess income over expenditure of \$2737.19 (represented by chq a/c balance of \$71.12 and investment a/c balance of \$2666.07) carried forward to 1991.

Notes to accompany accounts:

1. The bill for printing No. 18 relates to the last issue of the previous year; if this bill had been paid before the end of 1989 accumulated funds b/fwd from 1989 would have been \$2313.00.
2. Postage costs have been reduced by packaging Newsletters to all members at one institution together.

#### Balance sheet for the financial year 01 January - 31 December 1991

INCOME		EXPENDITURE	
B/fwd from 1990	2737.19	Printing No. 23	928.13
1991 Subscriptions	3268.00	Postage No. 23	178.40
1991 Student subscriptions	25.00	Printing No. 24	708.75
Donations	1159.12	Postage No. 24	175.20
1992 subs in advance	74.00	Printing No. 25	837.00
Back Issue Sales	142.50	Postage No. 25	194.40
Conference income	9078.05	Printing No. 26	1146.38
Interest chq a/c	1.82	Postage No. 26	179.20
Interest investment a/c	287.40	ECO subscription	65.00
		O/draft interest chq a/c	0.59
		Conference expenditure	8340.09
		Bank fees	<u>11.80</u>
	<u>\$16773.08</u>		<u>\$12764.94</u>

Excess income over expenditure of \$4008.14 (represented by chq a/c balance of \$449.35 and investment a/c balance of \$3558.79) carried forward to 1992.

Notes to accompany accounts:

1. Excess income over expenditure for joint NZBS/ASBS Conference \$737.96.
2. Accumulated funds include a sum of \$1486.42 comprising the Lucy Cranwell fund.

Anthony Wright, Treasurer, New Zealand Botanical Society

30 January 1992

## Regional Bot Soc News

### ■ Auckland Botanical Society

Another hand-bound issue of the ABS Journal, Vol. 47(1), has been published and includes articles on:

- How flowers work by C.J. Webb
- Succulent plants of Rangitoto Island by W.R. Sykes
- Mosses of Motukaraka (Flat Island) by J.E. Beever
- Flora and vegetation of an islet off Ponui Island by E.K. Cameron and G.A. Taylor
- Coral trees (*Erythrina*) of Auckland by R.O. Gardner
- A plate of beans by R.O. Gardner

The next field trip is a joint trip with Waikato Bot Soc to Pirongia Mountain on 21 March. Meet Ngutunui School 10.15am. Leader Catherine Beard, Hamilton, phone 0-8-490 812 (home).

**Sandra Jones**, Secretary, ABS, 14 Park Road, Titirangi, Auckland 7 (phone 0-9-817 6102)

### ■ Canterbury Botanical Society

#### December Camp Report

Boyle Lodge Camp, Lewis Pass, 6 to 8 December 1991. About 30 persons attended, with eight coming from Nelson Botanical Society.

On Saturday the weather cleared sufficiently for us to venture onto the Lewis Tops on the Main Divide, where snow was still lingering. Most spectacular of the alpiners in flower were the yellow cups of *Ranunculus insignis*, with a few *Celmisia* spp. in bloom. Within the beech forest, *Nothofagus fusca* still retained the previous season's leaves, the new buds just beginning to burst, while *N. menziesii* had about 25mm of new growth. *Cytaria gunnii*, hanging in cherry-like bunches, was noted on one tree.

The following day two separate parties explored the Boyle River Valley; a number of common orchids were seen in the scrubby forest including; *Chiloglottis cornuta* and *Caladenia lyallii*, with *Prasophyllum colensoi* growing in the meadow grass by the Lodge.

#### Summer Camp Report

Kokiri Camp. 4 to 11 January 1992. This was held at Kokiri on the West Coast where Riccarton High School has developed an Outdoor Education Centre from the old Kokiri School. Twenty-two people attended the camp, and everyone appeared to enjoy their stay.

Kokiri is located on the main road between Moana and Stillwater, and it proved to be central to a number of excellent scenic reserves. One of the highlights was a visit to Sewell Peak on Sunday 5 January, for which the weather was fine and clear. The Peak is approximately 900 metres high, and there were many sub-alpine plants amongst the rocks at the summit. The forest in the vicinity contained kamahi, *Acheria*, *Griselinia* and totara. A species list was prepared and this will be published in the 1992 Journal.

On Monday most of the party walked up Blackball Creek, while 5 crossed over the Paparoa by the Croesus Track to be collected at Barrytown. In the Blackball Creek there were many flowers of *Jovellana*, *Ourisia* and *Luzuriaga*.

During the morning of Tuesday, Wednesday and Thursday, time was spent at Kokiri lodge examining and naming collected specimens, using the technical books on the Society's collection. On each of these days the afternoons were fine, so trips were made to the Arnold River Scenic Reserve, Brunner Mine Site and Walkway, and to the Point Elizabeth Walkway.

Friday was fine and the group went to the Eldon Coates Reserve at Kopara. It has been a reserve for many years and was originally a cattle resting reserve after they had been driven over Amuri Pass from Canterbury. The reserve contained many large rimu and kahikatea as well as some miro and matai.

February Meeting: Friday 7 February, Dr David Robinson, Mathematics Department, University of Canterbury, spoke about "The Architecture of inflorescences". David discussed the ways in which plants are "put together" rather than describing the individual elements as in a standard flora.

**Ron Close**, Canterbury Botanical Society, PO Box 8212, Christchurch

## ■ Manawatu Botanical Society

After a break over the summer the Manawatu Botanical Society is back in action for the year.

Upcoming meeting topics include; the role of fungal endophytes in biological control and plant growth (March), a botanical foray to the Chatham Islands (April), and a weed workshop in May. Trips are planned into the southern Ruahine leatherwood area, currently proposed for Ecological Area status (March), Pohangina Scenic Reserve (April), and a marine algae hunt to Pakerua Bay on Saturday 9th May.

For information contact Peter van Essen or Jill Rapson.

**Peter van Essen**, Department of Ecology, University of Massey, Private Bag, Palmerston North (ph 0-6-356 9099)

## ■ Nelson Botanical Society

The November field trip was aimed at finding new sites for *Scutellaria novae-zelandiae*. After an initial foray at Waimaru, a well known locality and a brief examination of Peter William's research site the four of us proceeded to the Roding Reservoir. We examined several stands above the reservoir. Most of these were severely disturbed by roading debris or goat browsing and no significant finds were made.

After lunch we went up the Hackett to the Miner Falls. In the matai stand at the top of the falls one adult and many seedlings of the locally uncommon black maire (*Nestegis cunninghamii*) were seen. On the return journey a very large *Scutellaria* population was found between the Miner Falls and the junction with the Hackett. Some patches were up to 5 by 3m with most colonies occurring along the moist footslope under matai. On one brief foray upslope, a colony was found several hundred metres above the valley floor on a moist site under matai. The colonies ran for 700m on a terrace to a point about 200m below the Hackett River junction.

The last stop of the day was at Wakefield. No further *Scutellaria* sites were located but the original population was surviving well. At the *Scutellaria* site the locally uncommon meadow rice grass (*Micolaena stipoides*) was found and at an adjacent site *Anementhele lessoniana*, both new records for the species in Nelson. During the whole of the day no flowers were sighted. This probably limited our ability to find the plant and probably contributed to an inability to relocate it in five sites in the Hackett.

The December trip was up Mt Starveall. Most of the 19 people reached the summit, some even before lunch. The first part of the walk was through mountain beech forest with a rich understorey. The track then abruptly came out onto low shrubland on ultramafic rock. The manuka (*Leptospermum scoparium*) contained several orchids in flower, most notably *Adenochilus gracilis* and a good variety of hebe species. The most spectacular was the glaucous *Hebe carnosula* but others included *Hebe* "aff. rigidula", *H. vernicosa*, *H. brachysiphon*, and *H. tumida*. Near the hut the vegetation changed to open dry mountain beech forest and above it the forest was quite open with scree and bare subsoil which gave way finally to the alpine grasslands and the summit plateau. Here we saw many plants of *Notothlaspi australe* in full flower. Near the summit a wide variety of celmisias were present including the uncommon *Celmisia cordatifolia* and the local *C. hieracifolia*. Vegetable sheep (*Raoulia bryoides*) were a feature of the exposed rock areas.

In January we ventured up Mt Robert in mediocre weather. On the long grind up the hill we saw a good variety of orchids including *Adenochilus gracilis*, *Caladenia lyallii*, *Aporostylis bifolia* and two species of *Pterostylis*. At the forest limit coprosmas included abundant *Coprosma* "paludosa". Above the forest a good range of plants were in flower including *Celmisia spectabilis* and *C. incana*. On scree *Parahebe cheesemani*, *Neopaxia calycina*, and *Notothlaspi australe* were common but the find of the day was the quite abundant *Lignocarpa diversifolia* in full flower.

At Anniversary weekend a small party of five stayed at Planters Hut above Lake Challice. On Saturday we took the track to Mt Richmond. In the forest we recorded over 30 fern species, the most unusual of which was *Grammitis patagonica* which we saw in rock clefts. The find of the day though was surely a huge *Lycopodium varium* over 2 metres long and just as broad, hanging from a rock face.

Above the treeline two very similar hebes were present. *Hebe rigidula* and *H. "aff. rigidula"*, the former of which was in flower but is otherwise distinguished by the completely closed leaf tip in the bud. Amongst the rocks edelweiss (*Leucogenes leontopodium*) was spectacularly in flower and what at first appeared to be vegetable sheep turned out to be the local endemic *Celmisia macmahonii*. Near the foot of the bluffs where we turned back we saw *C. cordatifolia*, another uncommon local plant.

On Sunday we descended to Lake Chalice and circumnavigated the lake. The special find of this area was the local endemic *Hebe gibbsii* with its very hairy leaf margins and blue green leaves, quite unusual for a hebe. In the forest we saw quite a number of *Melicotus lanceolatus*. This shrub or small tree is widespread but very local in its distribution.

The lake was at a particularly low level and exposed over 3m vertical of rocky shore and a huge area of sands and mud at the head. The muddy areas were covered with a proliferation of the tall yellow flowered cress *Rorippa palustris*. Other species here included *Hydrocotyle hydrophila*, *Potentilla anserinoides*, *Elatine gratioloides* and *Convolvulus verecundus*. The track around the lake was through red and mountain beech forest with a rich diversity of ferns.

On Monday we took the track to Mt Patriarch (Wairau). The whole journey provides spectacular views and many glimpses of the Tasman and Golden Bay coasts. Much of the area is bare rock and scree. In the rock fields there was a rich array of plants including the odd *Celmisia cordatifolia* and *Cheesemaniania latesiliqua*. Near the summit there were large patches of carpet grass (*Chionochloa australis*) containing clumps of *Hebe lycopodioides*. On the summit scree *Haastia sinclairii* and *Hebe epacridea* were quite common. On the return journey we noted several mountain beech seedlings sheltering in the cracks of the rocks on the ridge, sure evidence that the area was once largely beech forest.

Coming Field Trips:

March - Moa Park  
April - Easter camp  
May - Harwoods Hole

**Graeme Jane**, 136 Cleveland Terrace, Nelson

## ■ Rotorua Botanical Society

Recent trips

About 40 people from Rotorua and Waikato Botanical Societies spent Anniversary weekend botanising on the margins of Tongariro Forest. Highlights were some interesting wetlands, lots of *Pittosporum turneri* and *Thismia rodwayi* (in the National Park). Unfortunately wet weather meant most people packed up on Monday.

Te Hopai Island, an area of estuarine vegetation in Tauranga Harbour was visited on the 22nd February by about 12 members. This island supports a diverse vegetation sequence from low-growing mangroves to manuka and includes such species as ngaio, *Coprosma propinqua*, *Olearia solandri* and marsh ribbonwood as well as salt-marsh herbs such as *Sarcocornia*, *Selliera* and *Samolus*.

Upcoming events

15 March Rotokakahi (Green Lake) - Willie Shaw  
Easter Coromandel - Barry Spring-Rice  
17 May Rangitaiki Plains wetlands - Robyn Irving  
20 May Hugh Wilson evening address.

In the December Newsletter (no. 24) contents include articles on:

*Euphorbia glauca* on Little Barrier Island by Chris Ecroyd  
Composition changes in four central North Island forests by Dale S Williams  
The vegetation and flora of Kaharoa Conservation Area by W B Shaw  
Maire tawake (*Syzgium maire*) in the Bay of Plenty by W B Shaw & S M Beadel  
On the rediscovery of *Carex pumila* in the Rotorua Lake Ecological District by Beverley R Clarkson.  
Reporter: Robyn Irving.

**S Beadel**, Secretary, Rotorua Botanical Society, Okere Road, RD 4, Rotorua

## Obituary

### ■ Harold St. John 1892 - 1991

Dr Harold St. John passed away peacefully at his home in Honolulu on Thursday, 12 December 1991. He will always be remembered as a tireless worker and affable teacher of several generations of botany students.

Born 25 July 1892 in Pittsburgh, Pennsylvania, he was the son of a Unitarian minister. He received degrees from Harvard University, completing his doctorate in 1917. During World War I he saw combat duty in France as an officer in the U.S. Army. Afterwards, he began a lifetime career of world travel to teach botany, collect plant specimens, do research, and write and publish botanical books and papers. He spoke five languages and wrote and worked in seven.

From 1920 to 1929 he taught at the State College of Washington in Pullman. He moved to Hawaii in 1929 where he taught botany at the University from 1929 to 1958, serving as department chairman for many years. In 1971 he was honored by the University when the Plant Science Building was named for him.

Dr St. John's other accomplishments are numerous and varied. He aided in the transfer of Foster Gardens to the City of Honolulu. He taught at Yale as an exchange professor in 1938-1939. From 1953 to 1958 he served as associate director and then director of the Lyon Arboretum in Honolulu. During World War II he searched for quinine in the mountains of Colombia for the U.S. Foreign Economic Administration. For the Atomic Energy Commission he did studies on radiation effects on vegetables. After he retired from the University of Hawaii, Dr St. John taught at Chatham College, and then, from 1959 to 1961, as a Fulbright professor at the University of Saigon and the College of Hue in Vietnam, and at Cairo University, Egypt. He received professional awards from the American Association of Botanical Gardens and Arboreta, Garden Club of America, Hawaiian Botanical Society, and Pacific Tropical Botanical Garden.

From 1929 to 1991 he was also a research associate at Bishop Museum. He was a fixture at the Herbarium Pacificum throughout these years, and he essentially moved over to the Museum lock, stock and barrel after he retired from the University. The Museum provided a place to work and unrestricted access to the collections upon which he based his numerous publications. He was an active participant in Museum functions and regularly worked eight to ten hours a day, six days a week up until the fall of 1990 when failing health forced him to slow his pace.

With his wife, Betty, he had a happy family life. They raised four children, many of whom accompanied him on field trips. Friends will remember Dr St. John as a man always ready to "talk story" and tell wonderful anecdotes about his life and the people he knew.

He is survived by his four children, 11 grandchildren and five great-grandchildren.

**Herbarium Pacificum News**, volume 9 No. 1 (1992)

## Other News

### ■ Herbarium fees

At the ninth New Zealand Herbarium Curators Meeting held in November 1991 it was decided that New Zealand herbaria would charge \$50/day for commercial use of herbarium resources. Because individual cases will always be different (i.e. some people deposit specimens as well) the final decision on charging would rest with each herbarium curator.

**Anthony Wright**, Chair, New Zealand National Herbarium Network, Auckland Institute & Museum, Private Bag 92018, Auckland

### ■ *Cordyline* sudden death breakthrough

On 4 December 1991 the Minister of Science (DSIR), Mr Marshall announced that the DSIR research team led by Dr Ross Beever and Dr Richard Forster may have found the cause of *Cordyline* sudden decline. A scientific team at Mt Albert DSIR believe a type of mycoplasma-like-organism (MLO) is involved. MLO's

are procaryotic organisms lacking a cell wall. The scientists have yet to confirm the vector which spreads the MLO but they suspect the Australian vine hopper. The MLO may be exotic or the same as the MLO that causes flax yellow-leaf disease.

#### **Editor**

#### **■ New University Schools**

##### Auckland

On 1 June 1991 Professor Dick Bellamy was appointed Director of a newly formed School of Biological Sciences (SBS) at the University of Auckland. Professor Peter Lovell (HOD Botany) has been appointed deputy Director (curriculum and teaching) and Sandra Jones (secretary of Auckland Botanical Society) as Assistant Registrar. During 1992 the previous four departments of Biochemistry, Botany, Cellular and Molecular Biology and Zoology will be phased out and some eight new groups according to research interests will be formed. Most botanists appear to be heading towards a Plant Science group and the ecologists towards a Conservation group. The new School has about 140 academic, administrative and technical staff, and a similar number of graduate students. The School aims to reorganise the early stages of undergraduate teaching, coordinate graduate activities better and improve its efficiency in handling large student numbers. A restructured first year curriculum is expected to be introduced in 1993. No new space has been allocated.

Note: University of Auckland has a new phone number (0-9-373 7999) and a Private Bag number (92019); and the Botany Department has a new fax number (0-9-373 7416).

##### Massey

On 1 January 1992, the then Department of Botany and Zoology was divided into two departments: the Department of Plant Biology (Acting H.O.D. - Dr D W Fountain) and the Department of Ecology (Acting H.O.D. - Dr Robin Fordham). These new Departments will, together with the established Department of Microbiology and Genetics (H.O.D. - Associate Professor T J Brown), form the core of a School of Biological Sciences, headed by Associate Professor Brown. The School is expected to expand by the addition of kindred spirit individuals or groups within the University and will be responsible to the Science Faculty (Dean - Professor G N Malcolm).

The Department of Ecology is responsible for a range of biological, ecological, environmental and zoological courses. Their research interests focus on ecology, conservation biology, entomology and limnology, they will be looking for cooperative ventures with colleagues elsewhere in research areas of common interest.

#### **Editor**

#### **■ Revegetation project for Motutapu Island**

On 1 March 1992 the Duke of Edinburgh, who is the international president of the World Wide Fund for Nature (WWF) launched the revegetation project for Motutapu Island in the Hauraki Gulf. The Duke's visit marked the establishment of a native plant nursery on the island. Sponsored by WWF, the nursery will provide trees for the replanting of Motutapu. It is part of an ambitious project that began with the poisoning of wallabies and possums on Rangitoto and Motutapu Islands during the sesqui centennial in 1990. It is a community project directed and managed by the Department of Conservation in partnership with tangata whenua and supported by major sponsors including WWF and Air New Zealand.

The project involves a long term vision (50 years) to restore Motutapu and Rangitoto as island sanctuaries. Together the two islands have the potential to become the largest predator-free land mass (3880 ha) in New Zealand. Reafforestation will go hand in hand with the protection of the many prehistoric and historic sites and landscapes on Motutapu. The Auckland Botanical Society has been promised input into the plan at an early stage.

#### **Editor**

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## NOTES AND REPORTS

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### Herbarium reports

#### ■ Auckland Institute and Museum Herbarium (AK) Report for period 1 April 1990 to 30 June 1991

The highlight of the year was the accessioning of the herbarium's 200,000th numbered specimen, celebrated with an Artillery morning tea for staff and volunteers on the Museum rooftop. With as-yet unregistered collections, the herbarium now contains over a quarter of a million specimens. Processing of both a record number of accessions and a record number and volume of loans could not have occurred without the AKILLES electronic herbarium management system. Jack Mackinder is now almost fully committed to loan processing and system maintenance causing the buildup of a substantial backlog of specimens requiring labelling and registration. Amongst minor enhancements of the AKILLES system made this year is a very useful one allowing automatic generation of latitudes and longitudes from metric map grid references.

The major project to curate and register the herbarium of the late J. K. Bartlett is nearing completion. The New Zealand Lottery Board has generously funded temporary staff (mainly Marcel Smits) and computer hardware and software to a total of \$77,500 since 1986, without which the project could not have proceeded. Over 15,000 individual collections of bryophytes and lichens have been packeted, mounted, labelled, registered and incorporated into existing Museum collections.

A second large project - to add the pre-1989 herbarium specimens to the AKILLES electronic database, has also received generous support from the New Zealand Lottery Board. An initial grant of \$70,000 plus GST has allowed purchase of a larger computer and trials of data capture from the backlog of specimens. It is estimated that this grant will enable databasing of over 25,000 backlog records. A third computer has been installed to service administration, publication and research needs.

Substantial progress was made with the Fern Atlas Project which has also been supported by the Lottery Board. Marcel Smits and I spent 3 weeks in the South Island mapping the fern specimens in the Otago, Canterbury and Lincoln University herbaria. A start has been made on extracting records from the DSIR herbarium at Lincoln - the final collection to be processed. Work will now concentrate on production of the final maps for the distribution Atlas.

Physical development of the Botany Department has now been completed within the existing space constraints. The department has been painted and carpeted this year, and improved lighting, venetian blinds and a raised floor (over the mobile shelving rails from the main corridor access) have been installed.

Fieldwork and collection of herbarium specimens were carried out on expeditions to Little Barrier Island (organised by the DSIR), Tongariro (University), Moturoa Island (Auckland Botanical Society), north Whangaroa Harbour (Department of Conservation), Hen Island (Offshore Islands Research Group), Waipoua (Auckland Botanical Society), Poor Knights Islands (Department of Conservation) and Poutu (Auckland Botanical Society) as well as on the regular monthly field trips of the Auckland Botanical Society. Fieldwork and extensive specimen collection were also associated with an orchid workshop on Karikari Peninsula and lichen workshops in Fiordland, Cass and Nelson.

Lectures and talks were given to the third year Botany students at the University of Auckland, the Auckland and Rotorua Botanical Societies, the pupils of Waima and Huapai Schools, the Auckland Regional Botanic Garden apprentices, and the Northern Branch of the Institute of Noxious Plant Officers.

Many hundreds of public enquiries were answered and assistance was given to numerous community, local government and central government organisations. Considerable effort was devoted to the preparation of a Management Plan for the grounds of Government House in Auckland - the culmination of many years of endeavour by several people. The Auckland Regional Council Parks Department was advised on the development of a Restoration and Management Plan for the Mt Smart fernery. A series of lichen specimens were identified (for a fee) for an environmental consulting company monitoring industrial atmospheric pollution. The Department of Conservation was assisted with numerous projects - most notably in scoring New Zealand's rare and threatened plant species for a priority ranking system to assist in their management.

The past year has been the busiest ever in this department - there were regularly up to 10 staff and volunteers working in the herbarium. Marcel Smits was employed for the whole of 1990 to work on the Bartlett collection and the Fern Atlas. Anne Hume has completed almost four years of temporary employment on a variety of projects, and has been a greatly valued personal assistant. Latterly she has worked on the Herbarium Backlog Databasing project with Alastair Jamieson, Mark Large and Margrit de Mann. Rhys Gardner has continued to voluntarily identify plant specimens and incorporate the new vascular plant specimens into the herbarium, while Joan Dow, Chris Mackinder and Meryl Wright mounted all new accessions.

It is now virtually impossible to juggle the efforts of temporary, research grant funded staff, volunteers and the one and a half permanent staff to *maintain* the departmental workload, let alone make advances. Additional permanent staffing is urgently required to adequately maintain a collection of this size and level of usage.

<i>Statistics</i>	(15 months)	(1989-90 12 months)
Accessions of numbered herbarium sheets		
31 June 1991	202186	
31 March 1990	<u>190657</u>	
Increase	11529	(7728)
Records on AKILLES electronic database		
30 June 1991	31981	
31 March 1990	<u>9112</u>	
Increase	22869	(777)
Exchange specimens		
Outwards 724 specimens to 9 herbaria		(735 to 8)
Inwards 1184 specimens from 6 herbaria		(332 from 5)
Loans of specimens		
Outwards 53 [3182 specimens] to 21 herbaria		(36 [974] to 13)
Inwards 18 [1558 specimens] from 11 herbaria		(6 [376] from 4)
Total number of specimens out on loan 4445		

**Anthony Wright**, Curator of Botany, Auckland Institute & Museum, Private Bag 92018, Auckland

■ **Herbarium (CHR), Botany Institute, DSIR Land Resources Report for period 1 July 1990 to 30 June 1991**

The first reorganisation of DSIR, 1 April 1990 from 22 into 10 divisions did not disrupt the work of the Herbarium to any extent. The establishment of the Foundation for Research, Science and Technology (in 1989 to fund science) and the subsequent restructuring of science generally (DSIR, Ministry of Agriculture and Fisheries, Forestry etc) in New Zealand since October 1990, has meant that much time has been spent coping with administrative and funding changes. These changes will continue at least until ten new crown research institutes come into existence on 1 July 1992. The Herbarium and botanists associated with it, are likely to experience less disruption than other science facilities in New Zealand. The Herbarium (CHR) in Christchurch will join administratively with the Fungal Herbarium (PDD), and the National Arthropod Collection, both at DSIR Plant Protection, Auckland, in the proposed National Institute for Land Environments (NILE).

**Identification Service**

This year our taxonomists determined 363 specimens. This is again a slight increase since the policy of charging for identifications ceased in August 1989. Plant identification is free except for forensic purposes and when clients profit commercially from the determination.

**Cabinet purchases**

We have been very fortunate this year to be able to purchase with DSIR Land Resources money, 100 half cabinets to completely relocate the Fern and Gymnosperm collections into their new area. A grant from Lottery Science of \$19,000 allowed us to order two loans cabinets (with shelves rather than pigeon holes), one tall and two short cone and fruit cabinets (modified to house larger specimens) and 25 half cabinets.

### Rearrangement of Angiosperms

With the purchase of sufficient new cabinets, the Angiosperm collections have been rearranged into a more modern classification as used in Flora volume IV. This classification is modified from the system given in Dahlgren, R. 1983, *Nordic Journal of Botany* 3: 119-149; and Dahlgren, R.; Clifford, H.T.; Yeo, P.F. 1985, "The Families of the Monocotyledons", Springer-Verlag, Berlin. The previous classification had been based on Hutchinson, J. 1926-1934, "The Families of Flowering Plants", Oxford.

### Friends of the Herbarium

This year six volunteers have contributed 2562 hours to the general curation of the herbarium, helping with relocating collections, mounting, exchange and mapping. We appreciate this help to allow us to continue to provide a service to the staff and visitors.

### Electronic Data Processing CHIRP (Christchurch Herbarium Information storage and Retrieval Project)

All new specimen accessions have been processed into CHIRP, and labels printed for the specimens. Attempts at retrieving information, however, have been frustrated by 'bugs' and other problems. The Database has been rebuilt four times, allowing the operator of CHIRP database little time for progress on the backlog of specimens. Some 1200 Rare Plant records supplied by David Given have been placed on the database so that this information can be made available to the Department of Conservation (DoC). A Lottery Science grant of \$45,000 has enabled a graduate to be employed for a year from December 1990 to make some headway on the backlog.

### Staff

Mrs Elizabeth Woods, who started as Technician in the Preparation Room on 15 April 1985, retired on 2 May 1990. Liz's last major task was mounting beautifully the 89 Banks and Solander (1769-1770) specimens sent from the BM. We were fortunate to be able to replace her with Kerry Ford who joined the Herbarium team on 29 July 1991.

### Loans

Forty eight inward loans of 3301 sheets were received from 15 institutions and thirty four outward loans of 1456 sheets were made to 21 institutions. The majority of incoming loans were for the revision of grasses for the Flora of New Zealand series by Dr E. Edgar and Dr H.E. Connor and the Orchidaceae for Dr B. Molloy.

### Exchange between Herbaria

A total of 742 specimens were received in exchange from 13 herbaria. Larger (100 or more) consignments were received from AK, CTES (Argentina), FR (grasses), NSW and US (Pacific Islands). The Herbarium staff made a special effort to collect duplicate specimens this year and 1614 sheets were sent in exchange to 31 institutions.

### Visitors

Sixty five visitors have worked in the herbarium on the collection this year. The overseas visitors are: A. Hay, R. Coveny and Sir Otto Frankel from Australia, David Galloway from BM London, and David Glenn, Solomon Islands.

Sixteen larger groups, from schools, tertiary education institutes, garden and rotary clubs have visited to see the displays and to learn of the botanical work being carried out here.

### Annotated Checklists of New Zealand Plants

The checklist of New Zealand lichens written by David Galloway (BM) is being edited for publication. The first draft of the checklist to wild dicotyledons of New Zealand has been completed. It is now being edited and checked. It is believed that these checklists will be an appropriate way of communicating accepted name changes to the botanical public. These checklists, which will include synonyms, will be maintained by the Herbarium staff according to the current practice used in our Herbarium where changes come about under the direction of the various taxonomic specialists in New Zealand. In some cases the checklists will be maintained by the taxonomists involved in their special groups. These checklists will provide a statement on current botanical taxonomic knowledge and will serve to emphasize those areas that require taxonomic revision. Information from these checklists is available on request.

**Murray J. Parsons**, Keeper and **Bryony Macmillan**, Assistant Keeper, Botany Institute, DSIR Land Resources, Private Bag, Christchurch

## Current Research

### ■ Botanical observations on Atiu, Cook Islands

#### Botanical history of Atiu

The written record of the plants of Atiu starts with the Journal of Captain James Cook on his third voyage in 1777, where a few of the commonest and most useful plants were mentioned (Beaglehole 1967, pages 831-843). Almost nothing of significance was written during the nineteenth century, the brief observations on the vegetation by the missionary Wyatt Gill (1876, 1885) constituting almost everything that I have unearthed. Since then only fragmentary or incidental botanical observations have appeared in reports and books. Most of these are concerned with agricultural and forestry developments since the 1940s (Joliffe 1953 & 1957). The principal activity in this sphere was the creation of the pineapple and coffee industries. Thus, there is still no published flora or even a comprehensive list of species which grow on Atiu. My observations result from a short visit in July 1974 and a longer one in July and August 1991. In this short account I have concentrated upon the makatea (raised coral reef) habitat because the indigenous flora is best represented there, as well as singling out important groups and families for special attention.

Adventive vascular plants now predominate in most areas of volcanic soil and some have invaded the makatea, especially along tracks. Their total number exceeds that of the indigenous species, of which there are about 122. The main threats to the indigenous flora of the makatea are the vines *Passiflora rubra* (red passion fruit) and *Mikania micrantha* (mile a minute), because these cover the rocky surfaces and smother any plants already there. This process can happen within two or three years along a track. By comparison, adventive trees, shrubs and low herbs do not seem to be nearly as serious, although a number are present on the makatea.

#### Geography

Atiu Island is roughly at latitude 20°S and longitude 158°W, and is 214 km NE of Rarotonga. The ancient name of the island was apparently Enu-Manu, which may refer to the fact that Atiu has a richer bird life than most other islands in the Cooks. Along with neighbouring Ma'uke and Mitiaro, Atiu is one of the makatea islands of the Southern Cooks, the three comprising the Ngaputoru Group. The only other land in the vicinity is Takutea, a coral sand cay only about 15km from Atiu. Each of the three makatea islands has a band of raised coral or makatea around the perimeter, usually rising steeply for several metres from the present reef, although there are a few small bays with beaches of coral sand. On the inward side of the makatea there are often swamps or even lakes formed by water draining from the volcanic central area. The last is very reduced on Mitiaro and best developed on Atiu where the surface rises gently to the plateau-like top about 70 m a.s.l.

The red volcanic soil is often badly eroded in the central part of Atiu and the vegetation there is almost totally modified, a large proportion of the surface consisting of fernland dominated by *Dicranopteris linearis* (tuanu'e or stag's horn fern). Some of this fernland was planted with pineapples some years ago but since the abandonment of the fields the area has been covered with naturalised introduced legumes, as outlined below. The plateau-like top is also the site of the five interconnected villages where the people of Atiu live.

There is now a coastal road right round the island and this makes access to the coastal makatea easy, but there are only about seven roads or tracks through the inland makatea to the volcanic interior. This makatea is very rough and jagged and usually very difficult to negotiate. The swamps are the sites of extensive taro plantations and the volcanic slopes are likewise often cultivated with a variety of crops; especially *Xanthosoma sagittifolium* (tarua), *Manihot esculenta* (maniotā or tapioca), *Coffea arabica* (coffee) and *Musa* hybrids (bananas).

#### Makatea flora

The makatea vegetation can roughly be divided into coastal and inland, although the transition from one to the other is gradual (Sykes 1976). In addition, there is a big difference between the more exposed eastern side and the more sheltered western side, this being well illustrated near Te Tau at the southern end of Atiu. On the eastern side there is a low horizontal scrub of *Pemphis acidula* (ngangie), *Scaevola sericea* (nga'u), *Euphorbia atoto* (totototo), and *Phyllanthus societatis*. This area is also dotted with low

*Pandanus tectorius* (ara). This community abruptly gives way on the western side to tall forest of *Casuarina equisetifolia* (toa or ironwood), *Barringtonia asiatica* (utu), *Hernandia nymphaeifolia* (puka), *Guettarda speciosa* (ano), and to a lesser extent *Cocos nucifera* (coconut). Along the western coast *Pemphis*, *Scaevola* and *Euphorbia* only form a narrow and often broken band of vegetation, and *Phyllanthus* is nearly always absent. Trees such as the *Casuarina* often occur right up to the seaward edge of the makatea and this species also grows from the coast to the top of Atiu. Recent palynological evidence suggests that it was probably introduced by early Polynesian people, whereas in the same study the record for coconuts extended back before the beginning of human occupation (Annette Parkes, University of Hull, pers. comm.).

The interior makatea forest is often dominated by *Elaeocarpus tonganus*, which on Atiu is called either rare or kuana according to whether or not the ageing leaves turn yellow or red. This distinction is said to be correlated with different timber qualities, but flowers and fruits seem identical. This forest contains the majority of the indigenous woody plants, although some of them, e.g. *Allophylus timoriensis*, *Celtis pacifica*, *Ixora triflora* and *Planchonella grayana* are uncommon. *Hernandia nymphaeifolia* is replaced by *H. moerenhoutiana* (turina), but *Pandanus* remains common. *Cyclophyllum* (*Canthium*) *barbatum*, often called orotea, is often the dominant woody plant in the understory, whilst small trees such as *Glochidion ramiflorum* agg. (makai), and *Xylosma suaveolens* subsp. *gracile* are common. Two widespread makatea species which eventually form large trees are *Calophyllum inophyllum* (tamanu), and *Cordia subcordata* (tou), but both are keenly sought after for their timber and are not as common as formerly.

#### Floristic differences between Atiu and its closest neighbours

Although Mitiaro is only about 50 km from Atiu the makatea scrub and forest there are surprisingly different. *Elaeocarpus* is absent on Mitiaro, whilst *Alyxia stellata* (maire rakau), *Geniostoma sykesii* (ange), *Haloragis prostrata* subsp. *coquana* and *Pittosporum rarotongense* (kavakava) are absent from Atiu although common or abundant on Mitiaro. The jute relative *Corchorus torresianus*, *Phyllanthus societatis* and *Tournefortia argentea* (tau'unu), usually treated as *Messerschmidia argentea*, are localised on Atiu but are widespread on Mitiaro. The last is one of the most widespread tropical Pacific island plants and has the distinction of being the only indigenous woody plant on Ducie, the easternmost of the Pitcairn Group. On the other hand, its herbaceous relative and ecological associate, the sweetly scented *Heliotropium anomalum*, is often common on Atiu. Although the Orchidaceae is amongst the largest families of flowering plants it is very poorly represented in the Cooks. The two species present on Atiu mainly grow on makatea. *Taeniophyllum fasciola*, is a small stemless epiphyte, whose flattened green photosynthetic roots are occasionally seen on coconut tree trunks. *Nervilia aragoana* (pia rau ta'i), is a terrestrial species with orbicular-cordate leaves and apparently only grows in a small area of makatea in the south-west of Atiu. It is a valued medicinal plant.

The dominant plants on little Takutea are also common on Atiu, but it has two species amongst the 29 vascular plants that I noted in 1974 that are apparently absent on the larger island. This is almost certainly partly because there is no makatea on Takutea. Thus, the shrubby *Suriana maritima* on Takutea also grows on many atolls to the north as well as on Mitiaro, but on Atiu it is completely replaced by its ecological counterpart *Pemphis acidula*. Although botanically unrelated and easily distinguished from each other, they are both called ngangie in the Cooks, apparently because their hard wood was used for similar purposes. *Hedyotis romanoffiense*, a little shrublet with large pinkish or white fleshy berries, never grows on makatea and is solely an atoll species. On Atiu it is replaced by *H. foetida*, a makatea plant with the little dry capsular fruits that are usually found in this genus.

#### Poaceae (grasses)

There are about 8 indigenous grasses on Atiu and the other makatea islands of the Cooks. Most of them grow on the coastal makatea. Trailing *Lepturus repens* and *Stenotaphrum micranthum* are often common, whereas the tufted *Ischaemum byrone* is rare and apparently confined to a small area in the north-west. The last has an interesting wider distribution; makatea islands of the Southern Cooks, Aitutaki (very rare and local), Austral Islands, and Hawaii. The Cook Islands/Hawaiian connection, which may or may not include one or more of the Australs, is also shown by several dicotyledonous plants (Sykes 1987, 1990). A second grass which has this distribution is the montane *Isachne distichophylla* on Rarotonga. The other indigenous grasses on Atiu, including the *Lepturus* and *Stenotaphrum*, are widespread in the South Pacific, but there is some uncertainty as to the nativity of four of them. On the other hand, 26 species of indisputably adventive grasses grow there. Some of the last group are very prominent and often dominate the herbaceous communities along roadsides, around plantations and houses and in gardens. The majority were probably present before 1950 but a few seem to have appeared since then and have increased rapidly

since, for example *Digitaria fuscescens* and *Paspalum paniculatum*. The former is now a prominent component of mown areas in Areora District.

Five or six species, mainly bamboos, are cultivated and not wild, except for the giant bamboo *Schizostachyum glaucifolium*. Of the other cultivated grasses, one is *Cymbopogon citratus* (lemon or citronella grass) and another is the scented *Vetiveria zizanioides* (a'i or vetiver grass). The last is now being propagated for establishment on the erosion-prone volcanic soils.

#### Wetland flora

Grasses are also sometimes prominent in the lakeside and swamp communities, especially the indigenous *Paspalum orbiculare* (mata), a widespread species shared with New Zealand. However, the Cyperaceae is much more often the dominant family in these habitats, although nowhere is there a comparable situation to that on Mitiaro where many hectares of swamp are covered by *Cladium jamaicense* (kutikuti), almost to the exclusion of all other plants. Kutikuti is present in several swamps on Atiu and there it usually grows with an even taller sedge, *Schoenoplectus californicus*, whose stems rise to c. 3 metres above the mud. As far as I can tell, this widespread American species has a very scattered distribution in Polynesia, possibly only occurring on Mangaia and Rapa (the most southerly islands in the Cooks and Australs respectively), as well as Easter Island. This is the well-known totora of the crater lakes on Easter Island. Its long and soft flexible stems have given rise to the story that *Typha* (raupo), grows in the Cooks.

One of the most abundant wetland species is the introduced *Ludwigia octovalvis* (pitorea) which forms great semi-floating mats with well-developed fleshy pink root pneumatophores in the mud or water. A temperate aspect is occasionally provided by *Polygonum glabrum* (tamore), whose inflorescence of pale pink flowers and lanceolate leaves resembles those of species such as the European *P. lapathifolia* and *P. persicaria*. Hydrophytic members of the Scrophulariaceae are known from most tropical and temperate countries, including New Zealand. The two species growing in the Cooks are both widespread in the tropical Pacific and have long been valued as medicinal plants. *Lindernia crustacea* (tutae torea), is a small herb with violet bilabiate flowers which grows on Mangaia, Aitutaki and Rarotonga as well as Atiu, usually around taro beds and other swamp margins. On the other hand, *Limnophila fragrans* is very rare in the Cooks and the only collection is my recent one in the Mapumai Swamp on Atiu. Yet this little herb with white almost regular flowers is well enough known locally to have the Atiuean name mapua (Whistler 1990), so I was not too surprised to see it.

#### Fabaceae (Leguminosae)

The largest family of plants on Atiu is the Fabaceae. There are 45 species wild or significant in cultivation. Of these 27 are adventive, 10 are only in cultivation and 8 are most probably indigenous. Members of the last group mainly grow on the makatea and include the coastal *Sophora tomentosa* (utukava). This is not however closely related to the three New Zealand kowhai. Most other indigenous legumes are lianes or trailing vines. *Caesalpinia major* (tataramoa), is a very thorny scrambling plant with large yellowish seeds which, like those of the utukava, are known to be dispersed for long distances by ocean currents.

*Mucuna gigantea* is an uncommon liane on Atiu and has very thick gnarled rope-like stems from which arise the long pendulous inflorescences bearing terminal clusters of beautiful pale lime green flowers. This species also grows in a few of the valleys on the volcanic slopes above the swamps amongst the dominant *Hibiscus tiliaceus* (au). Swamp margins and open places near the bottom of these slopes are the habitats of *Vigna adenantha*, a vine with large pink and white curled and twisted corollas very reminiscent of the *V. caracalla* (snail vine) sometimes cultivated in New Zealand. Both species have been usually treated in *Phaseolus*.

The majority of the adventive legumes on Atiu were originally introduced for forming pastures, developing a timber industry or to serve as shade trees in coffee plantations. The commonest of these trees is *Paraserianthes falcataria* (*Albizia falcataria*) whose flat tops are conspicuous in some of the valleys. This and other species were introduced in the early 1950's for a forestry project (Jolliffe 1953 and 1957), whereas *Adenanthera pavonina* (pitipiti'o), may have been brought to Atiu before European contact. The glossy scarlet seeds of the latter are often roasted and eaten like peanuts or used in necklaces.

Areas of abandoned pineapple plantations are now often covered with the matted roots of the leguminous *Stylosanthes guianensis* (stylo), which like the trailing and twining *Calopogonium mucunoides*, *Centrosema pubescens* and *Pueraria phaseoloides* were introduced for pasture-formation. *Clitoria*

*ternatea* has a similar habit but this beautiful blue-flowered legume was probably an earlier introduced ornamental. Two shrubs in the family which were introduced for providing fodder are *Crotalaria anagyroides* and *Tephrosia candida*, both sometimes forming dense thickets on open areas on the volcanic slopes. The largest genus in this family is *Desmodium* with five species, all being small herbs which grow in very modified habitats such as lawns, plantations, roadsides and waste places generally. Probably all are adventives.

A few common or fairly common introduced ornamental legumes never seem to grow spontaneously, notably the beautiful *Delonix regia* (flamboyant) and *Albizia saman* (*Samanea saman*), commonly known as rain or monkey pod tree. In several places a small shrub with a very unleguminous appearance is now cultivated; *Flemingia strobilifera* which has simple leaves which resemble a member of the Fagaceae. Its little pea-shaped flowers are completely enveloped in large inflated papery bracts which also bring to mind a catkin in this family.

### Pteridophyta

26 species of pteridophytes are now known to grow on Atiu. Thus it has many more than the four or five species which one would expect on a central Pacific atoll, but not as many as would occur on a high volcanic island. In comparison, Mitiaro has only 14 species. The distribution of this group of plants on Atiu is interesting; 12 species are restricted to or mainly occur on makatea, growing in coral cracks and crevices or on the lower parts of the often gnarled trees. The occurrence of pteridophytes is influenced by the degree of insolation and exposure to salt-laden winds. Often the only fern present near the more open coasts is *Phymatosorus grossus*, whose thick green rhizomes and leathery fronds are very like our Australasian *P. diversifolius*. In contrast, *Nephrolepis biserrata* mainly grows in shady and sheltered sites on the inland makatea and has thin rhizomes and very membranous fronds.

Two large basket ferns grow epiphytically or on the coral rock. *Asplenium australasicum* is common but *A. nidus* is much less frequent. The two species have often been confused or simply all called *A. nidus* in the Cooks and elsewhere, including New Zealand. The commonly grown basket fern in New Zealand is not *A. nidus* but *A. australasicum*. The "basket" of *A. nidus* is shallower and wider and its fronds have a rounded midrib beneath, unlike the acutely keeled one of *A. australasicum*.

The finely dissected *Asplenium robustum* has a very different appearance but is likewise widely distributed in the tropical Pacific. In the Cooks it is common on the Atiu makatea but rare and local elsewhere, being only known from a small area of makatea on Ma'u'ke and in a few high valleys on Rarotonga. Conversely, *A. polyodon* is a common makatea fern on Mitiaro but seems to be absent from Atiu. Surprisingly, *A. polyodon* is confined to this habitat in the Cooks (it is also on Mangaia) and never grows in moist forests as it does in New Zealand. A recent re-examination supports their treatment as a single species.

On the volcanic soils of Atiu the commonest pteridophyte is easily *Dicranopteris linearis* (tuanu'e or stag's horn fern). This forms large dense stands on the upper open slopes and is the main or often sole component of the "fernland" there. The next commonest plant is *Lycopodium cernuum* (vai titirangi) which grows up through the tuanu'e in places and appears identical to the New Zealand plant. This "fernland" is most likely to have developed as a response to burning of the vegetation in the distant past and, as elsewhere in the region (Beagle 1967, p.829), it was presumably present at the time of European contact. The Atiuean fernland is poorer in associated species than that on Mangaia and Rarotonga and I could not find any *Dodonaea viscosa*, *Dianella intermedia* or *Cymbopogon refractus* (barbed wire grass), which grow in or around the fernland on these larger islands.

The richest habitat for pteridophytes on Atiu is in the bottom of two small valleys on the upper volcanic slopes just below the villages, where beneath a canopy of *Hibiscus tiliaceus* (au), *Mangifera indica* (mango) and *Syzygium cuminii* (jambolan), small temporary streams flow down into the taro swamps. Four species of fern growing on these moist shady stream banks are unknown elsewhere in the Ngaputuro Group, but are characteristic species of moist valley bottoms beneath the high volcanic peaks on Rarotonga. This streamside habitat is very small and restricted on Atiu so it is not surprising that several of these ferns are very rare there. Only a few plants of the three largest species were seen; these being *Angiopteris evecta* (Marattiaceae) ('ana'e), *Macrothelypteris torresiana* (Thelypteridaceae) and *Hypolepis tenuifolia* (Dennstaedtiaceae). The last has often been recorded for New Zealand but the true species is now considered not to occur here. Many of the plants once thought to be *H. tenuifolia* are now treated as *H. dicksonioides* (Brownsey 1987). Interestingly, both species have recently been identified from Rarotonga; *H. tenuifolia* is mainly a lowland valley bottom plant and *H. dicksonioides* is from high ridges in the cloud zone. In the NZ Botanical Region *Macrothelypteris torresiana* is confined to Raoul Island of

the Kermadec Islands. *Angiopteris evecta* is strictly tropical. The other fern restricted to this habitat on Atiu is *Bolbitis lonchophora* (Lomariopsidaceae), a fairly common small plant with a very distinctive fertile frond. The most abundant ferns in this habitat however are smaller thelypterids, one of them being very similar to, if not conspecific with, *Christella dentata* from the Kaitaia area, in New Zealand. This is a species of disturbed and modified places in the Cooks and is often confused there with *C. parasitica*, but, in addition to morphological differences, the two are ecologically separated with *C. parasitica* mainly growing in less modified habitats.

### Endemism and rarity

Endemism is low in the Cook Islands as a whole and at a minor level. There are no taxa endemic to Atiu and probably only one to the Ngaputoru Group. Also, within the Cooks there are few indigenous species which are found mainly or only in the Ngaputoru Group, *Limnophila fragrans* has already been mentioned, but in 1991 I had two or more interesting finds in this category. Both grew in coastal makatea forest. *Ximenea americana* is a widespread tropical species in the small family Olacaceae which is only known otherwise in the Cooks from Penrhyn Atoll in the far north. The second plant was *Terminalia glabrata* var. *paulayi*, recently described from nearby Ma'uke. But the fruiting specimen I collected suggests that it is misplaced in this East Polynesian species and has much more in common with *T. samoensis*. The latter species is widespread from the Celebes and New Guinea to the Society Islands. *Acalypha lanceolata* is a rather inconspicuous, small-leaved, nettle-like herb of uncertain status which I only saw in a disused makatea pit in a remote part of Atiu. Its appearance is thus very different to the attractive, large-leaved, ornamental *A. wilkesiana* (copperleaf), which is so abundantly used for making hedges throughout tropical Polynesia. The only other species of this euphorbiaceous genus in the Cooks is the endemic Rarotongan *A. wilderi* which was collected in 1899 and 1929 and has not been found since, despite intensive searching during the past two decades.

### Conclusion

This study on Atiu is part of a project to write a Flora of the Cook Islands. Atiu is a key island in the outer Southern Cooks. It has an extensive area of relatively undisturbed makatea which has been poorly recorded, and a history of plant introduction which has been more comprehensive than other islands in the Cooks apart from Rarotonga and Aitutaki.

### Acknowledgments

Many people on Atiu assisted me in various ways during my visits. In particular, I am grateful to past and present members of the Agriculture Department, especially Teura Maka Kea and Upoko Simpson. Also I thank Va'ine Moeroa for his advice on Atiuean names, Rev. Father Edwin of the Catholic Mission for samples of *Elaeocarpus*, and Kura and Roger Malcolm for encouragement, advice and assistance throughout my stay in 1991.

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## Biography/Bibliography

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### ■ Biographical Notes (5): Frederick Hamilton Spencer (1854-1932)

The Rev. F. H. Spencer was born on 14 Nov. 1854 at Te Wairoa, Tarawera. His father, the Rev. Seymour Mills Spencer CMS, and his mother, Ellen Stanley Spencer, were Americans. They had gone to England in 1840 to further their training for work amongst the Maori. After studying at the Church Missionary College, Islington, they arrived in Auckland as Anglican missionaries in 1842 (1,2,3,4).

In his very interesting "Reminiscences of an old New Zealander" (1) Frederick recalls boyhood visitors. During Dr Hochstetter's visit in 1859, there was an excursion to Lake Rotomahana; and at Christmas, 1865, Sir George Grey arrived, tested Frederick's Latin, and offered him a cadetship in the Royal Navy which was also declined. The Rev. John Kinder came to stay that summer too, painting and photographing; and Frederick went to Lake Okataina with him, acting as interpreter. This visit led to Frederick's enrolment at the Church of England Grammar School in Parnell, Auckland, of which Kinder was Head. Here he could well have been instructed in Natural History by T. F. Cheeseman (1846-1923) who was certainly a visiting master at a later date (5).

After leaving school in 1870 Frederick worked on farms in the Bay of Plenty, and then joined the Armed Constabulary in 1874. While stationed at Waikaremoana (where one of his duties was to look after the library) he climbed Panekiri Bluff with Archdeacon (later Bishop) W. L. Williams (*Carmichaelia williamsii*) and collected plants. In Oct. 1875 he left the constabulary, and at the beginning of 1876 began studying for the ministry.

Bishopdale Theological College, Nelson, which Spencer attended from 1876 to 1879, was founded by Bishop Suter in 1868 and closed in 1908. There were never more than about seven students in any year. Much time was devoted to Latin and Greek; but the Bishop loved botany and engaged Dr Leonard Boor, Medical Superintendent of the Nelson Hospital, to lecture on the subject, believing that it would train the students in analytical reasoning (6).

In the New Year of 1879 Spencer walked to Paengatotara near Motueka to stay with a fellow student, Charles Jennings, and together they collected plants on the Mt Arthur Tableland and climbed Mt Arthur. Spencer sent his collection to Thomas Kirk and in reply Kirk invited him to call when in Wellington. Accordingly, in the following September, while in Wellington with the Provincial Rugby Team, Spencer visited the Kirks and "had some good botanical chats" (1).

In Sept. 1879 Spencer was ordained deacon having graduated Bachelor of Theological Studies (N.Z.); and from then until 1882 he was curate at Collingwood (4). On 30 Jan., 1880 he went by sea to Westport where he stayed with Rev. E. Cross and preached (1). They collected plants on the Denniston Plateau, and also on Mount Rochfort, where Spencer gathered a novel gentian, later named *G. spenceri* by Kirk who wrote: "I have only seen two specimens of this curious plant, both of which are too far advanced to be quite satisfactory; but, after waiting fourteen years in the vain hope of obtaining better material, I venture to publish it as a distinct species ..." (Tr. 1895).

Spencer then went north to Karamea where he gathered two further novelties. One of these was sent to J. B. Armstrong in Christchurch (with whom Jennings also corresponded) who described it as a new species and genus, *Siphonidium longiflorum* (Tr. 1881); and the other material was used by Kirk (7) when describing *Tillaea* (*Crassula*) *helmsii*.

In March, 1881, Spencer left for England, where he was curate at Bishop Auckland (1882) St. Stephens St., Lambeth (1883-84) ordained priest (1884) and married (1884) (1,4). He also visited Sir Joseph Hooker armed with a letter of introduction from Thomas Kirk. But he only recorded that they had a long talk about New Zealand and its flora; and that "there was a very good collection of New Zealand plants in the Kew Gardens doing very well in their new clime" (1).

Spencer's first parish on his return was Reefton (1885-86) followed by Spring Creek near Blenheim which he left in Sept. 1887, intending to work for the Church Missionary Society in Japan. But he was prevented from going there, and went to Rotorua in late 1887 where he became the first vicar of the new and far-flung parish of Rotorua in 1889 (3,4,6,8).

Here Spencer made two important collections of rare orchids shared with Australia. Of *Caleana* (*Paracaleana*) *minor* Kirk noted (Tr. 1892): "This remarkable plant was detected near Rotorua in 1890 by my friend the Rev. F. H. Spencer, who after protracted search succeeded in obtaining four or five specimens, which he generously presented to me. It is one of the most interesting additions to the New Zealand flora that have been made during recent years ...".

Kirk had also been shown a single flower of an unusual *Calochilus* from the Rotorua district and wrote: "but it was not until 1890 that I was able to obtain good specimens, through the kind exertions of my old friend the Rev. F. H. Spencer, who, although on the eve of leaving for England, gave himself considerable trouble in searching for the plant, and was rewarded with success. I am indebted solely to him for the opportunity of examining good specimens, which, although differing in one or two points from the Australian plant, must be identified with *C. campestris* R. Br." (Tr. 1892).

Spencer spent nine months in England in 1891, and after his resignation from Rotorua in March, 1895, became the New Zealand Agent for the British and Foreign Bible Society, living at 199 Victoria Street, Wanganui (9). This work entailed much travelling throughout New Zealand (as well as trips to England) and one notes that Spencer addressed the pupils of Waitaki B. H. S. on the work of the Society in the last term of 1906. H. H. Allan was not yet there, joining the staff in the second term of 1907 (10). Botany continued however, as shown by the following extract from one of Cheeseman's papers (Tr. 1908):

"I have also incorporated with the notes some observations of my own on certain plants noticed during three short visits to the elevated central plateau of the North Island in the years 1902, 1905, and in January, 1907. During this last visit I was accompanied by the Rev. F. H. Spencer and Mr. A. Allison, of Wanganui. We had hoped to spend a fortnight or three weeks in an exploration of the western flanks of Tongariro, Ngauruhoe, and Ruapehu. A very convenient camp was pitched on the saddle separating Ngauruhoe from Ruapehu, at an elevation of 3,800 ft., and from this as a base we had planned expeditions in all directions. But after three or four days' successful work the weather broke, and veritable torrents of rain fell, with snow on the higher levels. All communication with various parts of the district was cut off by floods of exceptional height; and we were reluctantly compelled to beat a retreat to the line of the Central Trunk Railway."

In about 1920 Spencer retired to Portland Road, Remuera, Auckland (9). On 29 Nov. 1923, an old friend Captain Gilbert Mair (*Utricularia mairii* - now included in *U. australis*) died at Tauranga, and Spencer preached at the funeral service in St. Faith's Church, Ohinemutu, Rotorua (11). About 1925 Spencer remarried, and on 21 August, 1932, he died in Auckland and was cremated at Waikumete (2).

At St. Faith's Church on 7 Feb. 1937 Bishop Bennett dedicated a window to commemorate the work of the Rev. S. M. Spencer of Te Wairoa, and said, "this window is unveiled to the memory of the Reverend Seymour Mills Spencer, the Rev. Frederick Hamilton Spencer and the members of the Maori race who assisted them in their ministrations" (11).

I am very grateful to Mr Anthony Wright and the Librarian, Auckland Institute and Museum for help with the Spencer reminiscences; and to Rev. Canon Gerald Hadlow for a copy of the centennial booklet of the Parish of Rotorua.

(1) F. H. Spencer: "Reminiscences of an old New Zealander" MS 285, Auckland Institute and Museum. (2) Registrar-General (3) Stafford, D. M. 1986: "The Founding Years in Rotorua" Ray Richards & Rotorua District Council (with portraits of S. M. Spencer and F. H. Spencer). (4) Clergy list to June 30, 1895 (Diocese of Waiapu) in Proceedings of the thirteenth General Synod of the Province of New Zealand, 1895. (5) Adams, N. M. 1972: James Adams, *Tuatara*. (6) Ault, H. F. 1958: "The Nelson Narrative", Diocese of Nelson. (7) Kirk, T. 1899: "Students' Flora of New Zealand". (8) "One hundred years: The Parish of Rotorua 1889-1989" (with portraits of S. M. Spencer and F. H. Spencer). (9) Wisers N. Z. Post Office Directory. (10) McDonald K. C. 1958: "The History of Waitaki Boys High School, 1883-1958" Whitcombe & Tombs. (11) Stafford, D. M. 1988: "The New Century in Rotorua". Ray Richards & Rotorua District Council.

**Eric Godley**, Research Associate, DSIR Land Resources, Private Bag, Christchurch

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## DESIDERATA

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### ■ *Gunnera* dried plants wanted

A British botanist is keen to obtain *Gunnera* plants for anatomical analysis. She requires about two plants (with roots/stolons and about six leaves) of as many New Zealand species as possible. Dried material can be sent to me for forwarding on.

**Brian Murray**, Botany Department, University of Auckland, Private Bag 92019, Auckland

### ■ Lobeliaceae, dried plants wanted

For my DNA-based study of the Lobeliaceae I am keen to receive material of New Zealand *Hypselia*, *Isotoma* and *Lobelia* spp. (except *L. anceps*).

I require 5 gms (fresh weight) of leaves and/or green stems. The material should be dried (avoid excessive heat). A single change of blotting paper is usually enough. Seeds are a desirable bonus for my living collection.

A voucher specimen needs to be included for each collection. If the voucher is to be deposited elsewhere, please send a copy of the label information and list of the recipient herbaria. Voucher specimens sent to me will be deposited in the University of Michigan herbarium (MICH).

**Eric Knox**, Department of Botany, Natural Sciences Building, University of Michigan, Ann Arbor, MI 48109-1048, U.S.A.

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## FORTHCOMING MEETINGS/CONFERENCES

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### ■ Southern Temperate Ecosystems: Origin and Diversification (a reminder) (Incorporating the second *Nothofagus* Symposium)

A new organisation, called "Southern Connection", was formed at a meeting held at Honolulu in May 1991 as part of the Pacific Science Congress. This "Southern Temperate Ecosystems" conference is a direct result of that meeting. It is anticipated that there will be a strong contingent of overseas scientists attending, particularly from South America and New Zealand. There are plans for pre- and post-congress field trips in Tasmania and New Zealand.

The conference, to be held at the University of Tasmania 18-23 January 1993, will incorporate the second *Nothofagus* Symposium (the first was held in Argentina in 1987), but there will be other sessions involving various aspects of southern temperate ecosystems, including systematics, biogeography, ecology and evolution.

The Ecological Society of Australia and the Palaeobotanical and Palynological Association of Australasia will also be associated with this conference, but full details are not yet available.

If you wish to receive further information regarding this conference, please write to:

**Dr Robert S. Hill**, Department of Plant Science, University of Tasmania, GPO Box 252C, Hobart, Tasmania, Australia 7001

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## THESES IN BOTANICAL SCIENCE

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### ■ University of Canterbury, Department of Plant and Microbial Sciences

Barracough, D.C. 1990: An investigation of epiphytic microorganisms on the Antarctic alga *Prasiola* (Chlorophyta, Ulvales). MSc.

Breitwieser, I. 1990: Leaf anatomy and chemotaxonomy in Gnaphaliinae (Inuleae-Compositae). PhD.

Calder, V.L. 1990: A translation strategy and gene map for pea seedborne mosaic virus. PhD.

- Clark, C.W. 1991: The amounts and decomposition of water soluble substances within various leaf litters. MSc.
- Condon, J.M. 1991: Aspects of comparative vegetative morphology as an aid to *Actinida* taxonomy. PhD.
- Corbett, G.E. 1991: Analysis of chitinase loci in *Serratia entomophila*, a pathogen of the New Zealand grass grub (*Costelytra zealandica* [white]). MSc.
- Daniel, I. 1990: Taxonomic investigation of elements from the early Cretaceous megaflora from the middle Clarence Valley, N.Z. PhD.
- Frampton, C.M. 1989: Multivariate numerical analyses of *Raoulia* subgenus *Raoulia*. PhD.
- Hay, J.M. 1990: Aspects of the molecular biology of potato virus Y. PhD.
- Innes, K.P.C. 1991: The response of native species to the 1988-89 drought, and a description of the vegetation in Ahuriri Valley Reserve. MSc.
- Lowe, E.S.H. 1990: *In vitro* manipulation of *Cucumis melo* L. MSc.
- Marshall, R.E. 1990: Interactions between *Phytophthora cinnamoni* and four *Camellia* species. MSc.
- McCallum, J.A. 1989: Biochemistry of phenolic compounds in wheat grains (*Triticum aestivum* L.). PhD.
- McCallum K. 1990: Seed biology of nodding thistle, and its interaction with biological control. MSc.
- Middleton, T.M. 1990: Wood structure and coatings an electron microscope study of *Dacrydium cupressinum*, *Podocarpus dacrydioides* and *Pinus radiata* weatherboard substrates. PhD.
- Nott, H.M. 1989: A study of "ginger-blotch" disease of mushrooms. MSc.
- O'Brien, I.E.W. 1990: A study of the incidence, pathogenicity virulence and potential biological control of the disease fireblight. MSc.
- Pangestu, E. 1990: *In vitro* responses of *Capsicum annum*. MSc.
- Rainey, P.B. 1990: The involvement of *Pseudomonas putida* in basidiome initiation of the cultivated mushroom *Agaricus bisporus*. PhD.
- Randall, P.M. 1990: Pollen dispersal across the Southern Alps, South Island, N.Z. MSc.
- Robertson, A. 1990: Evolution and pollination of New Zealand *Myosotis* (Boraginaceae). PhD.
- Roundhill, S.J. 1990: *Ascochyta* blight of lentil caused by *Ascochyta fabae* f. *lentis*. MSc.
- Sadler, T.J. 1991: *Serratia proteamaculans* pathogenesis of *Costelytra zealandica*. MSc.
- Smith, T. 1991: Molecular analysis of a locus involved in the production of chitinase in *Serratia entomophila*. MSc.
- Turnbull, M. 1991: Phenotypic variation in isolates of *Serratia entomophila* from the South Island and Chatham Islands of New Zealand. MSc.
- Williams, K.J. 1991: Chitinase induction in onion tissue cultures. MSc.
- Williams, L.St.C. 1989: A comparative ecology of two fern species, *Blechnum discolor* and *Polysticum vestitum*. MSc.
- Witty, M. 1990: Biologically active thaumatin is produced by transgenic *Solanum tuberosum*. MSc.
- Zyskowski, R.F. 1990: Allocations to reproductive structures in eleven New Zealand angiosperm species. MSc.

#### ■ University of Lincoln, Department of Plant Science

- Buick, R.D. 1991: Mode of action of organosilicone surfactants in enhancing the performance of triclopyr herbicide. PhD.
- Effendi, H. 1990: The effect of plant population and growth on the growth and yield of lentil (*Lens culinaris* Medik. cv. Olympic). M.Agr.Sc.
- Gebbru Hagos, J. 1990: Fodder productivity of tagasaste (*Chamaecytisus palmensis*). M.Agr.Sc.
- Gyamtscho, P. 1991: Performance of lucern-grass mixtures under different grazing durations and soil depths in a dryland environment. M.Agr. Sc.
- Rich, J.W. 1991: Management strategies for the riparian zones of the Manganuioteao River. M.Agr.Sc.
- Scott, J.T. 1991: Penman's yield response model and infrared thermometry for scheduling irrigation of semi-leafless peas and beans. M.Agr.Sc.
- Wangdi, K. 1991: Studies on the field establishment of Russell lupin (*Lupinus polyphyllus* x *L. arboreus*). M.Agr.Sc.

#### ■ University of Otago, Department of Botany

- Harris, N.S. 1991: Aspects of the ecology and distribution of hawkweeds (*Hieracium* spp.) in Central Otago, N.Z. BSc.Hons.

Moore, S. 1991: Germination requirements of four *Pittosporum* species. Dip.Sci.  
Smith, B. 1991: Effects of a man-made wind barrier on high alpine cushion vegetation in Central Otago, N.Z. Dip.Sci.

■ **University of Waikato, Department of Biological Sciences**

Gandell, M.E. 1990: A descriptive study of shoot vigour in *Vitis vinifera*. MSc.

Miller, S.T. 1990: Upper Waikato River: Benthic vegetation. MSc.

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## PUBLICATIONS

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■ **Tane**

Volume 33 of Tane, the Journal of the Auckland University Field Club was published in December 1991, and contains a variety of interesting articles including:

Kawerua lichens - a revision by B.W. Hayward & G.C. Hayward

Lichens from the Poor Knights Islands, northern New Zealand by B.W. Hayward & A.E. Wright

Descriptions of some mature kauri forests of New Zealand by M. Ahmed & J. Ogden

Flora & fauna of Plate (Motunau) Island, Bay of Plenty by G.A. Taylor

Flora & fauna of Motukaraka (Piercy Island), Cape Brett, northern New Zealand by E.K. Cameron & G.A. Taylor

The volume is available at the following prices:

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**The Editor**, Tane, C/- Botany Department, University of Auckland, Private Bag 92019, Auckland

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## LETTERS

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■ **Reply from the Minister of Science (DSIR) to the President's letter (published in Newsletter 26)**

Dear Dr Godley

20 December 1991

Thank you for your letter of 3 December regarding the recent announcements of surplus staffing positions within the Department of Scientific and Industrial Research and especially those in the botanical sciences area.

I am pleased that you have taken the time to write to me of your concerns on this issue. I am however concerned that your letter suggests a somewhat incomplete understanding of the process of science restructuring towards Crown Research Institutes. It is also of concern to me that you have linked this restructuring to the priority setting and funding process for government funded science.

DSIR is the government's principal technical advice agent. Along with the MAF Technology group, the New Zealand Meteorological Service, the Forest Research Institute and a handful of other Government owned agencies it is also, and primarily, responsible for providing science outputs, or affecting the product for the government's science dollar.

While the media has given extensive coverage to recent staff surplus announcements, and in particular that of Dr David Given, it has tended not to give the full background to these developments. For instance, the media has not made it clear that this Government has already committed itself to maintaining its science research investment at at least the current level for the next five years. In a time when we must exercise

extensive economic constraint, that is a major undertaking. You will also understand that this provides a high level of stability for New Zealand science, particularly when it is remembered that this funding is committed to "public good" strategic research. While the major proportion of Government research funding will go to CRI's, so maintaining our current Government research agency based science infrastructure, this funding will be provided through contracts to produce "public good" research objectives. If CRI's are to carry out "applied" work that is of direct benefit to industry users, they will have to be funded by industry itself for that.

Although it is regrettable that some of New Zealand's most competent scientists have lost their funding, it is very important that each provider works now to ensure the financial viability of Crown Research Institutes. CRI's will have their own legislation but will also be subject to the Company's Act. The government's investment in science which has been built up over many years is dependent on this process. DSIR and the other providers are working together to rationalise resources so that the priorities of government are catered for and the future needs of the nation's research and development effort are secured.

Crown Research Institutes will be able to be more flexible in their management of science funding because of two major innovations that this government has brought to the Public Good Science Fund. Firstly, a proportion of the Fund is being set aside for long term contracts of more than one year. There are two, three and five year contracts available. Secondly, 10% of the total Fund will be set aside for Crown Research Institutes for non-specific output funding. Non specific output funding will allow CRI's, with the agreement of the Foundation, to allocate money to projects which CRI's feel worthy of funding.

The result of these innovations is that DSIR, and from July 1992 CRI's, will be able to manage the change in priorities in a more flexible manner. However I must stress that these innovations are not designed to enable science providers to continue research on projects which are unlikely to receive future funding.

To ensure the best outcome it is inevitable that priorities will keep changing. So, for example, some areas of work get curtailed or reduced in scope, so that additional funding can be put into programmes that will have greater benefits or impact, by contributing more directly to new developments in industry and other fields.

Unfortunately, of course, that means that all research staff that are working in those areas which have reduced priority can no longer be funded by Government. The only alternatives are to find replacement funding from other sources.

I regret that some areas of research DSIR has traditionally undertaken have not been sufficiently funded to enable the Department to continue employing scientists to undertake them. On the other hand, DSIR simply does not have the capacity to keep on employing people, no matter how well known, if the priorities for funding have been re-allocated.

You commented on the government's commitment to "green policies". You will agree with me that the government invests a substantial amount of money into the natural environment. The Department of Conservation for instance has an advocacy role which actively promotes that protection of New Zealand's native flora and fauna. The Government's Taskforce Green initiative is a "green policy" which will become more prominent next year. Supporting these and other policies is the research into the natural environment to which DSIR contributes. Including geological structures, environmental protection, climate and atmosphere and marine and fresh water research some \$54.5 million dollars is allocated.

This is a time of fiscal constraint and there are many areas of research needing central government funding. It is a challenge to determine the priorities. I believe the infrastructure is guaranteed in the Crown Research Institute structure, and the allocative process is assured for maximum public good with the Ministry and Foundation for Research, Science and Technology.

Yours sincerely

Denis Marshall  
Minister of Science (DSIR)

■ **Reply from the Minister of Research, Science and Technology to the President's letter (published in Newsletter 26)**

Dear Dr Godley

29 January 1992

I am replying to your letter of 3rd December 1991 which draws my attention to scientist redundancies in the DSIR.

I cannot comment on specific decisions taken within the portfolio of another Minister, in this case the Minister for the DSIR, but I can provide some background information.

Total Government funding of science in New Zealand is very tight. It fell steadily during the 1980's; in the last Budget we arrested the decline, achieved a small increase, and guaranteed that the Public Good Science Fund would remain at least at current levels for five years forward. It seems likely that any significant increase will have to wait until we are in a more comfortable fiscal position.

Within that total funding level, the Government has been changing its science priorities, i.e. the proportional funding assigned to different areas of science. This is a process which seeks to align the pattern of Crown-funded research more closely with national needs. So far, funding changes have been very modest and funding for Botanical science has not been reduced. In fact, funding priorities for the 1991/92 financial year proposed an increase in the "Environmental Protection" output and no change to the "Land Use, Flora and Fauna" output.

As you know, Crown funding is now allocated on a contestable basis by the Foundation for Research, Science and Technology. Whether particular research programmes within outputs are funded is for the Foundation to decide. The Foundation tells me that the DSIR's overall share of funding has been static. Had DSIR wished to retain the services of particular scientists they had the opportunity to negotiate amendments to programmes with the Foundation. I am aware that because of recessionary economic conditions, DSIR has not been able to maintain its commercial revenues, and this may have contributed to staffing difficulties.

You refer to restructuring in Government science: presumably you mean the Government's programme for creating Crown Research Institutes from the science departments. I can assure you that science (and scientists) in New Zealand can only benefit from this change. The cost of these reforms will not be a charge on science funding.

You also assert that the science funding system has a short term funding base, and that DSIR has lost flexibility because of the Public Finance Act. In fact, the Foundation is able to commit funds to programmes for up to five years forward. There is no question that the combination of a guaranteed Public Good Science Fund, the relative independence of the Foundation and the CRI's, and the recently announced initiative to allocate non-specific output funding to CRI's is more conducive to research programme stability than the old system of annual appropriations.

You will already know that a process for examining long term science priorities has been set in train, and a major statement is to be issued by the Government in mid 1992. There will be ample opportunity for the relative importance of botanical and ecological science to be debated during this process.

I am personally committed to a healthy and growing science resource in New Zealand, because it is the key to national development. The whole process of funding and structural reform in science is directed to that end.

Yours sincerely

Simon Upton  
Minister of Research, Science  
and Technology

*Acknowledgements: Thanks to Antoinette Nielsen who typed the text and Jack Mackinder who produced camera-ready copy for the printer.*

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